IEG CONSULTANTS LTD.

Shell Canada Energy

Camp Farewell

Camp Farewell 2016 Remediation Program Report

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Inuvialuit Water Board
P.O. Box 2531
Inuvik NT
X0E 0T0

Mr. Bijaya Adhikari
Science and Regulatory Coordinator

Dear Mr. Adhikari:

Camp Farewell
2016 Remediation Program Report

On behalf of Shell Canada Energy, IEG Consultants Ltd. is pleased to submit the 2016 Camp Farewell Site Remediation Report to the Inuvialuit Water Board in accordance with the requirements of the current water licence N7L1-1834.

Please contact Nicole Wills (403-730-6809) with any questions or comments.

Yours truly,
IEG CONSULTANTS LTD.

Nicole Wills, P.Ag.
Project Manager

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Shell Canada Energy

Camp Farewell

Camp Farewell 2016 Remediation Program Report

EXECUTIVE SUMMARY

Shell Canada Energy (Shell) retained IEG Consultants Ltd (IEG) to conduct a Remediation Program at the Camp Farewell Lagoon located at 69°12'30.0" N and longitude 135°06'04.4" W in the Mackenzie Delta, approximately 125 km northwest of Inuvik and approximately 135 km west of Tuktoyaktuk, Northwest Territories. The field portion of the Remediation Program was conducted between July 12 and August 26, 2016.

The 2016 remediation program entailed the excavation, treatment, risk-based assessment, and backfilling of the impacted soil on-site. The conclusions and key findings of the 2016 remediation program are as follows:

- Soil was excavated from seven excavation zones and stockpiled on-site from July 13 to August 9, 2016. Excavated soil was placed into windrows established on the undisturbed area of the Site and treated with an Allu bucket;
- Treated soil was used to backfill successfully remediated areas. Due to the lack of sufficient treated soil some excavations or portions of excavations meeting GNWT guidelines or risk-based criteria were backfilled with untreated soil;
- A total of approximately 24,000 m^3 of soil was excavated from seven excavation zones. Approximately 10,000 m^3 was successfully treated on-site and used to fully backfill two excavations. Approximately 14,000 m^3 of soil did not meet the GNWT guidelines following soil treatment activities and was used to fully or partially backfill five excavations;
- Approximately 200 m^3 of soil was determined to be unsuitable for on-site treatment and was packaged into 1 m^3 soil bags for transport off-site via barge to an appropriate disposal facility; and
- Six excavation zones were successfully remediated and do not require further excavation. One zone requires additional excavation between 0.6 and 1.0 m bgs. Fifteen zones were not excavated during 2016 and require remediation during future programs at the Site.

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1 INTRODUCTION

Shell Canada Energy (Shell) retained IEG Consultants Ltd. (IEG) and Tervita Corporation (Tervita) to conduct a Remediation Program at Camp Farewell (the Site) located at latitude 69°12'30.0" N and longitude 135°06'04.4" W in the Mackenzie Delta, approximately 125 km northwest of Inuvik and approximately 135 km west of Tuktoyaktuk, Northwest Territories (Figure 1). This report details the activities and findings of the Remediation Program.

The 2016 Remediation Program entailed the excavation, treatment, risk-based assessment, and backfilling of the impacted soil on-site. Soil that was not successfully treated on-site was backfilled in impacted areas to be excavated and treated again at a later date. Soil that could not be treated within a feasible amount of time (as per the direction of Shell representatives) was packaged and removed from the Site via barge for transport to an appropriate facility. The field portion of the Remediation Program was conducted between July 12 and August 26, 2016.

2 SCOPE OF WORK

IEG conducted a Phase II Site Assessment at Camp Farewell (Site) in 2015, which identified soil impacts across the Site. The objective of the 2016 Remediation Program was to initiate the excavation and on-site treatment of impacted soil.

The scope of work for the 2016 Remediation Program was conducted by Tervita and IEG, and included the following:

- logistics management and permitting;
- dividing the main portion of the Site (excluding the airstrip) into a grid consisting of 22 zones. Excavating impacted soil in each zone to varying depths between 0.3 and 1.0 m below ground surface (bgs);
- conducting a risk assessment to evaluate impacted soils identified at depths greater than 1.0 m bgs;
- windrowing excavated soil and treating with an Allu bucket;
- excavating isolated areas with reported PHC fraction F3 and F4 exceedances and packaging soil for disposal off-site;
- conducting a risk assessment of soils at depths greater than 1.0 m;
- conducting a Global Positioning System (GPS) survey of the Site features and final excavation extents with a Trimble GPS unit;
- collecting confirmatory excavation soil samples prior to backfilling, and from windrows during treatment;
- backfilling of excavated areas; and
- preparation of a 2016 Remediation Program report.

IEG was responsible for conducting the following tasks within the overall scope of work:

- logistics management and permitting;
- supervising the excavation of impacted soil;
- risk assessment of impacted soil;
- collecting confirmatory excavation soil samples;
- collecting confirmatory windrow samples;
- collecting GPS coordinates of excavated areas;
- supervising the backfill of successfully treated soil into excavated areas; and,
- preparing the remediation program report.

3 SITE HISTORY

3.1 Site Construction History

Camp Farewell was constructed in the winter of 1970 and summer of 1971, and was operated as a staging and storage site in support of the Shell Mackenzie Delta Drilling Program. The Site consisted of a self-contained camp, providing electrical and heating services and facilities for accommodation, meals, fuel storage, equipment handling, water withdrawal and wastewater storage.

The Site was constructed on permafrost, and based on its history, the preservation of this layer was taken into account during construction. During construction, a layer of polyurethane (either 50 mm foam or pads) was installed, including 450 mm of compacted gravel, to act as a thermal barrier and prevent contamination of underlying soils and groundwater.

3.2 Spill History

Approximately 80,000 litres of water impacted with diesel fuel was released from the tank farm in 1981, according to a search of the Government of Northwest Territories (GNWT) Hazardous Spills Database. Investigation suggests the spill was a result of vandalism/theft that occurred in the winter of 1980 to 1981, resulting in the spring release, which was reported to authorities on May 24, 1981. Released fluids overtopped the berm and flowed with Site topography to the southwest, over the steep banks of the Site and onto the frozen Mackenzie River (WorleyParsons 2011).

Additional detail regarding the actual spill and clean-up efforts is provided in the Komex 2001 report titled "*Phase I and Phase II Environmental Site Assessment of the Shell Farewell Stockpile and Campsite*" (Komex 2001).

3.3 Previous Environmental Investigations

Multiple environmental investigation programs, remediation programs, and other investigations have been conducted at the Site since 2001. IEG has reviewed the available reports concerning these programs and have provided summaries of the programs (Appendix I).

- Komex (Komex International Ltd.), 2001. Phase I and Phase II Environmental Site Assessment of the Shell Farewell Stockpile and Campsite. Unpublished report prepared for: Shell Canada Limited, July, 2001. C52360000.
- WorleyParsons Komex, 2006. 2006 Environmental Site Assessment, Camp Farewell, NT. December, 2006.
- WorleyParsons, 2008. Interim Abandonment and Restoration Program, Camp Farewell, NT. Unpublished report prepared for Shell Canada Energy Limited, November, 2008. C52360500.
- WorleyParsons, 2010. 2009 Interim Abandonment and Restoration Program, Camp Farewell, NT. Unpublished report prepared for Shell Canada Energy Limited, April, 2010. C52360500.
- WorleyParsons, 2011. 2010 Interim Abandonment and Restoration Program, Camp Farewell, NT. Unpublished report prepared for Shell Canada Energy Limited, March, 2011. C52360500

- IEG (IEG Consultants Ltd.), 2010. 2009 Camp Farewell Hydrocarbon Impacted Soil Remediation Report. Prepared for: Shell Canada Energy. February 24th, 2010.
- IEG (IEG Consultants Ltd.), 2012. Summary of 2012 Camp Farewell Activities. Letter report prepared for: Shell Canada Energy and Canadian Wildlife Services in compliance with Kendall Island Bird Sanctuary Permit. December 13, 2012.
- IEG (IEG Consultants Ltd.), 2013b. 2012 Annual Report, Type "B" Water License #N7L1-1834. Prepared for: Shell Canada Energy and the Northwest Territories Water Board. March 28, 2013.
- IEG (IEG Consultants Ltd.), 2014. Camp Farewell Lagoon Remediation. April, 2014.
- IEG (IEG Consultants Ltd.), 2015. Environmental Supervision during 2014 Decommissioning Program – Amended. September 2015.
- IEG (IEG Consultants Ltd.), 2016a. Camp Farewell 2015 Decommissioning and Soil Assessment Program Report. April 2016.

3.4 Previous Environmental Studies

There have been no studies requested by the Inuvialuit Water Board that relate to waste disposal, water use, or reclamation. There are no future studies planned at this time.

4 PROGRAM LOGISTICS AND PERMITTING

As part of the scope of work, IEG and Shell conducted several tasks concerning logistics management and permitting for the 2016 Remediation Program. Each of these tasks is described in the following sections as per the requirements of the Inuvialuit Water Board.

4.1 Permitting and Licensing

IEG and Shell obtained permits and licenses prior to commencement of the Remediation Program. The following sections provide information on each permit or license. Copies of permits and licenses are provided in Appendix II.

4.1.1 Environmental Impact Screening Committee

IEG prepared a Project Description (IEG, 2016a) for the remediation activities at the Site. The Project Description was sent to the Environmental Impact Screening Committee (EISC), the Aklavik Hunters and Trappers Committee (AHTC), the Inuvik Hunters and Trappers Committee (IHTC) and the Tuktoyaktuk Hunters and Trappers Committee (THTC) on April 21, 2016. Three agencies responded with comments and/or approval to proceed. Permission to proceed with the Remediation Program was obtained by the EISC.

4.1.2 Water Use

Shell applied for a Type B Water License (N7L1-1834) through the Northwest Territories Water Board (NWTWB) on February 28, 2012. The application was to withdraw up to 150 m^3 per day from the McKenzie River to construct an ice road should remedial activities occur during the winter months and to withdraw up to 50 m^3 for operation of the on-site camp. Water License N7L1-1834 was granted on July 18, 2012 for the withdrawal of 150 m^3 per day for industrial undertakings and associated uses. The permit expires in July 18, 2017.

4.1.3 Canadian Wildlife Service Migratory Birds Sanctuary Permit

A Canadian Wildlife Services (CWS) permit (Migratory Birds Sanctuary Permit) is renewed for the Site each year. The applicable CWS permit (NWT-MBS-16-01) during the Camp Farewell Remediation Program was issued on February 17, 2016 and expired on December 31, 2016.

5 REMEDIATION PROGRAM METHODOLOGY

During the 2016 Remediation Program, Tervita was the prime contractor on-site managing and directing Site activities, as well as coordinating logistical and safety aspects. Tervita contracted Mackenzie Delta Integrated Oilfield Services (MDIOS) to provide personnel for the remediation activities. IEG provided environmental supervision and collected soil samples from excavations and windrows of treated soil. IEG contracted GatePost Risk Analysis (GPRA) to complete the risk assessment of selected soil impacts.

The following sections describe remediation activities conducted by Tervita, MDIOS, IEG, and GPRA. Site photographs are provided in Appendix III. A site plan is shown on Figure 2.

5.1 Camp Mobilization/Demobilization

A barge camp was mobilized to the Site from Inuvik on July 10, 2016 via the Mackenzie River. Mobilization of the barge to Site took approximately 24 hours (Appendix III, Photo 1). The barge was anchored to bollards in the boat docking area at the Site (Figure 2). The barge comprises three levels, consisting of a kitchen and dining unit, a common lounge area, sleeping accommodations, shop space, office space, a heli-pad, and heavy machinery. A fuel spill kit, generators, and a wastewater tank were also contained on the barge. Wastewater from the barge was disposed of in Inuvik. The barge was operated and maintained by a barge master for the duration of Site activities. On August 27, 2016 the barge was demobilized from the Site via the Mackenzie River.

5.2 Excavations and Soil Windrows

Soil was excavated from Zones 2, 3, 4, 10, 11, 13, and 14 and stockpiled on-site from July 13 to August 9, 2016. Prior to the excavating, the corner of each zone was located using a handheld GPS and marked with a stake. Excavation activities were started in the northwest section of the Site so that the remainder of the Site could be used for stockpiling, placement of windrows, and soil treatment (Appendix III, photo 2). The depth of the excavation in each zone was based on the location of impacted soil identified during the Phase II ESA preformed in 2015 (IEG 2016b). The excavation zones are shown on Figure 3. Details regarding the excavation in each zone are provided in Section 7.

Excavated soil was placed into one of 19 windrows established on the undisturbed area of the Site from July 13 to August 9, 2016. The windrowed soil was treated with an Allu bucket provided by MDIOS from July 16 to August 22, 2016 (Appendix III, photo 3). Windrow soil samples were collected following the first treatment to characterize remaining impacts or to confirm remediation success.

5.3 Soil Sampling

A total of 81 discrete confirmatory soil samples were collected from the excavation bases within each excavation area during the remediation program. The samples were collected in order to confirm remediation success at excavation walls and bases. Soil samples were collected on an approximately 20 m by 20 m grid from each of the excavations and submitted for analysis of BTEX and PHC fractions F1 to F4 concentrations. A total of 172 composite soil samples were collected from the windrows

during the remediation program. Windrow samples were also analyzed for BTEX and PHC fractions F1 to F4 concentrations.

Excavation and windrow soil samples collected were placed directly into sterile plastic bags and glass containers equipped with Teflon-lined lids. Field screening involved measuring the organic vapor concentration in the headspace of sample bags using a RKI Eagle portable gas detector. Field screening results are provided in Table 1.

Standard chain-of-custody protocol was followed for collected samples. Soil samples were stored in sealed coolers with frozen ice packs prior to being submitted to AGAT Laboratories (AGAT) in Edmonton, Alberta. AGAT is accredited by the Canadian Associations for Environmental Analytical Laboratories for the analyses performed.

During the course of the remediation program at Camp Farewell, the coordinates of each excavation soil sample location were measured using a Trimble GPS. The equipment used provides real time measurement of position and elevation with a positional accuracy of less than 1 m (generally less than 0.5 m) and less than 2 m in elevation. The coordinates were recorded in UTM NAD 83 (zone 8N).

5.4 Backfilling

Under the direction of Tervita, from August 16 to August 25, 2016 MDIOS hauled soil from the windrows of treated soil (confirmed as meeting the GNWT guidelines) and used it as backfill in excavations where analytical results confirmed all impacted soil had been successfully removed, or where impacted soil met risk-based criteria. Windrowed soil that was not fully treated was used as backfill in excavations where impacted soil was not completely removed. Due to the lack of available successfully treated soil, some excavations or portions of excavations meeting GNWT guidelines or risk-based criteria were backfilled with unsuccessfully treated windrowed soil that will be removed and further treated during future site activities.

The backfill was placed in 0.3 m lifts and slightly mounded with additional fill to allow for settlement (Appendix III, photograph 4). Following backfilling, the boundaries of impacted excavation zones and those zones backfilled with untreated soil were located via GPS so that the soil can be re-excavated for further treatment and clean excavation limits can be established.

5.5 Waste Disposal

Soil from portions of the Zone 3 and 4 excavations that could not be treated on-site within a feasible amount of time as determined by Shell was packed into soil bags provided by Tervita. Each soil bag contained approximately 1 m^3 of impacted soil. Soils bags were packed carefully using the backhoe bucket and placed in the on-site staging area, located east of the shops (Appendix III, photograph 5).

On August 25, 2016, barges were loaded with the soil bags for transport to Hay River. From Hay River the soil bags and crates were transferred to trucks and further transported to the Tervita Rainbow Lake Landfill (approximately 2,800 km from Camp Farewell). Approximately 200 m^3 of material was disposed in the landfill in 2016. An additional approximately 100 m^3 of potentially untreatable soil remains to be excavated during future remedial activities and shipped to the landfill.

Domestic waste and waste water generated at the barge camp was contained in garbage bins and a waste water holding tank, and disposed at an approved facility by the barge operator.

There were no spills or unauthorized discharges during the 2016 remediation program. An overview of appropriate spill response actions and communications was reviewed at morning tail gate meetings. An Emergency Response Plan which includes the Spill Contingency Plan is provided in Appendix IV.

5.6 Risk Assessment

Risk assessment is a remediation strategy implemented at appropriate sites as an alternative to physical remediation. Risk assessment directly evaluates whether impacted materials *in situ* pose a risk to existing receptors in a given environment. The objective of the risk assessment conducted by GPRA at the Camp Farewell site was to determine via risk-based criteria whether identified soil impacts at depths greater than 1.0 m bgs could be left in place rather than excavated and treated to meet GNWT guidelines. GPRA conducted a qualitative, screening level risk assessment that focused on receptor identification and site-appropriate exposure pathway elimination. The site characteristics of Camp Farewell were evaluated against existing guidelines using a risk assessment approach, and protective contaminant concentration limits were applied from existing sources that were most appropriate for the site (GPRA 2017). The GPRA risk assessment is provided in Appendix V.

5.7 Quality Assurance and Quality Control

Quality assurance and quality control measures were implemented while collecting, storing, shipping, and analyzing the samples collected during this investigation, including:

- donning new nitrile and/or latex gloves prior to the collection of each sample and/or subsequent to contact with soil while sampling;
- using both GPS and field measurements to record the sample locations;
- cleaning and decontaminating any sampling tools and/or equipment prior to collecting each sample and/or subsequent to contact with soil while sampling;
- labelling samples with a unique identifier;
- storing samples in clean and appropriate laboratory supplied sample jars;
- storing samples in ice packed coolers where appropriate to maintain samples near the recommended 4°C temperature; and,
- shipping samples to an accredited laboratory for analyses following standard chain-of-custody protocol.

The quality assurance and quality control (QA/QC) protocols are provided in Appendix VI.

6 REGULATORY FRAMEWORK

The guidelines for organic and inorganic parameters in soil, sediment and water are provided by the Canadian Council of Ministers of the Environment (CCME), *Canadian Environmental Quality Guidelines* (CEQG), 1999 (with updates). The CCME CEQG provides guidelines for four primary land uses; "Agricultural", "Residential/Parkland", "Commercial", and "Industrial", and two soil types; "Fine" and "Coarse" grained soil, defined as having a median grain size of <75 μm or >75 μm, respectively.

Guidelines for salinity, trace metals, PHC, and PAH parameters in soil are provided by the CCME *Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil* (2001) as well as by the GNWT, *Environmental Guideline for Affected Site Remediation*, November 2003. The GNWT Contaminated Site Remediation (CSR) guidelines defines the same land uses and soil textures as CCME CEQG. The GNWT CSR further identifies guidelines for surface soil (0 m to 1.5 m depth) and subsoil (>1.5 m), and site-specific pathways that apply to soil, including "soil ingestion", "nutrient cycling", and "ecological soil contact", among others.

The following information was used to determine the applicable assessment guidelines and exposure pathways for soil at the Site:

- the southern and western edges of the Site are adjacent to the Middle Channel of the Mackenzie River;
- the surface water bodies are capable of sustaining aquatic life;
- there are no domestic water wells on, or within a 1 km radius of the Site;
- soils at the Site consist of a very thin organic layer overlying a coarse-grained, sandy layer;
- the maximum depth of investigation was approximately 7.5 m bgs; and,
- current and likely future land uses for the Site and surrounding properties are "Residential/Parkland", by GNWT Guidelines.

Based on the current land use definitions, the Parkland guidelines are the most applicable for the Site at this time.

6.1 Soil Quality

Based on the land use of the Site and the surrounding properties, benzene, toluene, ethylbenzene, and xylenes (BTEX) in soil were compared to the coarse-textured soil guidelines found in the GNWT *Environmental Guideline for Affected Site Remediation* (November 2003), where applicable.

The analytical results for PHC fractions F1 (C_6-C_{10}), F2 (C_{10}-C_{16}), F3 (C_{16}-C_{34}) and F4 (C_{34}-C_{50}) were compared to the GNWT guidelines for coarse-textured subsoil (greater than 1.5 m). The limiting exposure pathway is "ecological soil contact". The "protection of potable groundwater" pathway is excluded based on the depth of permafrost in the region.

7 REMEDIATION PROGRAM RESULTS

7.1 Risk Assessment Results

The screening level risk assessment of soils for the Camp Farewell site was conducted by GPRA in January 2017. The majority of GNWT guidelines are based on exposure pathways protecting groundwater for drinking water or for freshwater aquatic life. The risk assessment resulted in elimination of the following exposure pathways: groundwater to drinking water; groundwater to freshwater aquatic life; direct soil contact or ingestion; and indoor vapour transport. These pathways were eliminated based on the shallow soil active zone where any groundwater would freeze annually, the permafrost barrier near 1.5 m, the distance to surface water bodies, and the remediation of surface soil (above 1.0 m bgs) to GNWT guidelines. For PHCs in the subsoil, the remaining potential exposure pathway was identified as ecological direct contact (GPRA 2017).

The risk assessment determined that leaving impacted soil in place at depths greater than 1.0 m bgs will result in very low risks of PHCs concentrations causing adverse effects for any ecological receptors via the direct contact pathway (GPRA 2017). Therefore, impacted soil at depths greater than 1.0 m bgs could be left in place in all excavation zones across the Site. As a further assurance, concentrations of PHC constituents in confirmatory soil samples were also compared with the PHC parameter concentrations used to complete the risk assessment to confirm that soil concentrations in excavated areas were within the assumptions of the risk assessment.

7.2 Windrow Soil Sample Results

Composite soil samples were collected from the 19 windrows of treated soil on-site between July 19 and August 18, 2017. Windrow soil analytical results are summarized in Table 2 and laboratory analytical reports are attached in Appendix VII.

Composite samples from windrows 1 to 5, 16, 17, and 18 contained concentrations of PHCs that were less than the GNWT guidelines and soil from these windrows was used to backfill all or part of the excavations in Zones 2, 10, 11, 13, and 14. Soil samples from the remaining 11 windrows contained concentrations of toluene, F2 and/or F3 that exceeded the GNWT guidelines. Soil from these 11 windrows was used to backfill excavations in Zone 3 and Zone 4, and portions of the Zone 10, 13, and 14 excavations. This soil will be excavated and further treated during future Site work.

7.3 Confirmatory Soil Sample Results

Seven zones were excavated during the 2016 remediation program. Confirmatory excavation limit samples were collected once the excavations had been expanded laterally and vertically to anticipated clean limits or to a depth of 1.0 m (Figure 3). Excavation soil sample results exceeding the GNWT guidelines and collected from depths of 1.0 m or greater were evaluated via the established risk assessment criteria. Detailed excavation and soil sampling results from each zone are provided in the following sections.

Confirmatory soil analytical results are summarized in Table 1 and laboratory analytical reports are attached in Appendix VI. Locations of all confirmatory excavation sample points are shown on Figure 4, along with the boundaries of each excavation and the composition of backfill material.

7.3.1 Zone 2 Excavation

Remedial excavation activities in Zone 2 were conducted from July 14, 2016 to July 21, 2016. The excavation was located in the northwest corner of the Site and measured approximately 75 m by 75 m. The maximum depth of the excavation was 1.0 m bgs.

A total of 17 soil samples, including one duplicate sample, were taken from the base of the Zone 2 excavation. Concentrations of toluene, xylenes, and hydrocarbon fractions F2 and F3 that exceeded the GNWT guidelines were detected in five Zone 2 excavation base samples. Confirmatory sample exceedances in Zone 2 are summarized in Table 7-1.

Table 7-1 Confirmatory Sample Exceedances – Zone 2

Sample Location	Parameters Exceeding GNWT Guidelines
GS16-002	Toluene, F3
GS16-006	F3
GS16-007	F2, F3
GS16-008	Toluene
GS16-016	Xylenes, F2, F3

Each of the five locations of PHCs exceedances in Zone 2 were evaluated according to the risk-based criteria. The sample results met the criteria to remain in place, and no further excavation is required in Zone 2. The Zone 2 excavation was fully backfilled with successfully treated windrowed soil.

7.3.2 Zone 3 Excavation

Remedial excavation activities in Zone 3 were conducted from July 21, 2016 to August 10, 2016. The excavation was located along the northern boundary of the Site. The dimensions of the excavation were approximately 85 m by 85 m. The maximum depth of the excavation was 1.0 m bgs.

A total of 16 confirmatory samples, including 1 duplicate sample, were taken from the base of the Zone 3 excavation. Concentrations of toluene, xylenes, and hydrocarbon fractions F2 and F3 that exceeded the GNWT guidelines were detected in nine of the Zone 3 excavation base samples. Confirmatory sample exceedances in Zone 3 are summarized in Table 7-2.

Table 7-2 Confirmatory Sample Exceedances – Zone 3

Sample Location	Parameters Exceeding GNWT Guidelines
GS16-110	Toluene
GS16-111	Toluene, Xylenes, F2, F3
GS16-112	F3
GS16-115	Toluene, F2, F3
GS16-116	Toluene, Xylenes, F2, F3
GS16-117	F3
GS16-118	Toluene, F2, F3

Sample Location	Parameters Exceeding GNWT Guidelines
GS16-119	Toluene, F2, F3
GS16-120	Toluene, Xylenes, F2, F3

Each of the nine locations of PHCs exceedances in Zone 3 were evaluated according to the risk-based criteria. The sample results met the criteria to remain in place, and no further excavation is required in Zone 3. The Zone 3 excavation was backfilled with impacted windrowed soil.

7.3.3 Zone 4 Excavation

Remedial excavation activities in Zone 4 were conducted from July 21, 2016 to August 2, 2016. The excavation was located along the north boundary of the Site. The dimensions of the excavation were approximately 40 m by 75 m. The maximum depth of the excavation was approximately 0.6 m bgs.

A total of eight soil samples were taken from the Zone 4 excavation. Concentrations of toluene, xylenes, and hydrocarbon fractions F1, F2 and F3 that exceeded the GNWT guidelines were detected each of the Zone 4 excavation base samples. Confirmatory sample exceedances in Zone 4 are summarized in Table 7-3.

Table 7-3 Confirmatory Sample Exceedances – Zone 4

Sample Location	Parameters Exceeding GNWT Guidelines
GS16-121	Xylenes, F1, F2, F3
GS16-122	F2, F3
GS16-123	F2
GS16-124	Xylenes, F3
GS16-125	Xylenes, F1, F2
GS16-126	Toluene, Xylenes, F1, F2
GS16-127	Toluene, Xylenes, F1, F2
GS16-128	Toluene, Xylenes, F2, F3

Because the eight locations of PHCs exceedances in Zone 4 were at depths less than 1.0 m bgs, they were not evaluated according to the risk-based criteria. Further excavation of impacted soil is required in Zone 4, and the Zone 4 excavation was backfilled with impacted windrowed soil.

7.3.4 Zone 10 Excavation

Remedial excavation activities in Zone 10 were conducted from July 21, 2016 to August 10, 2016. The excavation was located in the center of the Site. The dimensions of the excavation were approximately 25 m by 75 m. The maximum depth of the excavation was approximately 1.0 m bgs.

A total of 12 soil samples, including one duplicate, were taken from the Zone 10 excavation. Each of the soil samples collected from the base of the Zone 10 excavation contained PHC concentrations that were less than the GNWT guidelines, and no further excavation is required in Zone 10. The majority of the Zone 10 excavation was backfilled with successfully treated windrowed soil, while an area along the northern boundary of the excavation was backfilled with impacted windrowed soil.

7.3.5 Zone 11 Excavation

Remedial excavation activities in Zone 11 were conducted from July 14, 2016 to July 21, 2016. The excavation was located along the western boundary of the Site. The dimensions of the excavation were approximately 75 m by 75 m. The maximum depth of the excavation was approximately 1.0 m bgs.

A total of 16 soil samples, including two duplicates, were taken from the Zone 11 excavation. Confirmatory sample GS16-017 (1.0 m bgs) contained toluene that exceeded the GNWT guideline. This sample was evaluated according to the risk-based criteria. The sample results met the criteria to remain in place, and no further excavation is required in Zone 11. The Zone 11 excavation was fully backfilled with successfully treated windrowed soil. The boundaries of the Zone 11 excavation and the location of backfill material are shown on Figure 4.

7.3.6 Zone 13 Excavation

Remedial excavation activities in Zone 13 were conducted from July 21, 2016 to August 2, 2016. The excavation was located on the southwest zone of the Site. The dimensions of the excavation were approximately 75 m by 60 m. The maximum depth of the excavation was approximately 0.6 m bgs.

A total of 8 soil samples were taken from the base of the Zone 13 excavation. Each of the soil samples collected from the Zone 13 excavation contained PHC concentrations that were less than the GNWT guidelines, and no further excavation is required in Zone 13. The majority of the Zone 13 excavation was backfilled with successfully treated windrowed soil, while an area along the southern boundary of the excavation was backfilled with impacted windrowed soil.

7.3.7 Zone 14 Excavation

Remedial excavation activities in Zone 14 were conducted from July 21, 2016 to August 2, 2016. The excavation was located on the southwest zone of the Site. The dimensions of the excavation were approximately 20 m by 60 m. The maximum depth of the excavation was approximately 0.6 m bgs.

A total of 10 soil samples, including one duplicate, were taken from the Zone 14 excavation. Each of the soil samples collected from the base of the Zone 14 excavation contained PHC concentrations that were less than the GNWT guidelines, and no further excavation is required in Zone 14. The majority of the Zone 14 excavation was backfilled with successfully treated windrowed soil, while an area along the southern boundary of the excavation was backfilled with impacted windrowed soil.

7.4 Soil Volumes and Remediation Summary

A total of approximately 24,000 m^3 of soil was excavated from seven excavation zones during the 2016 Remediation Program. Approximately 10,000 m^3 was successfully treated on-site and used to fully backfill two excavations. Approximately 14,000 m^3 of soil did not meet the GNWT guidelines following soil treatment activities and was used to fully or partially backfill five excavations. This volume of soil requires additional on-site treatment during the 2017 remediation program.

Approximately 200 m^3 of soil was determined to be unsuitable for on-site treatment and was packaged into 1 m^3 soil bags for transport off-site via barge to an appropriate disposal facility.

Based on the results of confirmatory sampling, six excavation zones were successfully remediated during the 2016 program and do not require further excavation, other than removal of impacted windrowed soil for additional treatment. One zone requires additional excavation between 0.6 and 1.0 m bgs. Fifteen zones were not excavated during 2016 and require remediation during future programs at the Site.

7.5 Quality Assurance and Quality Control

For quality assurance purposes 24 replicate samples were collected for analysis of petroleum hydrocarbon parameters. The samples were submitted to the laboratory as blind replicates.

The laboratory results for the replicate and original samples were compared and evaluated for quality on the basis of either relative percent difference (RPD) or absolute difference (AD). Three parameters (F2 to F4) were identified above the Zeiner (1994) criteria in the QA/QC review for results received under AGAT work orders 16E117223, 16E119478, 16E123918, 16E126254, 16E128870, and 16E131607 and are considered estimates only. The remainder of the analytical program is considered to be precise.

The quality assurance and quality control (QA/QC) program included laboratory QA/QC protocols which are provided in Appendix V. QA/QC results are presented in Table 3. Laboratory quality assurance reports and analytical methods are presented in Appendix VI.

8 CONCLUSIONS

Shell retained IEG and Tervita to conduct the remediation program at the Site in July and August 2016. The 2016 remediation program entailed the excavation, treatment, risk-based assessment, and backfilling of the impacted soil on-site. The conclusions and key findings of the 2016 remediation program are as follows:

- Soil was excavated from seven excavation zones and stockpiled on-site from July 13 to August 9, 2016. Excavated soil was placed into windrows established on the undisturbed area of the Site and treated with an Allu bucket;
- Treated soil was used to backfill successfully remediated areas. Due to the lack of sufficient treated soil, some excavations or portions of excavations meeting GNWT guidelines or risk-based criteria were backfilled with unsuccessfully treated windrowed soil;
- A total of approximately 24,000 m^3 of soil was excavated from seven excavation zones. Approximately 10,000 m^3 was successfully treated on-site and used to fully backfill two excavations. Approximately 14,000 m^3 of soil did not meet the GNWT guidelines following soil treatment activities and was used to fully or partially backfill five excavations;
- Approximately 200 m^3 of soil was determined to be unsuitable for on-site treatment and was packaged into 1 m^3 soil bags for transport off-site via barge to an appropriate disposal facility; and
- Six excavation zones were successfully remediated and do not require further excavation other than removal and further treatment of impacted windrowed soil. One zone requires additional excavation between 0.6 and 1.0 m bgs. Fifteen zones were not excavated during 2016 and require remediation during future programs at the Site.

9 CLARIFICATIONS OF THIS REPORT

This report was prepared by IEG Consultants Ltd. for the account of Shell Canada Energy. The material in it reflects IEG's best judgment in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. IEG Consultants Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

The report's findings are based on conditions that existed at the time of IEG Consultants Ltd.'s site visit and should not be relied upon to precisely represent conditions at any other time. The conclusions in the report are based on IEG Consultant Ltd.'s observation of existing site conditions and on limited soil sampling and chemical testing. The concentrations of contaminants measured may not be representative of conditions between locations sampled. Be aware that conditions may change with time. Conclusions about site conditions under no circumstances comprise a warranty that conditions in all areas within the site and beneath structures are of the same quality as those sampled. Note also that changes in environmental regulations and interpretations may occur at any time and such changes could affect the extent of remediation required. Any additional information about the site that becomes available should be provided to IEG Consultants Ltd. for review and modification of its recommendations as necessary.

This report is an instrument of service of IEG Consultants Ltd. The report has been prepared for the exclusive use of Shell Canada Energy (Shell) for the specific application to the Camp Farewell Remediation Program. The report's contents may not be relied upon by any party other than Shell without the express written permission of IEG Consultants Ltd. In this report, IEG Consultants Ltd. has endeavoured to comply with generally-accepted professional practice common to the local area. IEG Consultants Ltd. makes no warranty, express or implied.

10 CLOSING

If you have any questions or comments regarding the above information, please contact the undersigned in our Calgary office at (403) 730-6809.

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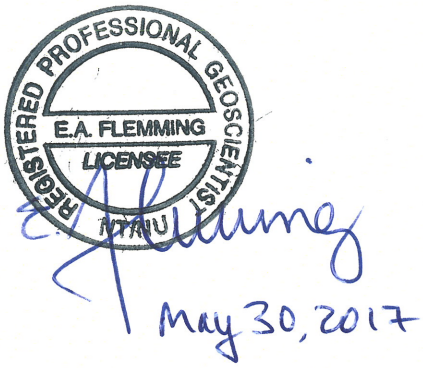

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Senior Environmental Scientist

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TABLES

Table 1: Confirmatory Soil Sample Analytical Results for Petroleum Hydrocarbons

GENERAL												
Location	Sample Designation	**Sample Depth** (m bgs)	**Sample Date** (yyyy-mm-dd)	OVA (Field Screening)	Benzene	Toluene	Ethylbenzene	Xylenes	F1	F2	F3	F4
			Units		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
GUIDELINES												
GNWT 2003 Residential/Parkland		Surface (0-1.5 m bgs)			**0.5**	**0.8**	**1.2**	**1**	**130**	**150**	**400**	**2800**
Excavation Zone												
Zone 2	GS16-001	1.0 m bgs	2016-07-19	10	<0.005	0.62	<0.01	<0.05	<10	<10	16	10
	GS16-002	1.0 m bgs	2016-07-19	150	<0.005	5.03	<0.01	<0.05	<10	<10	450	205
	GS16-003	1.0 m bgs	2016-07-19	10	<0.005	0.28	<0.01	<0.05	<10	<10	27	12
	GS16-004	1.0 m bgs	2016-07-19	5	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10
	GS16-005	1.0 m bgs	2016-07-19	5	<0.005	0.31	<0.01	<0.05	<10	<10	34	14
	GS16-006	1.0 m bgs	2016-07-19	120	<0.005	<0.05	<0.01	<0.05	<10	<10	426	159
	GS16-007	1.0 m bgs	2016-07-19	430	<0.005	0.32	<0.01	<0.05	<10	769	729	73
	GS16-008	1.0 m bgs	2016-07-19	35	<0.005	1.33	<0.01	<0.05	<10	13	81	29
	GS16-009	1.0 m bgs	2016-07-19	10	<0.005	0.19	<0.01	<0.05	<10	<10	11	<10
	GS16-010	1.0 m bgs	2016-07-19	5	<0.005	0.27	<0.01	<0.05	<10	<10	14	<10
	GS16-011	1.0 m bgs	2016-07-19	5	<0.005	0.14	<0.01	<0.05	<10	<10	25	18
	Dup 1	1.0 m bgs	2016-07-19	10	<0.005	0.18	0.02	0.15	<10	14	77	18
	GS16-012	1.0 m bgs	2016-07-19	5	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10
	GS16-013	1.0 m bgs	2016-07-19	5	<0.005	<0.05	<0.01	<0.05	<10	<10	11	<10
	GS16-014	1.0 m bgs	2016-07-19	5	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10
	GS16-015	1.0 m bgs	2016-07-19	5	<0.005	<0.05	<0.01	<0.05	<10	<10	20	10
	GS16-016	1.0 m bgs	2016-07-19	870	<0.005	<0.05	0.39	1.89	98	3060	2130	22
Zone 3	GS16-106	0.6 m bgs	2016-08-04	10	<0.005	0.78	<0.01	<0.05	<10	<10	95	35
	GS16-107	0.6 m bgs	2016-08-04	10	<0.005	0.20	<0.01	<0.05	<10	94	115	45
	GS16-108	0.6 m bgs	2016-08-04	10	<0.005	<0.05	<0.01	<0.05	<10	46	321	33
	GS16-109	1.0 m bgs	2016-08-09	15	<0.005	0.66	<0.01	<0.05	<10	103	929	452
	DUP - 10	1.0 m bgs	2016-08-09	50	<0.005	0.08	<0.01	<0.05	<10	335	523	63
	GS16-110	1.0 m bgs	2016-08-09	180	<0.005	6.82	<0.01	0.15	<10	112	2710	1310
	GS16-111	1.0 m bgs	2016-08-09	780	<0.005	2.51	0.96	4.15	22	2400	3000	580
	GS16-112	1.0 m bgs	2016-08-09	110	<0.005	0.12	<0.01	<0.05	<10	55	492	280
	GS16-113	1.0 m bgs	2016-08-09	10	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	40
	GS16-114	1.0 m bgs	2016-08-09	15	<0.005	0.06	<0.01	<0.05	<10	32	59	70
	GS16-115	1.0 m bgs	2016-08-09	240	<0.005	1.04	0.15	0.69	21	881	1350	469
	GS16-116	1.0 m bgs	2016-08-09	210	0.444	5.26	1.11	6.22	73	621	1190	538
	GS16-117	1.0 m bgs	2016-08-09	70	<0.005	0.18	<0.01	<0.05	<10	108	2350	<10
	GS16-118	1.0 m bgs	2016-08-09	80	<0.005	1.49	<0.01	<0.05	<10	155	783	401
	GS16-119	1.0 m bgs	2016-08-09	200	<0.005	2.02	<0.01	<0.05	<10	226	1260	664
	GS16-120	1.0 m bgs	2016-08-09	90	0.471	2.36	0.56	2.51	11	242	550	176
Zone 4	GS16-121	0.6 m bgs	2016-08-04	580	<0.005	<0.05	0.08	1.31	160	2110	890	<10
	GS16-122	0.6 m bgs	2016-08-04	240	0.021	<0.05	0.12	0.71	<10	164	496	208
	GS16-123	0.6 m bgs	2016-08-04	80	0.023	<0.05	0.02	<0.05	10	157	185	84
	GS16-124	0.6 m bgs	2016-08-04	65	0.015	0.13	0.21	1.29	110	890	242	17
	GS16-125	0.6 m bgs	2016-08-04	670	0.015	0.48	0.21	2.33	220	1700	146	38
	GS16-126	0.6 m bgs	2016-08-04	1300	0.405	20.2	6.16	46.3	1920	10400	955	152
	GS16-127	0.6 m bgs	2016-08-04	410	0.073	1.86	0.42	3.92	470	2670	950	260
	GS16-128	0.6 m bgs	2016-08-04	205	0.207	3.75	0.57	4.09	120	682	1020	467
Zone 10	GS16-095	0.6 m bgs	2016-08-04	10	<0.005	0.23	<0.01	<0.05	<10	<10	239	63
	GS16-096	0.6 m bgs	2016-08-04	5	<0.005	<0.05	<0.01	<0.05	<10	<10	61	29
	GS16-097	0.6 m bgs	2016-08-04	40	<0.005	<0.05	<0.01	<0.05	<10	<10	49	25
	GS16-098	0.6 m bgs	2016-08-04	35	<0.005	0.25	<0.01	<0.05	<10	<10	247	92
	DUP - 9	0.6 m bgs	2016-08-04	60	<0.005	0.24	<0.01	<0.05	<10	<10	774	525
	GS16-099	0.6 m bgs	2016-08-04	40	<0.005	<0.05	<0.01	<0.05	<10	<10	91	45
	GS16-100	0.6 m bgs	2016-08-04	10	<0.005	0.10	<0.01	<0.05	<10	<10	61	23
	GS16-101	0.6 m bgs	2016-08-04	25	<0.005	0.42	<0.01	<0.05	<10	<10	255	105
	GS16-102	0.6 m bgs	2016-08-04	35	<0.005	0.11	<0.01	<0.05	<10	<10	277	141
	GS16-103	0.6 m bgs	2016-08-04	10	<0.005	<0.05	<0.01	<0.05	<10	<10	78	37
	GS16-104	0.6 m bgs	2016-08-04	5	<0.005	0.10	<0.01	<0.05	<10	<10	75	22
	GS16-105	0.6 m bgs	2016-08-04	5	<0.005	<0.05	<0.01	<0.05	<10	<10	74	38

Notes:

1. m bgs = metres below ground surface
2. Current and/or applicable guidelines are bolded
   (yellow highlight) = Exceeds applicable guidelines
3. View analytical report for more comprehensive results
4. Government of Northwest Territories (GNWT), 2003. Environmental Guideline for Contaminated Site Remediation. November 2003.

Table 1: Confirmatory Soil Sample Analytical Results for Petroleum Hydrocarbons

GENERAL												
Location	Sample Designation	**Sample Depth** (m bgs)	**Sample Date** (yyyy-mm-dd)	OVA (Field Screening)	Benzene	Toluene	Ethylbenzene	Xylenes	F1	F2	F3	F4
			Units		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
GUIDELINES												
GNWT 2003 Residential/Parkland		Surface (0-1.5 m bgs)			**0.5**	**0.8**	**1.2**	**1**	**130**	**150**	**400**	**2800**
Zone 11	GS16-017	1.0 m bgs	2016-07-19	10	<0.005	0.81	<0.01	<0.05	<10	<10	73	32
	GS16-018	1.0 m bgs	2016-07-19	5	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10
	GS16-019	1.0 m bgs	2016-07-19	10	<0.005	<0.05	<0.01	<0.05	<10	11	56	18
	GS16-020	1.0 m bgs	2016-07-19	0	<0.005	<0.05	<0.01	<0.05	<10	<10	10	15
	GS16-021	1.0 m bgs	2016-07-19	5	<0.005	<0.05	<0.01	<0.05	<10	<10	12	<10
	Dup 2	1.0 m bgs	2016-07-19	5	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10
	GS16-022	1.0 m bgs	2016-07-19	5	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10
	GS16-023	1.0 m bgs	2016-07-19	5	<0.005	0.06	<0.01	<0.05	<10	<10	<10	<10
	GS16-024	1.0 m bgs	2016-07-19	5	<0.005	0.08	<0.01	<0.05	<10	<10	<10	<10
	GS16-025	1.0 m bgs	2016-07-19	5	<0.005	0.07	<0.01	<0.05	<10	<10	36	19
	GS16-026	1.0 m bgs	2016-07-19	10	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10
	GS16-027	1.0 m bgs	2016-07-19	15	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10
	GS16-028	1.0 m bgs	2016-07-19	5	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10
	Dup 3	1.0 m bgs	2016-07-19	5	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10
	GS16-029	1.0 m bgs	2016-07-19	5	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10
	GS16-030	1.0 m bgs	2016-07-19	10	<0.005	<0.05	<0.01	<0.05	<10	<10	89	29
Zone 13	GS16-078	0.6 m bgs	2016-08-04	5	<0.005	<0.05	<0.01	<0.05	<10	<10	201	88
	GS16-079	0.6 m bgs	2016-08-04	0	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10
	GS16-080	0.6 m bgs	2016-08-04	0	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10
	GS16-081	0.6 m bgs	2016-08-04	15	<0.005	<0.05	<0.01	<0.05	<10	90	139	35
	GS16-082	0.6 m bgs	2016-08-04	10	<0.005	<0.05	<0.01	<0.05	<10	<10	31	14
	GS16-083	0.6 m bgs	2016-08-04	10	<0.005	<0.05	<0.01	<0.05	<10	<10	95	42
	GS16-084	0.6 m bgs	2016-08-04	5	<0.005	<0.05	<0.01	<0.05	<10	<10	57	<10
	GS16-085	0.6 m bgs	2016-08-04	5	<0.005	0.26	<0.01	<0.05	<10	<10	62	13
Zone 14	GS16-086	0.6 m bgs	2016-08-04	5	<0.005	<0.05	<0.01	<0.05	<10	<10	66	14
	DUP - 8	0.6 m bgs	2016-08-04	15	<0.005	<0.05	<0.01	<0.05	<10	<10	105	52
	GS16-087	0.6 m bgs	2016-08-04	5	<0.005	0.07	<0.01	<0.05	<10	<10	92	40
	GS16-088	0.6 m bgs	2016-08-04	10	<0.005	0.12	<0.01	<0.05	<10	<10	121	40
	GS16-089	0.6 m bgs	2016-08-04	15	<0.005	<0.05	<0.01	<0.05	<10	<10	22	<10
	GS16-090	0.6 m bgs	2016-08-04	5	<0.005	0.16	<0.01	<0.05	<10	<10	78	22
	GS16-091	0.6 m bgs	2016-08-04	15	<0.005	<0.05	<0.01	<0.05	<10	<10	175	88
	GS16-092	0.6 m bgs	2016-08-04	5	<0.005	0.09	<0.01	<0.05	<10	<10	30	15
	GS16-093	0.6 m bgs	2016-08-04	10	<0.005	<0.05	<0.01	<0.05	<10	<10	82	26
	GS16-094	0.6 m bgs	2016-08-04	5	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10

Notes:

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2. Current and/or applicable guidelines are bolded
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3. View analytical report for more comprehensive results
4. Government of Northwest Territories (GNWT), 2003. Environmental Guideline for Contaminated Site Remediation. November 2003.

Table 2: Windrow Soil Sample Analytical Results for Petroleum Hydrocarbons

GENERAL													
Location	Sample Designation	**Sample Depth** (m bgs)	**Sample Date** (yyyy-mm-dd)	OVA (Field Screening)	Benzene	Toluene	Ethylbenzene	Xylenes	F1	F2	F3	F4
			Units		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
GUIDELINES												
GNWT 2003 Residential/Parkland		Surface (0-1.5 m bgs)			**0.5**	**0.8**	**1.2**	**1**	**130**	**150**	**400**	**2800**
WINDROW												
Windrow 1	GS16-030	-	2016-07-19	5	<0.005	<0.05	<0.01	<0.05	<10	<10	89	29
	GS16-031	-	2016-07-19	5	<0.005	<0.05	<0.01	<0.05	<10	<10	31	17
	GS16-032	-	2016-07-19	10	<0.005	0.08	<0.01	<0.05	<10	18	162	72
	GS16-033	-	2016-07-19	15	<0.005	<0.05	<0.01	<0.05	<10	14	166	80
	GS16-034	-	2016-07-19	5	<0.005	<0.05	<0.01	<0.05	<10	26	77	32
	GS16-035	-	2016-07-19	5	<0.005	<0.05	<0.01	<0.05	<10	20	68	32
Windrow 2	GS16-036	-	2016-07-19	5	<0.005	<0.05	<0.01	<0.05	<10	<10	47	28
	GS16-037	-	2016-07-19	10	<0.005	<0.05	<0.01	<0.05	<10	19	73	27
	GS16-038	-	2016-07-19	15	<0.005	<0.05	<0.01	<0.05	<10	126	219	23
	GS16-039	-	2016-07-19	15	<0.005	<0.05	<0.01	<0.05	<10	134	243	30
	GS16-040	-	2016-07-19	10	<0.005	<0.05	<0.01	<0.05	<10	13	68	38
	GS16-041	-	2016-07-19	15	<0.005	<0.05	<0.01	<0.05	<10	12	109	29
	GS16-042	-	2016-07-19	15	<0.005	<0.05	<0.01	<0.05	<10	47	105	21
	Dup 4	-	2016-07-19	5	<0.005	<0.05	<0.01	<0.05	<10	36	98	<10
	GS16-043	-	2016-07-19	5	<0.005	<0.05	<0.01	<0.05	<10	22	91	13
Windrow 3	GS16-044	-	2016-07-19	10	<0.005	<0.05	<0.01	<0.05	<10	<10	34	15
	GS16-045	-	2016-07-19	15	<0.005	<0.05	<0.01	<0.05	<10	116	184	45
	GS16-046	-	2016-07-19	15	<0.005	<0.05	<0.01	<0.05	<10	10	35	15
	GS16-047	-	2016-07-19	10	<0.005	<0.05	<0.01	<0.05	<10	36	63	32
	GS16-048	-	2016-07-19	5	<0.005	<0.05	<0.01	<0.05	<10	<10	42	24
	GS16-049	-	2016-07-19	5	<0.005	<0.05	<0.01	<0.05	<10	<10	30	24
Windrow 4	GS16-050	-	2016-07-19	5	<0.005	<0.05	<0.01	<0.05	<10	11	41	18
	GS16-051	-	2016-07-19	5	<0.005	<0.05	<0.01	<0.05	<10	<10	82	48
	GS16-052	-	2016-07-19	15	<0.005	<0.05	<0.01	<0.05	<10	23	370	188
	GS16-053	-	2016-07-19	10	<0.005	<0.05	<0.01	<0.05	<10	<10	48	24
	GS16-054	-	2016-07-19	35	<0.005	<0.05	<0.01	<0.05	<10	172	316	44
	GS16-055	-	2016-07-19	30	<0.005	<0.05	<0.01	<0.05	<10	<10	165	60
	Dup 5	-	2016-07-19	15	<0.005	<0.05	<0.01	<0.05	<10	10	176	16
	GS16-056	-	2016-07-19	15	<0.005	<0.05	<0.01	<0.05	<10	<10	47	26
	GS16-057	-	2016-07-19	10	<0.005	<0.05	<0.01	<0.05	<10	<10	38	26
	GS16-058	-	2016-07-19	20	<0.005	<0.05	<0.01	<0.05	<10	<10	112	77
	GS16-073	-	2016-07-19	15	<0.005	<0.05	<0.01	<0.05	<10	42	82	16
	GS16-074	-	2016-07-19	5	<0.005	<0.05	<0.01	<0.05	<10	25	40	12
	GS16-075	-	2016-07-19	5	<0.005	<0.05	<0.01	<0.05	<10	23	45	11
	GS16-076	-	2016-07-19	5	<0.005	<0.05	<0.01	<0.05	<10	14	34	<10
	GS16-077	-	2016-07-19	5	<0.005	<0.05	<0.01	<0.05	<10	28	46	16
	Dup 7	-	2016-07-19	5	<0.005	<0.05	<0.01	<0.05	<10	14	40	<10
Windrow 5	GS16-067	-	2016-07-19	20	<0.005	<0.05	<0.01	<0.05	<10	778	535	46
	GS16-167 retest 067	-	2016-08-04	15	<0.005	<0.05	<0.01	<0.05	<10	919	718	35
	GS16-231 retest 167	-	2016-08-18	15	<0.005	<0.05	<0.01	<0.05	<10	85	157	27
	Dup-22	-	2016-08-18	10	<0.005	<0.05	<0.01	<0.05	<10	45	67	<10
	GS16-068	-	2016-07-19	10	<0.005	<0.05	<0.01	<0.05	<10	10	118	59
	GS16-069	-	2016-07-19	10	<0.005	<0.05	<0.01	<0.05	<10	14	98	53
	GS16-070	-	2016-07-19	5	<0.005	<0.05	<0.01	<0.05	<10	14	57	26
	GS16-071	-	2016-07-19	5	<0.005	<0.05	<0.01	<0.05	<10	24	68	28
	GS16-072	-	2016-07-19	10	<0.005	<0.05	<0.01	<0.05	<10	11	64	22
	GS16-162	-	2016-08-04	15	<0.005	<0.05	<0.01	<0.05	<10	<10	81	37
	Dup - 14	-	2016-08-04	5	<0.005	<0.05	<0.01	<0.05	<10	<10	70	12
	GS16-163	-	2016-08-04	5	<0.005	<0.05	<0.01	<0.05	<10	<10	65	38
	GS16-164	-	2016-08-04	15	<0.005	<0.05	<0.01	<0.05	<10	10	144	72
	GS16-165	-	2016-08-04	5	<0.005	<0.05	<0.01	<0.05	<10	15	97	59
	GS16-166	-	2016-08-04	10	<0.005	<0.05	<0.01	<0.05	<10	<10	93	44
	Dup 6	-	2016-07-21	10	<0.005	<0.05	<0.01	<0.05	<10	<10	43	<10

Notes:

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Table 2: Windrow Soil Sample Analytical Results for Petroleum Hydrocarbons

GENERAL												
Location	Sample Designation	**Sample Depth** (m bgs)	**Sample Date** (yyyy-mm-dd)	OVA (Field Screening)	Benzene	Toluene	Ethylbenzene	Xylenes	F1	F2	F3	F4
			Units		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
GUIDELINES												
GNWT 2003 Residential/Parkland		Surface (0-1.5 m bgs)			**0.5**	**0.8**	**1.2**	**1**	**130**	**150**	**400**	**2800**
Windrow 6	GS16-060	-	2016-07-21	5	<0.005	<0.05	<0.01	<0.05	<10	<10	11	<10
	GS16-061	-	2016-07-21	180	<0.005	<0.05	<0.01	0.11	<10	1030	759	36
	GS16-062	-	2016-07-21	5	<0.005	<0.05	<0.01	<0.05	<10	<10	234	423
	GS16-063	-	2016-07-19	310	<0.005	<0.05	<0.01	<0.05	<10	1790	985	42
	GS16-064	-	2016-07-19	510	<0.005	<0.05	0.02	0.2	15	3250	1690	38
	GS16-065	-	2016-07-19	280	<0.005	<0.05	0.03	0.32	17	1750	684	39
	GS16-066	-	2016-07-19	540	<0.005	<0.05	<0.01	<0.05	<10	1340	1120	46
	GS16-168	-	2016-08-09	615	<0.005	<0.05	<0.01	<0.05	<10	548	916	42
	GS16-169	-	2016-08-09	810	<0.005	<0.05	<0.01	0.36	<10	3040	1260	48
	GS16-170	-	2016-08-09	650	<0.005	<0.05	<0.01	0.38	<10	2970	1260	37
	GS16-171	-	2016-08-09	410	<0.005	<0.05	<0.01	<0.05	<10	2080	1160	47
	GS16-172	-	2016-08-09	380	<0.005	<0.05	<0.01	<0.05	<10	487	606	41
	GS16-173	-	2016-08-09	240	<0.005	<0.05	<0.01	<0.05	<10	226	304	25
	GS16-234	-	2016-08-18	15	<0.005	<0.05	<0.01	<0.05	<10	46	176	41
	GS16-235	-	2016-08-18	840	<0.005	<0.05	0.03	0.39	<10	2150	1070	25
	GS16-236	-	2016-08-18	780	<0.005	<0.05	<0.01	0.36	<10	3100	1340	28
	GS16-237	-	2016-08-18	610	<0.005	<0.05	<0.01	0.06	<10	1890	1100	30
	GS16-238	-	2016-08-18	210	<0.005	<0.05	<0.01	<0.05	<10	340	399	19
	GS16-239	-	2016-08-18	15	<0.005	<0.05	<0.01	<0.05	<10	<10	33	<10
Windrow 7	GS16-174	-	2106-08-09	20	<0.005	<0.05	<0.01	<0.05	<10	35	376	208
	Dup - 15	-	2106-08-09	10	<0.005	<0.05	<0.01	<0.05	<10	18	261	128
	GS16-175	-	2106-08-09	65	<0.005	<0.05	<0.01	<0.05	<10	173	608	225
	GS16-176	-	2106-08-09	180	<0.005	<0.05	<0.01	<0.05	<10	656	703	66
	GS16-177	-	2106-08-09	65	<0.005	<0.05	<0.01	<0.05	<10	45	279	137
	GS16-178	-	2106-08-09	180	<0.005	<0.05	<0.01	<0.05	<10	35	495	240
	GS16-179	-	2106-08-09	195	<0.005	<0.05	<0.01	<0.05	<10	126	470	185
	GS16-240	-	2016-08-18	220	<0.005	<0.05	<0.01	0.12	<10	719	442	23
	GS16-241	-	2016-08-18	210	<0.005	<0.05	<0.01	<0.05	<10	668	649	35
	GS16-242	-	2016-08-18	180	<0.005	<0.05	<0.01	<0.05	<10	322	531	78
	GS16-243	-	2016-08-18	90	<0.005	<0.05	<0.01	<0.05	<10	81	350	116
	GS16-244	-	2016-08-18	75	<0.005	0.06	<0.01	<0.05	<10	16	164	68
	GS16-245	-	2016-08-18	15	<0.005	<0.05	<0.01	<0.05	<10	54	190	67
Windrow 8	GS16-180	-	2106-08-09	185	<0.005	<0.05	<0.01	<0.05	<10	22	438	240
	retest 180	-	2016-08-18	75	<0.005	<0.05	<0.01	<0.05	<10	13	297	145
	GS16-182	-	2106-08-09	40	<0.005	<0.05	<0.01	<0.05	<10	17	272	132
	GS16-183	-	2106-08-09	35	<0.005	<0.05	<0.01	<0.05	<10	16	245	119
	GS16-184	-	2106-08-09	15	<0.005	<0.05	<0.01	<0.05	<10	13	187	88
	GS16-185	-	2106-08-09	135	<0.005	<0.05	<0.01	<0.05	<10	242	526	140
	Retest 185	-	2016-08-18	110	<0.005	0.05	<0.01	<0.05	<10	213	373	97
	GS16-181	-	2106-08-09	15	<0.005	<0.05	<0.01	<0.05	<10	19	304	146
Windrow 9	GS16-144	-	2016-08-04	230	<0.005	0.17	<0.01	<0.05	<10	94	558	282
	GS16-145	-	2016-08-04	165	<0.005	<0.05	<0.01	<0.05	<10	32	537	354
	GS16-146	-	2016-08-04	165	<0.005	0.08	<0.01	<0.05	<10	47	479	322
	GS16-147	-	2016-08-04	245	<0.005	0.08	<0.01	<0.05	<10	32	741	466
	GS16-148	-	2016-08-04	230	<0.005	<0.05	<0.01	<0.05	<10	148	534	339
	GS16-149	-	2016-08-04	310	<0.005	0.08	<0.01	<0.05	<10	317	1000	440
	GS16-150	-	2016-08-04	485	<0.005	<0.05	0.01	0.19	50	1880	1960	162
Windrow 10	GS16-136	-	2016-08-04	460	<0.005	0.13	0.01	0.09	60	1640	2040	542
	GS16-137	-	2016-08-04	310	<0.005	0.06	<0.01	<0.05	<10	229	665	275
	GS16-138	-	2016-08-04	580	<0.005	0.12	<0.01	<0.05	<10	331	1470	776
	GS16-139	-	2016-08-04	275	<0.005	0.13	<0.01	<0.05	<10	228	820	436
	GS16-140	-	2016-08-04	980	<0.005	0.07	0.03	0.42	130	3430	2610	284
	GS16-141	-	2016-08-04	870	<0.005	0.23	<0.01	<0.05	20	1380	2420	644
	GS16-142	-	2016-08-04	660	<0.005	<0.05	<0.01	<0.05	10	1330	1860	192
	GS16-143	-	2016-08-04	610	0.009	3.83	0.11	0.51	10	344	564	153
Windrow 11	GS16-129	-	2016-08-04	945	<0.005	<0.05	0.01	0.67	110	2120	1200	50
	GS16-130	-	2016-08-04	700	<0.005	<0.05	<0.01	<0.05	50	1240	1160	46
	GS16-131	-	2016-08-04	740	<0.005	<0.05	<0.01	0.06	50	1700	1520	102
	GS16-132	-	2016-08-04	680	<0.005	<0.05	<0.01	0.16	40	1360	1420	55
	GS16-133	-	2016-08-04	830	<0.005	<0.05	<0.01	<0.05	60	2780	2120	125
	GS16-134	-	2016-08-04	540	<0.005	<0.05	0.04	0.48	110	1600	1120	62
	GS16-135	-	2016-08-04	15	<0.005	<0.05	<0.01	<0.05	<10	19	79	22
	GS16-270	-	2016-08-18	690	0.01	<0.05	0.02	0.22	26	2470	1290	52
	Dup-24	-	2016-08-18	710	<0.005	<0.05	0.02	0.88	21	2540	1460	63
	GS16-271	-	2016-08-18	585	<0.005	<0.05	<0.01	0.05	<10	1380	1360	69
	GS16-272	-	2016-08-18	490	<0.005	<0.05	<0.01	0.1	<10	1230	1010	57
	GS16-273	-	2016-08-18	665	<0.005	<0.05	0.03	0.4	<10	2350	1700	94
	GS16-274	-	2016-08-18	620	<0.005	0.05	0.01	0.76	10	2080	1340	72
	GS16-275	-	2016-08-18	65	<0.005	<0.05	<0.01	<0.05	<10	95	130	35

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			Units		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
GUIDELINES												
GNWT 2003 Residential/Parkland		Surface (0-1.5 m bgs)			**0.5**	**0.8**	**1.2**	**1**	**130**	**150**	**400**	**2800**
Windrow 12	GS16-186		2019-08-09	210	<0.005	0.17	0.02	0.06	<10	330	180	67
	Dup - 16	-	2019-08-09	150	<0.005	0.1	0.02	0.06	17	348	185	60
	GS16-187	-	2019-08-09	85	<0.005	0.24	<0.01	<0.05	<10	262	280	108
	GS16-188	-	2019-08-09	25	<0.005	<0.05	<0.01	<0.05	<10	61	140	71
	GS16-189	-	2019-08-09	15	<0.005	<0.05	<0.01	<0.05	<10	<10	38	33
	GS16-190	-	2019-08-09	110	0.042	1.05	0.09	0.47	<10	463	300	96
	GS16-191	-	2019-08-09	85	<0.005	0.3	0.07	0.3	<10	221	111	45
	GS16-258	-	2016-08-18	70	<0.005	<0.05	<0.01	0.06	<10	184	77	19
	GS16-259	-	2016-08-18	40	<0.005	0.15	<0.01	0.08	<10	150	99	19
	GS16-260	-	2016-08-18	15	<0.005	<0.05	<0.01	<0.05	<10	11	31	<10
	GS16-261	-	2016-08-18	35	<0.005	<0.05	<0.01	<0.05	<10	129	112	26
	GS16-262	-	2016-08-18	40	<0.005	0.1	0.04	0.16	<10	172	168	44
	GS16-263	-	2016-08-18	35	<0.005	0.11	<0.01	0.11	<10	168	150	41
Windrow 13	GS16-192	-	2019-08-09	60	<0.005	<0.05	<0.01	<0.05	<10	252	137	28
	GS16-193	-	2019-08-09	45	<0.005	0.25	0.06	0.29	<10	102	130	54
	GS16-194	-	2019-08-09	35	<0.005	0.32	<0.01	<0.05	<10	19	147	52
	GS16-195	-	2019-08-09	15	<0.005	<0.05	<0.01	<0.05	<10	12	107	131
	GS16-196	-	2019-08-09	15	<0.005	<0.05	<0.01	<0.05	<10	16	67	41
	GS16-197	-	2019-08-09	10	<0.005	<0.05	<0.01	<0.05	<10	<10	45	36
Windrow 14	GS16-198	-	2016-08-10	10	<0.005	<0.05	<0.01	<0.05	<10	64	93	41
	Dup - 17	-	2016-08-10	15	<0.005	<0.05	<0.01	<0.05	<10	20	65	10
	GS16-199	-	2016-08-10	75	<0.005	<0.05	0.06	0.57	<10	199	125	26
	GS16-200	-	2016-08-10	110	<0.005	<0.05	<0.01	0.18	<10	221	119	32
	GS16-201	-	2016-08-10	310	<0.005	0.2	0.13	0.83	<10	1660	212	33
	GS16-202	-	2016-08-10	260	0.042	0.56	0.13	0.85	<10	984	138	33
	GS16-203	-	2016-08-10	200	<0.005	<0.05	<0.01	<0.05	<10	738	232	44
Windrow 15	GS16-204	-	2016-08-10	180	<0.005	<0.05	<0.01	<0.05	<10	118	163	34
	GS16-205	-	2016-08-10	25	<0.005	<0.05	<0.01	<0.05	<10	<10	37	18
	GS16-206	-	2016-08-10	540	<0.005	<0.05	<0.01	<0.05	<10	875	490	32
	GS16-207	-	2016-08-10	880	<0.005	<0.05	<0.01	<0.05	<10	2120	1060	60
	GS16-208	-	2016-08-10	940	<0.005	<0.05	<0.01	<0.05	<10	2880	1020	49
	GS16-209	-	2016-08-10	680	<0.005	<0.05	<0.01	<0.05	<10	507	129	35
	GS16-252	-	2016-08-18	420	<0.005	<0.05	<0.01	0.06	<10	611	209	50
	GS16-253	-	2016-08-18	415	<0.005	<0.05	0.03	0.21	<10	641	259	14
	GS16-254	-	2016-08-18	590	0.009	<0.05	0.01	0.23	<10	2180	1120	37
	GS16-255	-	2016-08-18	380	<0.005	<0.05	<0.01	<0.05	<10	502	203	<10
	GS16-256	-	2016-08-18	375	<0.005	<0.05	<0.01	0.17	<10	428	352	25
	GS16-257	-	2016-08-18	35	<0.005	<0.05	<0.01	<0.05	<10	41	69	11
Windrow 16	GS16-210	-	2016-08-11	10	<0.005	<0.05	<0.01	<0.05	<10	<10	40	22
	Dup - 18	-	2016-08-11	15	<0.005	<0.05	<0.01	<0.05	<10	<10	64	33
	GS16-211	-	2016-08-11	5	<0.005	<0.05	<0.01	<0.05	<10	<10	24	<10
	GS16-212	-	2016-08-11	15	<0.005	<0.05	<0.01	<0.05	<10	11	58	20
	GS16-213	-	2016-08-11	10	<0.005	<0.05	<0.01	<0.05	<10	<10	32	13
	GS16-214	-	2016-08-11	15	<0.005	<0.05	<0.01	<0.05	<10	14	33	10
	GS16-215	-	2016-08-11	5	<0.005	<0.05	<0.01	<0.05	<10	<10	21	<10
Windrow 17	GS16-216	-	2016-08-11	25	<0.005	<0.05	<0.01	<0.05	<10	<10	50	16
	GS16-217	-	2016-08-11	15	<0.005	<0.05	<0.01	<0.05	<10	12	40	15
	GS16-218	-	2016-08-11	10	<0.005	<0.05	<0.01	<0.05	<10	<10	25	<10
	GS16-219	-	2016-08-11	15	<0.005	<0.05	<0.01	<0.05	<10	<10	43	15
	GS16-220	-	2016-08-11	670	<0.005	<0.05	<0.01	<0.05	<10	1070	426	28
	GS16-265 retest 220	-	2016-08-18	15	<0.005	<0.05	<0.01	<0.05	<10	<10	39	16
	GS16-221	-	2016-08-11	10	<0.005	<0.05	<0.01	<0.05	<10	<10	24	<10
Windrow 18	GS16-222	-	2016-08-11	20	<0.005	<0.05	<0.01	<0.05	<10	43	111	42
	Dup - 20	-	2016-08-11	25	<0.005	<0.05	<0.01	<0.05	<10	48	143	28
	GS16-223	-	2016-08-11	15	<0.005	<0.05	<0.01	<0.05	<10	12	69	54
	GS16-224	-	2016-08-11	10	<0.005	<0.05	<0.01	<0.05	<10	<10	43	32
	GS16-225	-	2016-08-11	15	<0.005	<0.05	<0.01	<0.05	<10	<10	46	43
	GS16-226	-	2016-08-11	15	<0.005	<0.05	<0.01	<0.05	<10	20	87	40
	GS16-227	-	2016-08-11	15	<0.005	<0.05	<0.01	<0.05	<10	<10	102	31
Windrow 19	GS16-228	-	2016-08-11	560	<0.005	0.28	<0.01	0.05	<10	381	828	239
	GS16-229	-	2016-08-11	320	<0.005	0.08	<0.01	<0.05	<10	37	616	312
	GS16-230	-	2016-08-11	220	<0.005	0.16	<0.01	<0.05	<10	28	499	272
	Dup - 21	-	2016-08-11	580	<0.005	0.07	<0.01	<0.05	<10	711	1210	275
	GS16-266	-	2016-08-18	580	<0.005	<0.05	<0.01	<0.05	<10	441	795	161
	Dup-23	-	2016-08-18	320	<0.005	0.05	<0.01	<0.05	<10	262	427	73
	GS16-267	-	2016-08-18	40	<0.005	0.1	<0.01	<0.05	<10	43	246	79
	GS16-268	-	2016-08-18	25	<0.005	<0.05	<0.01	<0.05	<10	<10	176	68
	GS16-269	-	2016-08-18	60	<0.005	0.09	<0.01	<0.05	<10	29	408	213

Notes:

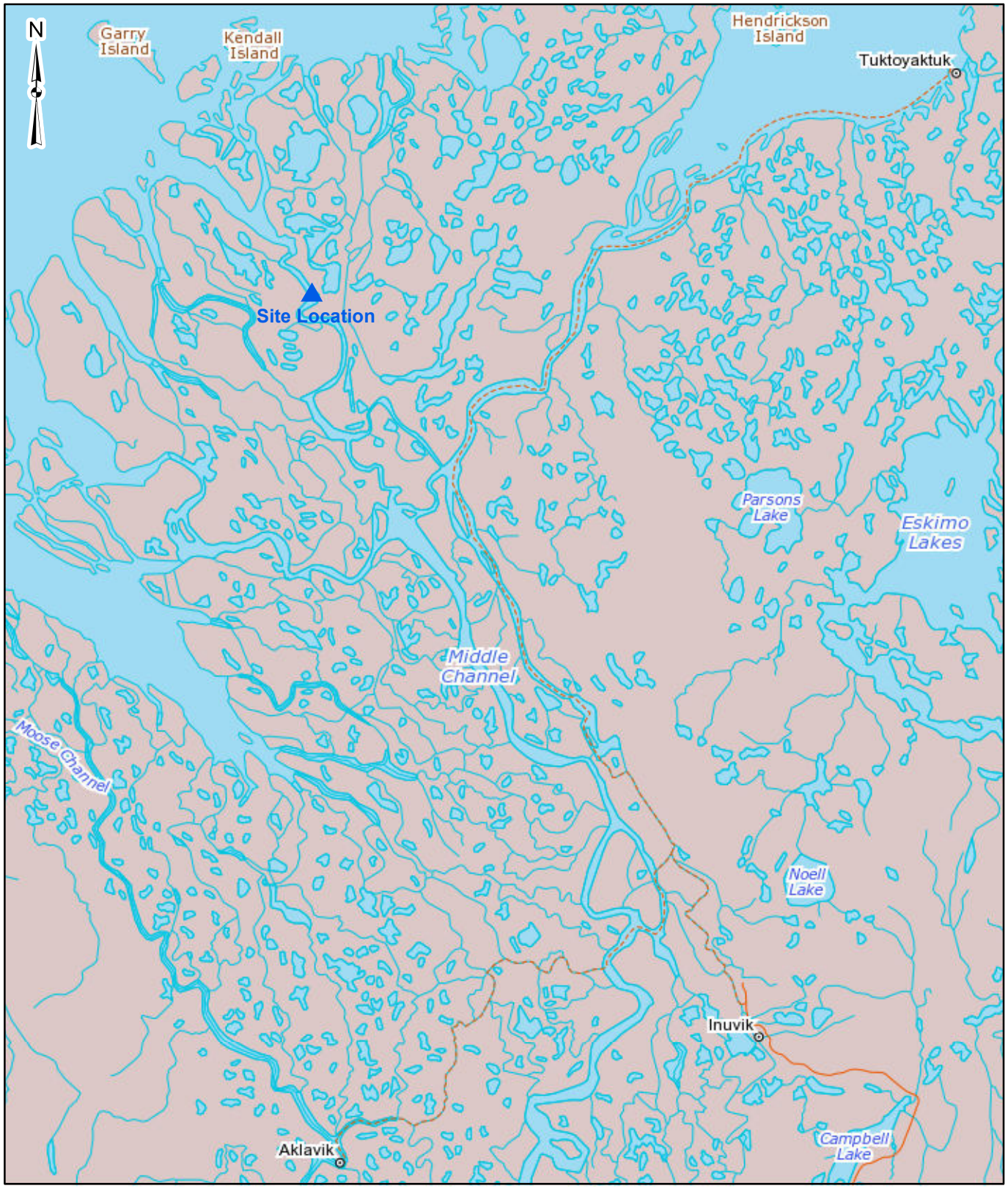
1. m bgs = metres below ground surface
2. Current and/or applicable guidelines are bolded
   (yellow highlight) = Exceeds applicable guidelines
3. View analytical report for more comprehensive results
4. Government of Northwest Territories (GNWT), 2003. Environmental Guideline for Contaminated Site Remediation. November 2003.

Shell Canada Energy
Camp Farewell 2016 Remediation Program

GENERAL			PETROLEUM HYDROCARBONS							
Table 3: Summary of Quality Assurance / Quality Control Results for Petroleum Hydrocarbons										
Sample Designation	**Sample Depth** (m bgs)	**Sample Date (yyyy-mm-dd)**	Benzene	Toluene	Ethylbenzene	Xylenes	F1	F2	F3	F4
		Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Method Detection Limits			0.005	0.0003	0.01	0.005	10	10	10	10
GS16-011	1.0 m bgs	2016-07-19	<0.005	0.14	<0.01	<0.05	<10	<10	25	18
Dup 1	1.0 m bgs	2016-07-19	<0.005	0.18	0.02	0.15	<10	14	77	18
Relative Percent Difference (RPD) (%)			0%	0%	0%	0%	0%	95%	**102%**	**0%**
Absolute Difference			**0**	**0**	**0**	**0**	**0**	**9**	52	0
GS16-021	1.0 m bgs	2016-07-19	<0.005	<0.05	<0.01	<0.05	<10	<10	12	<10
Dup 2	1.0 m bgs	2016-07-19	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10
Relative Percent Difference (RPD) (%)			0%	0%	0%	0%	0%	0%	82%	0%
Absolute Difference			**0**	**0**	**0**	**0**	**0**	**0**	**7**	**0**
GS16-028	1.0 m bgs	2016-07-19	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10
Dup 3	1.0 m bgs	2016-07-19	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10
Relative Percent Difference (RPD) (%)			0%	0%	0%	0%	0%	0%	0%	0%
Absolute Difference			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
GS16-042	-	2016-07-19	<0.005	<0.05	<0.01	<0.05	<10	47	105	21
Dup 4	-	2016-07-19	<0.005	<0.05	<0.01	<0.05	<10	36	98	<10
Relative Percent Difference (RPD) (%)			0%	0%	0%	0%	0%	0%	7%	123%
Absolute Difference			**0**	**0**	**0**	**0**	**0**	**11**	**7**	**16**
GS16-055	-	2016-07-19	<0.005	<0.05	<0.01	<0.05	<10	<10	165	60
Dup 5	-	2016-07-19	<0.005	<0.05	<0.01	<0.05	<10	10	176	16
Relative Percent Difference (RPD) (%)			0%	0%	0%	0%	0%	0%	6%	116%
Absolute Difference			**0**	**0**	**0**	**0**	**0**	**0**	**11**	**44**
GS16-072	-	2016-07-19	<0.005	<0.05	<0.01	<0.05	<10	11	64	22
Dup 6	-	2016-07-21	<0.005	<0.05	<0.01	<0.05	<10	<10	43	<10
Relative Percent Difference (RPD) (%)			0%	0%	0%	0%	0%	75%	39%	126%
Absolute Difference			**0**	**0**	**0**	**0**	**0**	**6**	**21**	**17**
GS16-077	-	2016-07-19	<0.005	<0.05	<0.01	<0.05	<10	28	46	16
Dup 7	-	2016-07-21	<0.005	<0.05	<0.01	<0.05	<10	14	40	<10
Relative Percent Difference (RPD) (%)			0%	0%	0%	0%	0%	0%	14%	105%
Absolute Difference			**0**	**0**	**0**	**0**	**0**	**0**	**6**	**11**
GS16-086	0.6 m bgs	2016-08-04	<0.005	<0.05	<0.01	<0.05	<10	<10	66	14
DUP - 8	0.6 m bgs	2016-08-04	<0.005	<0.05	<0.01	<0.05	<10	<10	105	52
Relative Percent Difference (RPD) (%)			0%	0%	0%	0%	0%	0%	**46%**	95%
Absolute Difference			**0**	**0**	**0**	**0**	**0**	**0**	39	**38**
GS16-098	0.6 m bgs	2016-08-04	<0.005	0.25	<0.01	<0.05	<10	<10	247	92
DUP - 9	0.6 m bgs	2016-08-04	<0.005	0.24	<0.01	<0.05	<10	<10	774	525
Relative Percent Difference (RPD) (%)			0%	0%	0%	0%	0%	0%	**103%**	**140%**
Absolute Difference			**0**	**0**	**0**	**0**	**0**	**0**	527	433
GS16-109	1.0 m bgs	2016-08-09	<0.005	0.66	<0.01	<0.05	<10	103	929	452
DUP - 10	1.0 m bgs	2016-08-09	<0.005	0.08	<0.01	<0.05	<10	335	523	63
Relative Percent Difference (RPD) (%)			0%	0%	0%	0%	0%	0%	**56%**	151%
Absolute Difference			**0**	**0**	**0**	**0**	**0**	**0**	406	389
GS16-162	-	2016-08-04	<0.005	<0.05	<0.01	<0.05	<10	<10	81	37
Dup - 14	-	2016-08-04	<0.005	<0.05	<0.01	<0.05	<10	<10	70	12
Relative Percent Difference (RPD) (%)			0%	0%	0%	0%	0%	0%	**15%**	131%
Absolute Difference			**0**	**0**	**0**	**0**	**0**	**0**	11	**25**
GS16-174	-	2106-08-09	<0.005	<0.05	<0.01	<0.05	<10	35	376	208
Dup - 15	-	2106-08-09	<0.005	<0.05	<0.01	<0.05	<10	18	261	128
Relative Percent Difference (RPD) (%)			0%	0%	0%	0%	0%	0%	**36%**	48%
Absolute Difference			**0**	**0**	**0**	**0**	**0**	**0**	115	**80**
GS16-186	-	2019-08-09	<0.005	0.17	0.02	0.06	<10	330	180	67
Dup - 16	-	2019-08-09	<0.005	0.1	0.02	0.06	17	348	185	60
Relative Percent Difference (RPD) (%)			0%	0%	0%	0%	0%	**5%**	**3%**	11%
Absolute Difference			**0**	**0**	**0**	**0**	**0**	18	5	**7**
GS16-198	-	2016-08-10	<0.005	<0.05	<0.01	<0.05	<10	64	93	41
Dup - 17	-	2016-08-10	<0.005	<0.05	<0.01	<0.05	<10	20	65	10
Relative Percent Difference (RPD) (%)			0%	0%	0%	0%	0%	105%	**35%**	122%
Absolute Difference			**0**	**0**	**0**	**0**	**0**	**44**	28	**31**
GS16-210	-	2016-08-11	<0.005	<0.05	<0.01	<0.05	<10	<10	40	22
Dup - 18	-	2016-08-11	<0.005	<0.05	<0.01	<0.05	<10	<10	64	33
Relative Percent Difference (RPD) (%)			0%	0%	0%	0%	0%	0%	46%	40%
Absolute Difference			**0**	**0**	**0**	**0**	**0**	**0**	**24**	**11**
GS16-222	-	2016-08-11	<0.005	<0.05	<0.01	<0.05	<10	43	111	42
Dup - 20	-	2016-08-11	<0.005	<0.05	<0.01	<0.05	<10	48	143	28
Relative Percent Difference (RPD) (%)			0%	0%	0%	0%	0%	0%	**25%**	40%
Absolute Difference			**0**	**0**	**0**	**0**	**0**	**0**	32	**14**
GS16-230	-	2016-08-11	<0.005	0.16	<0.01	<0.05	<10	28	499	272
Dup - 21	-	2016-08-11	<0.005	0.07	<0.01	<0.05	<10	711	1210	275
Relative Percent Difference (RPD) (%)			0%	0%	0%	0%	0%	**185%**	**83%**	1%
Absolute Difference			**0**	**0**	**0**	**0**	**0**	683	711	**3**
GS16-231	-	2016-08-18	<0.005	<0.05	<0.01	<0.05	<10	85	157	27
Dup-22	-	2016-08-18	<0.005	<0.05	<0.01	<0.05	<10	45	67	<10
Relative Percent Difference (RPD) (%)			0%	0%	0%	0%	0%	62%	**80%**	138%
Absolute Difference			**0**	**0**	**0**	**0**	**0**	**40**	90	**22**
GS16-266	-	2016-08-18	<0.005	<0.05	<0.01	<0.05	<10	441	795	161
Dup-23	-	2016-08-18	<0.005	0.05	<0.01	<0.05	<10	262	427	73
Relative Percent Difference (RPD) (%)			0%	0%	0%	0%	0%	51%	**60%**	**75%**
Absolute Difference			**0**	**0**	**0**	**0**	**0**	**179**	368	88
GS16-270	-	2016-08-18	0.01	<0.05	0.02	0.22	26	2470	1290	52
Dup-24	-	2016-08-18	<0.005	<0.05	0.02	0.88	21	2540	1460	63
Relative Percent Difference (RPD) (%)			0%	0%	0%	0%	0%	**3%**	**12%**	**19%**
Absolute Difference			**0**	**0**	**0**	**0**	**0**	70	170	11

Notes:
1. Applicable values (RPD or AD) are bolded. RPD is applicable if parameter concentrations in both samples are greater than or equal to 5x the detection limit; otherwise AD is applicable.
2. (yellow highlight) = Exceeds Zeiner criteria (RPD must be less than or equal to 20%, or AD is greater than method detection limit).
3. View analytical report for more comprehensive results

FIGURES



NOT FOR CONSTRUCTION

km
0 25

NOTES:
1. HORIZONTAL DATUM: NAD83
2. GRID ZONE: UTM Zone 8N
3. IMAGE SOURCE: The Toporama Web Map Service, http://wms.ess-ws.nrcan.gc.ca/wms/toporama_en, Government of canada, Natural Resources Canada, Earth Sciences Sector

CLIENT
Shell Canada Energy

IEG CONSULTANTS LTD.

PROJECT
Camp Farewell 2016 Decommissioning and Remediation Program

TITLE
Camp Farewell Site Location Map

SCALE	PROJECT No.	FIG No.
1:700,000	A04012A08	1

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Date: February 23, 2017
File: Z:\AICGY\Alberta\A04012A08 SCE Camp Farewell 2016 REM Proj\400 Drawings\A04012A05_Figure1_Site_Location_Map_170124.mxd

N

TUNDRA

TUNDRA

WILLOWS

TANK FARM

FUEL TANK

REMEDIATED LAGOON

CAMP BUILDING

SHED #1

SHED #2

SHED #3

ROAD (GRASS) WINTER ACCESS

ROAD (GRAVEL) SUMMER ACCESS

MACKENZIE RIVER

BOLLARDS

Legend

- Former Aboveground Storage Tank
- Airstrip
- Removed infrastructure
- Boundary
- Edge of Gravel
- River
- Sand
- Top of Bank

0 100 m

NOT FOR CONSTRUCTION

NOTES:
1. HORIZONTAL DATUM: NAD83
2. GRID ZONE: UTM8N
3. SOURCE: Site survey plan prepared for Shell Canada Limited by Inukshuk Geomatics Inc.; original scale 1:2000.

CLIENT: Shell Canada Energy

IEG CONSULTANTS LTD.

PROJECT: Camp Farewell 2016 Decommissioning and Remediation Program

TITLE: Site Plan

SCALE	PROJECT No.	FIG No.
1:2,500	A04012A08	2

File: Z:\AICGY\Alberta\A04012A07 SCE CF Decomm and Soil Asmnt\400 Drawings\410 Drawings\A04012A08_SitePlan_170124_figure 2.mxd Date: February 23, 2017 Time: 13:22:24 PM Creator:: tchung

N

TUNDRA

WILLOWS

30m

TUNDRA

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22

FUEL TANK

REMEDIATED LAGOON

SHED #1

ROAD (GRASS) WINTER ACCESS

ROAD (GRAVEL) SUMMER ACCESS

MACKENZIE RIVER

BOLLARDS

Legend

- Airstrip
- Boundary
- Edge of Gravel
- River
- Sand
- Top of Bank
- 1 Excavation Zones
- Approximate Exacavation Area Boundary

0 100 m

NOT FOR CONSTRUCTION

NOTES:
1. HORIZONTAL DATUM: NAD83
2. GRID ZONE: UTM8N
3. SOURCE: Site survey plan prepared for Shell Canada Limited by Inukshuk Geomatics Inc.; original scale 1:2000.

CLIENT: Shell Canada Energy

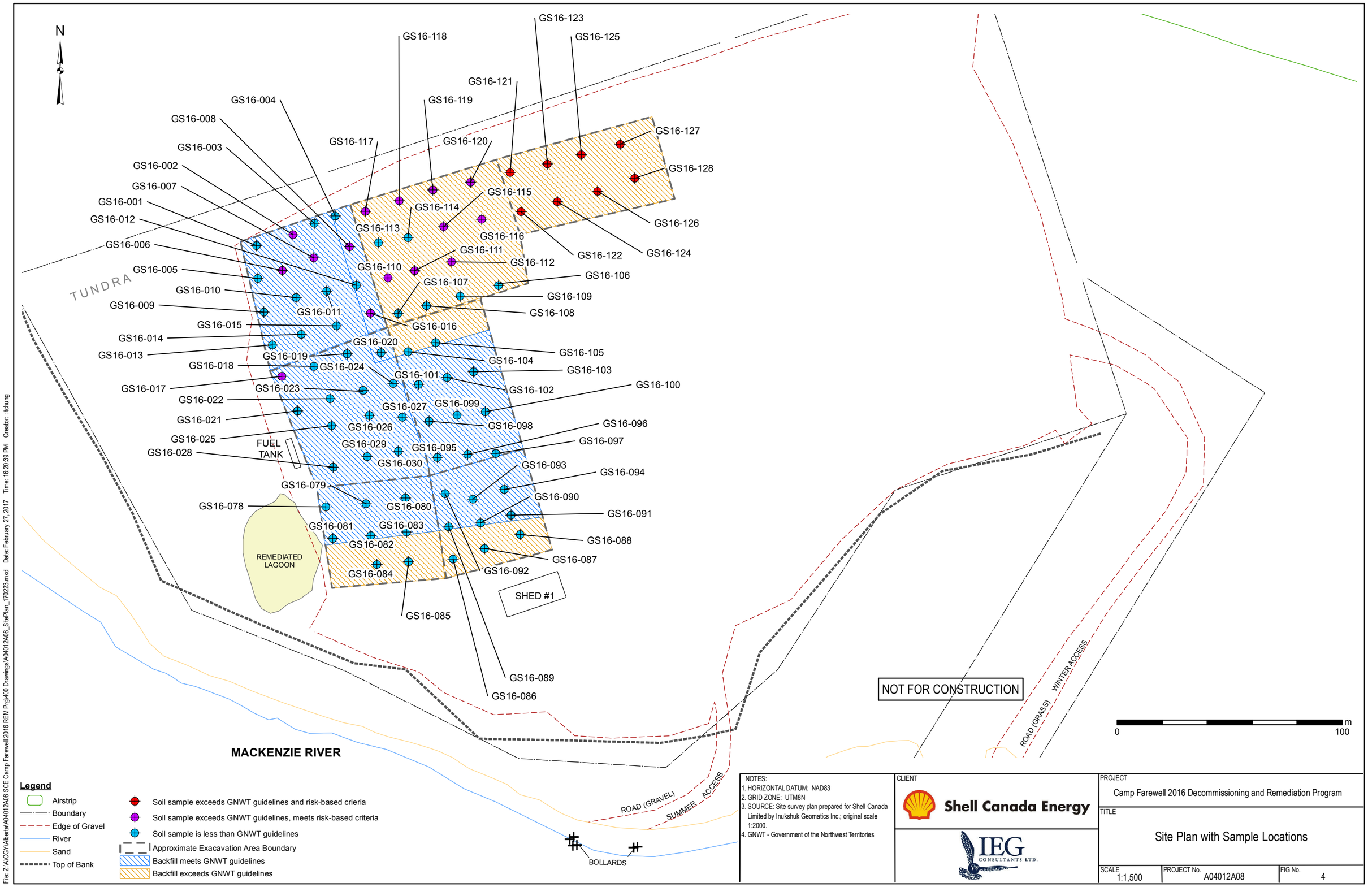
IEG CONSULTANTS LTD.

PROJECT: Camp Farewell 2016 Decommissioning and Remediation Program

TITLE: Site Plan with Excavation Zones

SCALE	PROJECT No.	FIG No.
1:2,500	A04012A08	3

File: Z:\AICGY\Alberta\A04012A08 SCE Camp Farewell 2016 REM Prg\400 Drawings\A04012A08_SitePlanwithExcavationAreas_170223.mxd Date: February 27, 2017 Time: 14:45:25 PM Creator:: tchung



Legend

- Airstrip
- Boundary
- Edge of Gravel
- River
- Sand
- Top of Bank
- Soil sample exceeds GNWT guidelines and risk-based crieria
- Soil sample exceeds GNWT guidelines, meets risk-based criteria
- Soil sample is less than GNWT guidelines
- Approximate Exacavation Area Boundary
- Backfill meets GNWT guidelines
- Backfill exceeds GNWT guidelines

NOTES:
1. HORIZONTAL DATUM: NAD83
2. GRID ZONE: UTM8N
3. SOURCE: Site survey plan prepared for Shell Canada Limited by Inukshuk Geomatics Inc.; original scale 1:2000.
4. GNWT - Government of the Northwest Territories

CLIENT: Shell Canada Energy

IEG CONSULTANTS LTD.

PROJECT: Camp Farewell 2016 Decommissioning and Remediation Program

TITLE: Site Plan with Sample Locations

SCALE	PROJECT No.	FIG No.
1:1,500	A04012A08	4

File: Z:\AGY\Alberta\A04012A08 SCE Camp Farewell 2016 REM Prg\400 Drawings\A04012A08_SitePlan_170223.mxd Date: February 27, 2017 Time: 16:20:39 PM Creator: : tchung

APPENDIX I

Historical Reports

Appendix I
Camp Farwell Annual Reports

I-1 PREVIOUS ENVIRONMENTAL SITE ASSESSMENT PROGRAMS

I-1.1.1 2000

In 2000, Golder and Associates (Golder) conducted a baseline environmental assessment of the Site and Geco-Prakla, a division of Schlumberger Canada, conducted a baseline assessment prior to sub-leasing a portion of the Site from Shell. The area of the sub-lease included the main camp accommodations, associated accommodation trailers, the lagoon area and the area south of the storage crates and racks (including Shed #1), and extended to the east of the lease (Worley Parsons, 2011).

I-1.1.2 2001

Phase I and Phase II Environmental Site Assessments (ESAs) were conducted by Komex in 2001. Analyzed parameters reported to exceed applicable guidelines which included: total petroleum hydrocarbons (TPHs), polycyclic aromatic hydrocarbons (PAHs), and selected trace metals within (and down gradient of) the burn pit; xylenes and TPHs in the area of the tank farm and the area of the historical tank release; TPHs and barium concentrations from surface stained areas and throughout the gravel base pad; and electrical conductivity (EC) and pH on the base pad where mud additives were reportedly stored.

In addition, two background samples were collected from locations located to the northeast of the Site; one situated in native tundra (organic soil) and the second located on the gravel airstrip (mineral soil). Salinity parameters, including EC (180 to 360 uS/cm), pH (6.3 to 8.0) and sodium adsorption ratio (SAR) (0.9 to 1.1) were reported within the applicable guidelines for residential/parkland and industrial land uses for both locations. Concentrations of metals parameters were reported below applicable guidelines (WorleyParsons Komex, 2006).

Following the ESAs conducted in 2001, Komex submitted an Interim Abandonment and Restoration Plan to the NWTWB (Komex, 2002).

I-1.1.3 2006

A more detailed Phase II ESA was conducted by WorleyParsons Komex in 2006. The purpose of the additional Phase II ESA was to further delineate previously identified soil impacts and to identify potential groundwater impacts.

Two background soil and groundwater sample locations were established and tested to the northeast of the Site, in areas not likely to have been affected by historical operations. Background soil locations were advance to 0.4 m bgs, to the depth of permafrost. Findings for the background soil and groundwater locations indicated concentrations of hydrocarbons which were attributed to naturally occurring organic material. Salinity parameters EC, pH, and SAR were reported at 251 uS/cm, 6.7, and

0.6, respectively, within and/or below applicable guidelines (WorleyParsons Komex, 2006). Metals parameters were not analyzed.

Hydrocarbon impacts were identified in the vicinity of the burn pit, tank farm, above ground fuel storage tanks, and across the gravel pad including the perimeter. Salinity and barium impacts were identified on the gravel pad (WorleyParsons Komex, 2006).

I-1.1.4 2008

WorleyParsons submitted a second Interim Abandonment and Restoration Plan in 2008 following the 2006 Phase II. A summary of the 2006 results were included as well as specific Progressive Reclamation Plans to be conducted in 2009 and 2010 (WorleyParsons, 2008).

I-1.1.5 2010

WorleyParsons submitted an updated Interim Abandonment and Restoration Program Report that described the activities that were conducted in 2008 and 2009 (WorleyParsons, 2010).

IEG also summarized the 2008 and 2009 Site activities in the 2009 Camp Farewell Hydrocarbon Impacted Soil Remediation Report (IEG, 2010). The 2006 Phase II ESA results were summarized, and the remediation activities were described in detail, including the sampling schedule and results.

I-1.1.6 2012

IEG conducted required Site inspections and collected water samples from the lagoon. Site inspections indicated no sign of spills, leaks, and animal or human activity on the Site. Laboratory analytical results for water samples reported values below applicable guidelines and lagoon water was subsequently discharged to the Mackenzie River in accordance with licence number N7L1-1762 (IEG 2012b, IEG 2013a, and IEG 2013b).

I-1.1.7 2013

In 2013, IEG conducted a remediation program at the former lagoon at Camp Farewell. The lagoon excavation was located on the west side of the camp building with the Mackenzie River bordering the south and east sides. The dimensions of the excavation were approximately 52 m by 34 m. The maximum depth of the excavation was approximately 7.5 m. Prior to remedial activities, the lagoon had a depth of approximately 2.5 m. Domestic waste debris was observed in the excavated material, including metal cans, fragments, and plastic debris. Water supply facilities and sewage treatment facilities were also decommissioned and removed during the 2013 Remediation Program.

A total of 96 soil samples were collected from the lagoon excavation: 25 interim soil samples and 71 confirmatory soil samples.

Petroleum hydrocarbon (PHC) affected soil resulting from previous operations was effectively removed from the lagoon area during the 2013 Remediation Program based on laboratory analytical data. Approximately 1,900 m^3 of excavated soil was barged to Hay River and hauled to and disposed at the Tervita Rainbow Lake Landfill in Rainbow Lake, AB. The last load of the barged impacted soil

arrived at the landfill on October 16, 2013. Approximately 100 m^3 remained on-site in a secured metal shed, to be barged to the landfill during 2014 decommissioning activities (IEG, 2014).

I-1.1.8 2014

Decommissioning activities occurred from August 6, 2014 to September 18, 2014. During the 2014 Decommissioning Program, infrastructure was decommissioned and removed along with miscellaneous materials on-site, minor investigative soil sampling was conducted, and remaining waste from the 2013 Remediation Program was packaged and removed.

Shed #2, Shed #3, and the camp building were disassembled. Materials that could be recycled such as metals were separated from the debris and waste material, for shipment to appropriate facilities. Other materials stored on-site including rig mats, piping, hoses, wooden crates, and miscellaneous parts were also removed. Materials removed were transported off-site via barge.

Approximately 18 m^3 of remaining waste soil from the 2013 remediation program was packed into soil bags or wooden crates provided by Tervita. Each soil bag and wooden crate contained approximately 1 m^3 of impacted soil.

On August 14, 2014, two composite soil samples were collected from the dirt floor of Shed #1 to assess for contaminants. The dirt floor of Shed #1 was compacted and the sampling device could only penetrate to a depth of approximately 0.1 m bgs. Measured concentrations of EC, SAR, sodium, and chloride were reported above background conditions in the two composite soil samples collected. The concentration of total barium and PHC parameter F3 exceeded the applicable guidelines in both composite samples. The concentration of PHC parameter F2 exceeded the applicable guideline in one composite sample.

I-1.1.9 2015

Site activities included removal of the tank farm, identification and removal of buried material, and assessing subsurface conditions. The conclusions and key findings of Site activities were as follows:

- The tank farm was decommissioned and removed during August 2015. Metal from the tank farm was compressed and packaged for removal via barge;
- The EM (electromagnetic) survey identified 15 subsurface anomalies which were investigated. Uncovered debris was removed. Two areas of elevated conductivity were identified on the northern half of the Site and to the west of the former tank farm, respectively;
- IEG Site assessment activities included installation of 124 boreholes and collection of groundwater samples from the existing piezometers on-site;
- Background soil and groundwater guidelines were established for the Site. Reported parameter concentrations for background soil samples were below the method detection limit and/or Government of Northwest Territories (GNWT) guideline for each parameter analyzed in 2015.

- pH values were reported below the guideline range in 56 samples collected from various locations across the extent of the Site. pH values reported for background samples were within the guideline range.
- Electrical conductivity (EC) values above the GNWT guideline were observed in three samples collected from one borehole at the airstrip. Remaining analyzed samples had reported EC values below the GNWT guideline.
- True total barium concentrations were reported above the Alberta Environment (AENV) guideline in three samples collected from one borehole in the burn pit area, one borehole inside shed #1, and one borehole in the laydown/storage area.
- Concentrations of benzene exceeded the GNWT guideline in eight soil samples collected from eight boreholes in the tank farm area.
- Concentrations of toluene exceeded the GNWT guideline in 65 soil samples collected from three boreholes in the Shed #1 area, 29 boreholes in the tank farm area, three boreholes at the airstrip, 16 boreholes in the laydown/storage area, and one borehole in the camp area.
- Concentrations of ethylbenzene exceeded the GNWT guideline in nine samples collected from two boreholes in the burn pit area, one borehole in the laydown/storage area, and five boreholes in the tank farm area.
- Concentrations of xylenes exceeded the GNWT guideline in 28 samples collected from three boreholes in the laydown/storage area, four boreholes in the burn pit area, and 13 boreholes in the tank farm area.
- Concentrations of petroleum hydrocarbon (PHC) fraction F1 exceeded the GNWT guideline in 16 samples collected from one borehole in the laydown/storage area, two boreholes in the burn pit area, and eight boreholes in the tank farm area.
- Concentrations of PHC fraction F2 exceeded the GNWT guideline in 44 samples collected from three boreholes in the Shed #1 area, seven boreholes in the laydown/storage area, four boreholes in the burn pit area, and 18 boreholes in the tank farm area.
- Concentrations of PHC fraction F3 exceeded the GNWT guideline in 83 samples collected from four boreholes in the shed #1 area, five boreholes at the airstrip, 23 boreholes in the laydown/storage area, two boreholes in the camp area, four boreholes in the burn pit area, 30 boreholes in the tank farm area, and two boreholes in the tundra area.
- Concentrations of PHC fraction F4 exceeded the GNWT guideline in one sample collected from the burn pit area.
- Groundwater samples collected from two piezometers contained concentrations of total dissolved solids (TDS) that exceeded the GNWT guidelines. Groundwater samples collected from four piezometers contained concentrations of aluminum, cadmium, copper, iron, and selenium that exceeded the GNWT guidelines. One groundwater sample contained concentrations of naphthalene that exceeded the GNWT guideline.

APPENDIX II

Permits and Licenses

Environment and Climate Change Canada | Environnement et Changement climatique Canada

ENVIRONMENT CANADA
PERMIT

Migratory Birds - Sanctuary Permit for	**NWT-MBS-16-01** Permit no.
Northwest Territories province(s), territories	**9.** Issued under section
Randall Warren **Shell Canada Ltd.,** **P.O. Box 100 Station "M"** **Calgary, AB** **T2P 2H5** Permittee	**Migratory Bird Sanctuary Regulations** For the Minister

Date of issue : **February 17, 2016**
Date of expire: **December 31, 2016**

The Permittee is authorized to conduct care, maintenance and remediation of the Camp Farewell and Stockpile lease area in the Kendall Island Migratory Bird Sanctuary.

SPECIAL CONDITIONS

1. PROTECTION OF TERRESTRIAL HABITAT

1.1. The Permittee shall not conduct any activities in the Kendall Island Bird Sanctuary outside the Camp Farewell and Stockpile lease area.

1.2. The Permittee shall use portable ramps during loading or unloading ships or barges.

1.3. The Permittee shall not remove or relocate earth, except contaminated soils collected as part of a clean-up program.

1.4. The permittee shall not move any equipment or vehicles unless the ground is in a state capable of fully supporting the equipment of vehicle without rutting or gouging.

2. PROTECTION OF AQUATIC HABITAT

2.1. The Permittee shall not place dirt or debris into streams to serve as ramps for loading or unloading ships or barges.

3. The Permittee shall not cut any bank of a waterbody.

4. WILDLIFE DISTURBANCE AND INTERACTION

4.1. The Permittee shall not feed wildlife or attempt to attract wildlife.

4.2. The Camp Farewell airstrip is not permitted to be used from 10 May – 20 June and 25 August – 30 September, except for emergencies.

4.3. Aircraft activity is restricted to flights necessary to carry out care and maintenance of the Camp Farewell and Stockpile lease area.

4.4. Aircraft shall maintain a minimum horizontal distance of 1.5 km from any observed concentrations of migratory birds.

4.5. The Permittee shall notify the Manager of any birds nesting on the infrastructure within the lease area.

5. FUEL STORAGE AND HANDLING

5.1. The Permittee shall not allow oil, oil wastes or any other substance harmful to migratory birds to be deposited in waters or other areas frequented by migratory birds, or in a place from which the substances may enter waters frequented by migratory birds.

5.2. The Permittee shall permanently mark all fuel containers, including 205 L drums, with the Permittee's name.

6. HAZARDOUS MATERIALS AND CONTAMINANTS – HANDLING AND DISPOSAL

6.1. The Permittee shall have the appropriate Workplace Hazardous Material Information System, 'Material Safety Data Sheets' identification available on site.

6.2. The Permittee shall remove and dispose of all hazardous materials at an approved facility.

6.3. The Permittee shall conduct maintenance, oil changes, refueling and lubricating of mobile equipment no closer than 100 m from waterbodies (lakes, ponds and streams).

7. GARBAGE AND WASTE WATER HANDLING AND REMOVAL

7.1. The Permittee shall ensure that all domestic garbage and other wildlife attractants are inaccessible to wildlife at all times.

7.2. The Permittee shall regularly collect all waste, debris and domestic garbage and dispose of it using appropriate technology and accepted practices.

7.3. The Permittee shall inventory and dispose of any waste materials, construction materials, drilling materials or other materials on at least an annual basis to minimize accumulation within the permit area. The inventory of materials disposed and materials remaining within the permit area must be reported to the Manager.

8. REPORTING

8.1. The Permittee shall submit a report within thirty (30) days of the expiration date of this permit. The report shall describe all activities that occurred at Camp Farewell during 2016 including the time period of the Permittee's activities on site, location of soil sampling and laboratory results (if available) as well as remaining infrastructure and photos showing the current state of the Camp Farewell lease area in particular locations were work was conducted in 2016.

GENERAL CONDITIONS

1. The permit is not valid unless signed by the Permittee (holder) or authorized representative, in the space designated as "Permittee".

2. By signing this document you bind yourself to respect all terms and conditions of this permit.

3. The Permittee must comply with all other applicable Canadian laws and regulations.

4. Copy of signed permit must be carried by the field supervisor and Permittee when conducting this work and will be presented if asked by Police or Game Officer.

5. The Permittee shall display a copy of this permit in a conspicuous place in each campsite established to carry out this program.

6. All personnel (including employees, agents, contractors, volunteers, and visitors of the Permittee) and activities carried out under the authority of the permit fall under the conditions of the permit.

7. The Permittee shall ensure that a copy of this Permit, operating conditions and definitions is provided, understood and adhered to by all contractors and sub-contractors prior to the start-up of the permitted activity

8. Additional restrictions may be required and may be added to this permit by the Minister if it is deemed necessary to ensure compliance with the Migratory Birds Convention Act and the Regulations.

9. Issuance of this permit does not supersede the necessity or legal requirement to acquire any other pertinent Territorial or Municipal license and or permit which may otherwise be applicable. This permit is not transferable to any other person(s) or organization(s) and is not valid if altered in any way.

10. If the Permittee proposes to conduct any activities that are not identified in the original permit application, the Permittee shall notify the Manager and, if necessary, apply for a new or amended permit to conduct the new activities.

11. The Permittee is authorized to possess firearms in the Kendall Island Migratory Bird Sanctuary for protection from dangerous wildlife only.

12. This permit may be revoked at any time at the discretion of the Minister.

DEFINITIONS

Manager: 'The Manager', Northern Conservation Section, Canadian Wildlife Service, Environment Canada or his/her designate.

Minister: The Minister of the Environment.

Permittee: The party to whom a CWS Sanctuary Permit is issued for conducting activities in a Migratory Bird Sanctuary.

Waterbody: Any river, stream, creek, lake, or pond.

Camp: A collection of accommodations, maintenance, transportation, and storage facilities located either permanently or temporarily at a site.

Sub-permit holder and/or nominee(s):
On site field supervisor, Tervita Corporation (to be determined)
Field staff to include personnel from Tervita and IEG (4 staff) and Mackenzie Delta Industrial Oilfield Services (10-15 staff).

I declare that I have read and understand this Permit, including all the conditions attached.

Signature of Permittee

WATER REGISTER: N7L1-1834

July 18, 2012

Mr. Randal Warren
Manager; DAR and Drilling Waste
Projects and Technology
Shell Canada Energy
400- 4th Avenue S.W.
P.O. Box 100, Station M
Calgary, Alberta T2P 2H5

Dear Mr. Warren:

Re: Issuance of a Type "B" Water Licence- Camp Farewell

Attached is Water Licence N7L1-1834 granted by the Northwest Territories Water Board (the Board) in accordance with the *Northwest Territories Waters Act*. A copy of this Licence has been filed in the Public Registry at the Board offices in Yellowknife and in Inuvik. Water Licence N7L1-1834 has been approved for a period of five years commencing July 18, 2012 and expiring July 17, 2017. Also attached are the general procedures for the administration of Licences in the Northwest Territories. Please review these carefully and address any questions to one of the Board offices.

Please be advised that this letter, with attached procedures, all inspection reports and correspondence related thereto are part of the Board public registry and are intended to keep all interested parties informed of the manner in which the Licence requirements are being met. All public registry material will be considered if an amendment to the Licence or its renewal is requested.

In accordance with the Northwest Territories Water Regulations (NTWR) section 6(1) and 9(1)(b) there will be a requirement for a further payment of the water use fee based on the approved water use of 150 cubic metres per day. The annual water use fee has been calculated to be $547.50 and is payable to the Receiver General of Canada on the anniversary of the date of issuance of the licence as per section 9(6)(b)(ii) of the NTWR. At the time of your Water Licence application there was a payment of $30.00 for the first year fee payment and there remains a balance of $517.50 to be paid for the water use fee at the time the Licence is issued.

Please note for future Water Licence applications in accordance with NTWR section 6(1) an application for a Licence or for the amendment or renewal of a Licence shall be accompanied by a deposit equal to any water use fee that would be payable in respect of the first year of the Licence that is being applied for.

Please read all the conditions carefully and note that in accordance with the attached Water Licence Part B, condition 10, a security deposit in the amount of $2,000,000.00 shall be posted with the Minister and copied to the Board prior to the start of the operation pursuant to section 17 of the *Northwest*

Territories Waters Act. Submit payment of the security, made out to the Receiver General for Canada in the amount of $2,000,000.00, to: Aboriginal Affairs and Northern Development Canada, P.O. Box 1500, Yellowknife, NT, X1A 2R3 Attention: Robert Jenkins.

Supplemental information to be submitted by Licensee as required through Licence conditions:

- post and maintain security deposit (by August 17, 2012)
- an Annual Report (by March 31, 2013-2017);
- a map or drawing of SNP sampling locations (by August 17, 2012)
- post signs to identify SNP sampling stations (by August 17, 2012)
- an updated operation and maintenance plan for the Waste Disposal Facilities (by August 17, 2012)
- an updated Emergency Response & Spill Contingency Plan (by August 17, 2012)
- an updated Abandonment and Restoration Plan (by July 17, 2013)
- submit to an Analyst for approval a Quality Assurance/Quality Control Plan (by August 17, 2012)

The full cooperation of Shell Canada Energy is anticipated and appreciated.

Should you have any further questions or concerns, please communicate with the Northwest Territories Water Board by telephone at (867) 678-2942 or via e-mail at info@nwtwb.com.

Sincerely,

Eddie Dillon
Chairperson
NWT Water Board

Attached: Water Licence N7L1-1834
General Procedures for the administration of licences issued under the *Northwest Territories Waters Act* in the Northwest Territories

Distribution: Conrad Baetz, AANDC-NMDO
Robert Jenkins, AANDC-WRD
Krista Beavis, Klohn Crippen Berger
Patrick Clancy, GNWT-ENR
Rick Walbourne, DFO
Stacey LeBlanc, EC

GENERAL PROCEDURES FOR THE ADMINISTRATION OF LICENCES ISSUED UNDER THE *NORTHWEST TERRITORIES WATERS ACT* IN THE NORTHWEST TERRITORIES

1. At the time of issuance, a copy of the Licence is placed on the Northwest Territories Water Board public registry in the Yellowknife and Inuvik Offices, and is then available to the public.

2. To enforce the terms and conditions of the Licence, the Minister of Aboriginal Affairs and Northern Development Canada has appointed Inspectors in accordance with Section 35(1) of the *Northwest Territories Waters Act*. The Inspectors coordinate their activities with officials of the Water Resources Division of Aboriginal Affairs and Northern Development Canada. The Inspector responsible for Licence N7L1-1834 is located in the North Mackenzie District Office in Inuvik.

3. To keep the Northwest Territories Water Board and members of the public informed of the Licensee's conformity to Licence conditions, the Inspectors prepare reports which detail observations on how each item in the Licence has been met. These reports are forwarded to the Licensee with a covering letter indicating what action, if any, should be taken. The inspection reports and covering letters are places on the Northwest Territories Water Board public registry, as are any responses received from the Licensee pertaining to the inspection reports. It is therefore of prime importance that you react in all areas of concern regarding all inspection reports so that these concerns may be clarified.

4. If the renewal of Licence N7L1-1834 is contemplated it is the responsibility of the Licensee to apply to the Northwest Territories Water Board for renewal of the Licence. The past performance of the Licensee, new documentation and information, and points raised during a public hearing, if required, will be used to determine the terms and conditions of any Licence renewal. Please note that if the Licence expires and another has not been issued, then water and Waste disposal must cease, or you, the Licensee, would be in contravention of the *Northwest Territories Waters Act*. An application for renewal of Licence N7L1-1834 should be made at least eight (8) months in advance of the Licence expiry date.

5. If, for some reason, Licence N7L1-1834 requires amendment, then a public hearing may be required. You are reminded that applications for amendments should be submitted as soon as possible to provide the Northwest Territories Water Board with ample time to go through the amendment process. The process may take up to six (6) months or more depending on the scope of the amendment requested.

6. Specific clauses of your Licence make reference to the Board, Analyst or Inspector. The contact person, address, phone and fax number of each is:

Board:
Executive Director
Northwest Territories Water Board
P.O. Box 2531
Inuvik, NT X0E 0T0
Phone No: (867) 678-2942
Fax No: (867) 678-2943

Analyst:
Analyst
Taiga Environmental Laboratory
Aboriginal Affairs and Northern Development Canada
P.O. Box 1500, 4601 – 52nd Avenue
Yellowknife, NT X1A 2R3
Phone No: (867) 669-2788
Fax No: (867) 669-2718

Inspector:
Water Resource Officer
North Mackenzie District Office
Aboriginal Affairs and Northern Development Canada
P.O. Box 2100
Inuvik, NT X0E 0T0
Phone No: (867) 777-8900
Fax No: (867) 777-2090

7. Your Licence requires a security deposit be submitted. Should the security deposit be submitted in the form of a "letter of credit", recommended wording is outlined below. It is advised that a "draft" letter of credit be forwarded to Water Resources Division for review. The contact person, address, phone and fax number of the individual administering security deposits is:

Manager
Water Resources Division
Aboriginal Affairs and Northern Development Canada
P.O. Box 1500, 4923 – 52nd Street
YELLOWKNIFE, NT X1A 2R3
Phone No: (867) 669-2654
Fax No: (867) 669-2716

[BANK ADDRESS]

IRREVOCABLE LETTER OF CREDIT
[The term "DOCUMENTARY CREDIT" may also be used instead of "Letter of Credit"]

DATE OF ISSUE: [Date] **OUR REFERENCE NUMBER:** [Bank's reference number]
AMOUNT: CAD$#########.00
MAXIMUM #########.00
CANADIAN DOLLARS ONLY

APPLICANT:	**BENEFICIARY:**
["Customer" can be used instead of "Applicant"]	RECEIVER GENERAL FOR CANADA ON BEHALF OF THE MINISTER OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT
[Company's Name]	4923 – 52nd STREET, 2nd FLOOR
[Company's Address]	P.O. BOX 1500
	YELLOWKNIFE, NT X1A 2R3
	ATTENTION: REGIONAL DIRECTOR GENERAL
	DIAND - NT REGION

RE: **SECURITY PURSUANT TO** [the Water Licence Type and Number]

AT THE REQUEST AND FOR THE ACCOUNT OF [Company's Name] (THE "APPLICANT"), WE, [Bank's Name], HEREBY ESTABLISH IN YOUR FAVOUR OUR IRREVOCABLE LETTER OF CREDIT NO. [Bank's Reference Number] ("CREDIT") FOR SUMS NOT EXCEEDING IN THE AGGREGATE [Amount of Security required stated in Canadian Dollars].

THIS CREDIT IS AVAILABLE WITH US FOR DRAWING AT SIGHT, WITHOUT ENQUIRY AS TO WHETHER YOU HAVE RIGHT AS BETWEEN YOURSELF AND THE APPLICANT TO MAKE SUCH DEMAND AND WITHOUT RECOGNIZING ANY CLAIM OF THE APPLICANT, AGAINST PRESENTATION TO US, BY YOU OR YOUR DULY AUTHORIZED REPRESENTATIVE OR AGENT, OF THE FOLLOWING DOCUMENTS:

1. A SIGHT DRAFT DRAWN ON [Bank's Name and Address of the Branch that the security can be drawn at, usually one of the Bank's larger commercial banking centres]; AND
2. THE ORIGINAL OF THIS IRREVOCABLE LETTER OF CREDIT NO. [Bank's Reference Number] FOR ENDORSEMENT OF PAYMENT THEREON; AND

3. A STATEMENT SIGNED BY AN OFFICIAL OF THE DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT CERTIFYING

A) THAT THE SIGNATORY IS AN OFFICIAL OF THE DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT AND HAS AUTHORITY TO SIGN THE STATEMENT ON BEHALF OF THE MINISTER OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT (THE "MINISTER"), AND

B) EITHER

I THAT THE MINISTER IS ENTITLED TO APPLY THE AMOUNT DRAWN, BEING ALL OR PART OF THE SECURITY POSTED AND MAINTAINED PURSUANT TO [the Water Licence Type and Number] ISSUED BY THE NORTHWEST TERRITORIES WATER BOARD, WHETHER AS ORIGINALLY ISSUED OR AS AMENDED OR RENEWED FROM TIME TO TIME, OR

II THAT THIS LETTER OF CREDIT IS DUE TO EXPIRE IN THIRTY (30) DAYS OR LESS AND THAT THE APPLICANT HAS NOT REPLACED THIS CREDIT BY POSTING WITH THE MINISTER OTHER SECURITY SATISFACTORY TO THE MINISTER.

PARTIAL DRAWINGS ARE PERMITTED.

THIS CREDIT IS EFFECTIVE FROM [Time] .AM. ON [Effective Date as required by Water Licence] AND SHALL EXPIRE AT OUR COUNTERS AT [Time] P.M. [Expiry Date] (THE "INITIAL EXPIRATION DATE"). THIS CREDIT SHALL BE RENEWED AUTOMATICALLY FOR AN ADDITIONAL ONE-YEAR PERIOD FROM THE INITAL EXPIRATION DATE, AND FOR AN ADDITIONAL ONE-YEAR PERIOD FROM EACH FUTURE EXPIRATION DATE, UNLESS AT LEAST NINETY (90) DAYS PRIOR TO THE OPERATIVE EXPIRATION DATE WE NOTIFY YOU IN WRITING BY REGISTERED MAIL OR COURIER THAT WE ELECT NOT TO CONSIDER THIS CREDIT RENEWED FOR SUCH ADDITIONAL PERIOD.

WE HEREBY AGREE THAT ALL DRAFTS DRAWN UNDER AND IN COMPLIANCE WITH THE TERMS OF THIS CREDIT SHALL BE DULY HONOURED BY US IF PRESENTED FOR PAYMENT ON OR BEFORE THE OPERATIVE EXPIRATION DATE.

EXCEPT SO FAR AS IS OTHERWISE EXPRESSLY STATED HEREIN, THIS CREDIT IS SUBJECT TO THE UNIFORM CUSTOMS AND PRACTICE FOR DOCUMENTARY CREDITS (1993 REVISION), INTERNATIONAL CHAMBER OF COMMERCE, PUBLICATION NO. 500. NOTWITHSTANDING ARTICLE 17 OF SAID PUBLICATION, IS THIS CREDIT EXPIRES DURING AN INTERRUPTION OF BUSINESS AS DESCRIBED IN ARTICLE 17, WE AGREE TO EFFECT PAYMENT IF THIS CREDIT IS

DRAWN ON US WITHIN FIFTEEN (15) DAYS AFTER THE RESUMPTION OF BUSINESS.

[Bank's Name]

_____ _____

[Official's Name and Position] [Official's Name and Position]

NORTHWEST TERRITORIES WATER BOARD

Pursuant to the *Northwest Territories Waters Act* and Regulations the Northwest Territories Water Board, hereinafter referred to as the Board, hereby grants to

SHELL CANADA ENERGY
(Licensee)

of 400- 4 Avenue S.W., P.O. Box 100, Station M
CALGARY, ALBERTA T2P 2H5
(Mailing Address)

hereinafter called the Licensee, the right to alter, divert or otherwise use water subject to the restrictions and conditions contained in the *Northwest Territories Waters Act* and Regulations made thereunder and subject to and in accordance with the conditions specified in this Licence.

Licence Number	N7L1-1834
Licence Type	"B"
Water Management Area	NORTHWEST TERRITORIES 07
Location	Within a two kilometre radius of Latitude 69°12'30" N. Longitude135°06'04" W. MACKENZIE RIVER DELTA, N.W.T
Purpose	TO USE WATER AND DISPOSE OF WASTE FOR INDUSTRIAL UNDERTAKINGS AND ASSOCIATED USES
Description	OIL AND GAS EXPLORATION AND DEVELOPMENT
Quantity of Water Not To Be Exceeded	150 CUBIC METRES DAILY
Effective Date of Licence	JULY 18TH, 2012
Expiry Date of Licence	JULY 17TH, 2017

This Licence issued and recorded at Inuvik includes and is subject to the annexed conditions.

NORTHWEST TERRITORIES WATER BOARD

Witness

Chairperson (Eddie Dillon)

PART A: SCOPE AND DEFINITIONS

1. Scope

a) This Licence entitles Shell Canada Energy to use water and dispose of Waste as an industrial undertaking associated with oil and gas exploration and development in the Mackenzie Delta at Farewell Camp and Stockpile Site (Camp Farewell) located at Latitude 69°12'30" North, and Longitude 135°06'04" West, Northwest Territories;

b) This Licence is issued subject to the conditions contained herein with respect to the taking of water and the depositing of Waste of any type in any Waters or in any place under any conditions where such Waste or any other Waste that results from the deposits of such Waste may enter any Waters. Whenever new Regulations are made or existing Regulations are amended by the Governor in Council under the *Northwest Territories Waters Act*, or other statutes imposing more stringent conditions relating to the quantity or type of Waste that may be so deposited or under which any such Waste may be so deposited, this Licence shall be deemed, upon promulgation of such Regulations, to be automatically amended to conforming to such Regulations; and

c) Compliance with the terms and conditions of this Licence does not absolve the Licensee from responsibility for compliance with the requirements of all applicable Federal, Territorial and Municipal legislation.

d) This Licence is issued subject to the conditions contained herein with respect to the use of Waters as prescribed in Section 8 of the *Act* and the deposit of Waste to any Waters as prescribed in Section 9 of the *Act*.

2. Definitions

In this Licence: **N7L1-1834**

"Act" means the *Northwest Territories Waters Act*;

"Analyst" means an Analyst designated by the Minister under Section 35(1) of the *Northwest Territories Waters Act*;

"Average Concentration" means the discrete average of up to four (4) consecutive analytical results submitted to the Board in accordance with the sampling and analysis requirements specified in the "Surveillance Network Program";

"Board" means the Northwest Territories Water Board established under Section 10 of the *Northwest Territories Waters Act*;

"Freeboard" means the vertical distance between water line and the lowest elevation of the effective water containment crest on a dam or dyke's upstream slope;

"Geotechnical Engineer" means a professional engineer registered with the Northwest Territories and Nunavut Association of Professional Engineers and Geoscientists whose principal field of specialization is the design and construction of earthworks in a permafrost environment;

"Greywater" means all liquid Wastes from showers, baths, sinks, kitchens and domestic washing facilities, but does not include toilet Waste;

"Inspector" means an Inspector designated by the Minister under Section 35(1) of the *Northwest Territories Waters Act*;

"Licensee" means the holder of this Licence;

"Minister" means the Minister of Aboriginal Affairs and Northern Development Canada (AANDC);

"Modification" means an alteration to a physical work that introduces a new structure or replaces an existing structure and does not alter the purpose or function of the work, but does not include an expansion;

"Regulations" mean Regulations proclaimed pursuant to Section 33 of the *Northwest Territories Waters Act;*

"Sewage" means all toilet Wastes and Greywater;

"Sewage Treatment Facilities" comprises the area and engineered structures designed to contain Sewage as identified in the project description and also include a Sump constructed of impervious material and/or with an impervious liner;

"Sump" means an excavation for the purpose of catching or storing water and/or Waste;

"Waste" means Waste as defined by Section 2 of the *Northwest Territories Waters Act*;

"Waste Disposal Facilities" mean all facilities designated for the disposal of Waste and include the Sewage disposal facilities, solid Waste disposal facilities, and bagged toilet Wastes disposal facilities;

"Water Supply Facilities" mean all facilities designed to collect, treat and supply water for industrial purposes; and

"Waters" mean Waters as defined by Section 2 of the *Northwest Territories Waters Act*;

PART B: GENERAL CONDITIONS

1. The Licensee shall file an Annual Report with the Board not later than March 31st of the year following the calendar year reported which shall contain the following information:

    a) the monthly and annual quantities in cubic metres of fresh water obtained from all sources;

    b) the monthly and annual quantities in cubic metres of each and all Waste discharged;

    c) the location and direction of flow of all Waste discharged to the water or the land;

    d) a summary of the monthly and annual quantities of Waste stored on site and transported off site;

    e) the results of sampling carried out under the "Surveillance Network Program";

    f) a summary of any Modifications carried out on the Water Supply Facilities and Sewage Treatment Facilities, including all associated structures;

    g) a list of any spills and unauthorized discharges;

    h) details on the restoration of any Sumps;

    i) a summary of any abandonment and restoration work completed during the year and an outline of any work anticipated for the next year;

j) a summary of any studies requested by the Board that relate to Waste disposal, water use, or reclamation, and a brief description of any future studies planned;

k) notation of updates and/or revisions to the approved Spill Contingency Plan, Waste Disposal Facilities operations and maintenance plan, and sewage treatment plan;

l) an outline of any spill training and communications exercises carried out; and

m) any other details on water use or Waste disposal requested by the Board within forty-five (45) days before the annual report is due.

2. The Licensee shall comply with the "Surveillance Network Program" annexed to this Licence, and any amendment to the said "Surveillance Network Program" as may be made from time to time, pursuant to the conditions of this Licence.

3. The "Surveillance Network Program" and compliance dates specified in the Licence may be modified at the discretion of the Board.

4. The Licensee shall, within thirty (30) days of the issuance of this Licence, submit to the Board for approval a map or drawing indicating the location of all Surveillance Network Program sampling stations.

5. The Licensee shall, within thirty (30) days of the issuance of this Licence, post the necessary signs to identify the stations of the "Surveillance Network Program". All postings shall be located and maintained to the satisfaction of an Inspector.

6. Any meters, devices or other such methods used for measuring the volumes of water used or Waste disposed and discharged shall be installed, operated and maintained by the Licensee to the satisfaction of an Inspector.

7. The Licensee shall immediately report to the 24 Hour Spill Report Line (**867-920-8130**) any spills which are reported to, or observed by, the Licensee within the project boundaries.

8. All monitoring data shall be submitted in printed form and electronically in spreadsheet format on a diskette or other electronic forms acceptable to the Board.

9. All reports shall be submitted to the Board in printed format accompanied by an electronic copy in a common word processing format on diskette or other electronic forms acceptable to the Board.

10. Within thirty (30) days of issuance of this Licence, the Licensee shall have posted and shall maintain a security deposit in the amount of Two Million ($2,000,000.00) Dollars pursuant to Section 17 of the *Act* and Section 12 of the Regulations, in a form suitable to the Minister. The security deposit shall be maintained until such time as it is fully or in part refunded by the Minister pursuant to Section 17 of the *Act*.

11. The Licensee shall ensure a copy of this Licence is maintained at the site of operation at all times.

PART C: CONDITIONS APPLYING TO WATER USE

1. The Licensee shall obtain water from the Middle Channel of the Mackenzie River in winter or the unnamed lake north of the camp in summer as described in the project description, or as otherwise approved by an Inspector.

2. The daily quantity of water used for all purposes shall not exceed 150 cubic metres.

PART D: CONDITIONS APPLYING TO WASTE DISPOSAL

1. The Licensee shall within thirty (30) days of the issuance of this Licence, submit to the Board for approval an updated operation and maintenance plan for the Waste Disposal Facilities. This plan shall include but not necessarily be limited to details on the design, operational capacity, management and maintenance, and disposal of sludges.

2. All Sewage shall be directed to the onsite Sewage Treatment Facilities as approved by an Inspector.

3. The Sewage Treatment Facilities shall be maintained and operated in such a manner as to prevent structural failure to the satisfaction of the Inspector.

4. All Waste discharged from the onsite Sewage lagoon shall be directed to the channel of the Mackenzie River at a location approved by an Inspector.

5. There should be no discharge of floating solids, garbage, grease, free oil or foam.

6. All effluent discharged by the Licensee from the Sewage lagoon at "Surveillance Network Program" Station Number 1834-1 shall meet the following effluent quality requirements:

Sample Parameter	Average Concentration
BOD_5	70.0 mg/L
Total Suspended Solids	70.0 mg/L
Faecal Coliforms	1 X 10^4 CFU/dL
Oil and Grease	5.0 mg/L
Total Residual Chlorine (TRC)	0.1 mg/L

7. The effluent discharged shall have a pH between six (6) and nine (9) and no visible sheen of oil and grease.

8. Introduction of water to Waste for the purpose of achieving effluent quality requirements in Part D, Item 7 is prohibited.

9. A Freeboard limit of 1.0 metre shall be maintained at all times in the Sewage lagoon, or as recommended by a qualified Geotechnical Engineer and/or as approved by the Board.

10. The Licensee shall advise an Inspector at least five (5) days prior to initiating and decant of the Sewage lagoon.

11. All analyses shall be conducted in accordance with methods prescribed in the current edition of "Standard Methods for the Examination of water and Wastewater" or by such other methods as may be approved by an Analyst.

12. The Licensee shall contain all contaminated soil or contaminated snow in such a manner as to minimize the potential for migration of contaminants into any Waters, to the satisfaction of an Inspector.

13. The Licensee shall store, segregate and dispose of all solid and hazardous Wastes in a manner acceptable to the Inspector.

14. Unless authorized by this Licence, the Licensee shall ensure that any Wastes associated with this undertaking do not enter any water body.

15. The Licensee shall submit to the Board a copy of each agreement(s) between third parties to store, transport or dispose of Wastes. The copy submitted to the Board shall include, at a minimum, the following:

a. type of Waste;

b. quantities of Waste;

c. disposal location(s), and

d. proof of acceptance from third parties.

PART E: CONDITIONS APPLYING TO MODIFICATIONS

1. The Licensee may, without written approval from the Board, carry out Modifications to the planned undertakings provided that such Modifications are consistent with the terms of this Licence and the following requirements are met:

    a) the Licensee has notified an Inspector in writing of such proposed Modifications at least five (5) days prior to beginning the Modifications;

    b) such Modifications do not place the Licensee in contravention of either the Licence or the *Act*;

    c) an Inspector has not, during the five (5) days following notification of the proposed Modifications, informed the Licensee that review of the proposal will require more than five (5) days; and

    d) an Inspector has not rejected the proposed Modifications.

2. Modifications for which all of the conditions referred to in Part F, Item 1 have not been met may be carried out only with written approval from an Inspector.

3. The Licensee shall provide to the Board as-built plans and drawings of the Modifications referred to in this Licence within ninety (90) days of completion of the Modifications.

PART F: CONDITIONS APPLYING TO CONTINGENCY PLANNING

1. The Licensee shall submit to the Board for approval within thirty (30) days of issuance of this Licence an updated Emergency Response & Spill Contingency Plan in accordance, for example, with the *Guidelines for Spill Contingency Planning, April 2007,* developed by AANDC-Water Resources Division.

2. The Licensee will maintain a copy of the approved Emergency Response & Spill Contingency Plan onsite in a readily available location, to the satisfaction of an Inspector.

3. The Licensee shall ensure that petroleum products, hazardous material and other Wastes associated with the project do not enter any Waters.

4. The Licensee shall ensure that all containment berms are constructed of an impermeable material, to the satisfaction of an Inspector.

5. The Licensee shall ensure that fuel stored in each tank within the tank farm be no greater than 85% of the tank's capacity to allow for expansion and avoid overflows.

6. If, during the period of this Licence, an unauthorised discharge of Waste occurs, or if such a discharge is foreseeable, the Licensee shall:

    a) report the incident immediately via the 24 Hour Spill Reporting Line (867) 920-8130; and

    b) submit to an Inspector a detailed report on each occurrence not later than thirty (30) days after initially reporting the event.

PART G: CONDITIONS APPLYING TO ABANDONMENT AND RESTORATION

1. The Licensee shall submit to the Board for approval within one (1) year of issuance of this Licence, an updated Interim Abandonment and Restoration Plan including plans for the abandonment and restoration of the Sewage lagoon and a complete Phase II environmental site assessment of Camp Farewell. This assessment will include the full delineation of contamination (soil and water) associated with Camp Farewell operations, located both on and off the gravel base pad.

2. The Licensee shall implement this Plan as and when approved by the Board.

3. Following approval of the Plan, the Licensee shall review the Abandonment and Restoration Plan every two (2) years and shall modify the Plan as necessary to reflect changes in operations and technology. All proposed Modifications to the Plan shall be submitted to the Board for approval.

NORTHWEST TERRITORIES WATER BOARD

Chairman

Witness

NORTHWEST TERRITORIES WATER BOARD

LICENSEE: Shell Canada Energy

LICENCE NUMBER: N7L1-1834

EFFECTIVE DATE OF LICENCE: July 18, 2012

EFFECTIVE DATE OF SURVEILLANCE NETWORK PROGRAM: July 18, 2012

SURVEILLANCE NETWORK PROGRAM

A. Location of Sampling Stations

Station Number	Description
1834-1	Discharge from the Sewage lagoon.

B. Sampling and Analysis Requirements

1. Water at Station Number 1834-1 shall be sampled prior to, and once during decanting. Each sample shall be analyzed for the following parameters:

BOD5	Total Suspended Solids
Oil and Grease	Faecal Coliforms
Ammonia	pH
Phosphorous	Total Residual Chlorine

2. More frequent sample collection may be required at the request of an Inspector.

3. All sampling, sample preservation, and analyses shall be conducted in accordance with methods prescribed in the current edition of "Standard Methods for the Examination of Water and Wastewater", or by such other methods approved by an Analyst.

4. All analysis shall be performed in a laboratory approved by an Analyst.

5. The Licensee shall, by August 17, 2012, submit to an Analyst for approval a Quality Assurance/Quality Control Plan.

6. The Plan referred to in Part B, Item 5 shall be implemented as approved by an Analyst.

C. Reports

1. The Licensee shall, within thirty (30) days following the month of discharge from the Sewage lagoon, submit to the Board and an Inspector all data and information required by the "Surveillance Network Program" including the results of the approved Quality Assurance/Quality Control Plan.

NORTHWEST TERRITORIES WATER BOARD

Chairman **Witness**

Northwest Territories Water Board
Reasons for Decision

Issued pursuant to section 26 of the
Northwest Territories Waters Act, S.C. 1992 C.39

Water Licence Number: N7L1-1834(Type B)

This is the decision of the Northwest Territories Water Board (Board) for the issuance of Water Licence N7L1-1834. The project is located at Latitude 69°12'30" North and Longitude 135°06'04" West in the Northwest Territories.

The Northwest Territories Water Board issued Licence N7L1-1834 in accordance with Section 14 of the *Northwest Territories Waters Act*.

Background:

Shell Canada Energy applied to the Board on March 5th, 2012 for a Water Licence for Farewell Camp and Stockpile Site (Camp Farewell) in the Mackenzie Delta. The Board deemed the application complete on May 23, 2011.

Canadian Environmental Assessment Act (CEAA)
The Water Licence application was exempt from the Canadian Environmental Assessment Act under Section 7(1)(a), specifically under Schedule 1, Part 1, Section 3(a) of the Exclusion List Regulations.

Environmental Impact Screening Committee (EISC)
On April 20, 2012 the Board received an official notification from the Environmental Impact Screening Committee that determined the application met the definition of development and that it was exempt from the screening process, as it qualified under exclusion #1 of Environmental Impact Screening Guidelines, Appendix C.

Notice of Application
In accordance with rule 38 of the Board Rules of Procedure, the Board gave notice of the application for a Water Licence regarding Camp Farewell, on May 28, 2012 in News North in English, May 31, 2012 in the Inuvik Drum in Inuvialuktun, and May 25, 2012 in L'Aquilon in French.

Reviewers' Comments
The Board sent the Water Licence application and supporting information for review to the following agencies: AANDC-NMDO, AANDC-WRD, EC, DFO and GNWT-ENR on May 23, 2012. The Board received written comments from AANDC (June 15, 2012), EC (June 15, 2012), DFO (May 28, 2012) and GNWT-ENR (June 14, 2012).

The Board considered all submitted comments at a Board meeting held via teleconference on July 10, 2012. The Board approved a Water Licence for the applicant's review. The Licence was submitted to the applicant on July 11, 2012 and it indicated in its response on July 16, 2012 that the Licence was acceptable.

Requirements of the Northwest Territories Waters Act:

Shell Canada Energy has provided the Board with its Schedule III application and supporting information for its consideration as required by section 16 of the *Northwest Territories Waters Act*.

The Board is in accordance with Paragraph 14(4)(a) of the *Northwest Territories Waters Act* by ensuring that the granting of the Water Licence to Shell Canada Energy will not adversely affect, in a significant way, any existing Licensee, providing the conditions of Water Licence N7L1-1834 are met. There are no other applicants with precedence.

The Board does not believe that any users nor persons listed in Paragraph 14(4)(b) of the *Northwest Territories Waters Act* will be adversely affected by the use of waters or the deposit of waste proposed by the Licensee provided that the Licensee operates in accordance with the terms and conditions of Water Licence N7L1-1834.

The Board is of the view that compliance with Water Licence N7L1-1834 terms and conditions will ensure that the waste will be treated and deposited in a manner that will maintain water quality in the area and will be consistent with applicable water quality standards in accordance with Sub-Paragraph 14(4)(c) (i) of the *Northwest Territories Waters Act*.

The Board drafted the terms and conditions of Water Licence N7L1-1834 in accordance with Section 15 of the *Northwest Territories Waters Act*.

In Accordance with Sub-Section 17(1) of the *Northwest Territories Waters Act*, the Board requested that a security deposit in the amount of two million dollars ($2,000,000.00) be posted and shall be maintained in a form suitable to the Minister of Aboriginal Affairs and Northern Development Canada.

Decision to issue Water Licence N7L1-1834:

The Board has reviewed the Camp Farewell Project Application and draft Water Licence N7L1-1834 for issuance. Upon consideration of the facts and circumstances, the purpose, scope and intent of the *Northwest Territories Waters Act,* the Board has determined that it can issue Water Licence N7L1-1834.

For the above reasons the Board has determined to issue Water Licence N7L1-1834 in accordance with Sub-Section 14(1) and Sub-Paragraph 14(6)(b)(i) of the *Northwest Territories Waters Act* for the use of water and the deposit of wastes.

SIGNED this 18 day of July, 2012 on behalf of the Northwest Territories Water Board.

Eddie Dillon

Chairperson, Northwest Territories Water Board

APPENDIX III

Site Photographs

Photograph 1: View south of barge camp secured to bollard on shore (July 14, 2016).

Photograph 2: View northwest of Zone 2 excavation (August 29, 2016).

Photograph 3: Impacted soil windrowed and being treated with an Allu bucket (August 6, 2016).

Photograph 4: View northeast of excavated area being backfilled with treated soil (August 5, 2016).

Photograph 5: View south of shed #1 building in good condition and soil bags prepared for removal off-site (August 19, 2016).

APPENDIX IV

GPRA Risk Assessment

GatePost
Risk Analysis

Risk-Based remediation for Camp Farewell, Mackenzie Delta, Northwest Territories.

Submitted to:

IEG Consultants Ltd.

Submitted by:

GatePost Risk Analysis

January 2017

Table of Contents

Summary

Camp Farewell is a former oil exploration and staging camp located on the main channel of the Mackenzie River Delta. Remediation of the site is currently underway; a qualitative, screening level risk assessment was performed to evaluate risks of leaving contaminants in place at greater than 1.0 m below ground surface.

The camp is located in an arctic geoclimatic zone with permafrost underlying the site and frozen conditions / snow cover for a significant portion of the year. It is situated at the southernmost end of the Kendall Island Migratory Bird Sanctuary. No known SARA listed species frequent the site area, however, many species of waterfowl and shorebirds use the sanctuary for breeding and nesting. Arctic herbivores and carnivores are common in the Mackenzie Delta, as are raptor species. Vegetation is typically low willow scrub, shrubs, arctic grasses and sedges, and lichen.

Groundwater is unlikely to be used as a source for drinking water due to the shallow permafrost, freeze-thaw cycles, and other nearby sources of freshwater. Also, the lease area is greater than 10 m away from the Mackenzie River and at least 100 m from the nearest wetland. Together these observations rule out groundwater as a significant exposure pathway for human or ecological receptors.

The remediation efforts currently underway aim to remove the top 1.0 m of soil from the contaminated areas of the site, followed by on-site treatment. This risk evaluation assumes surface soil will meet relevant GNWT guidelines; therefore, it is based on contaminants remaining in soil deeper than 1.0 m.

Our screening level risk assessment of the post-remediation scenario at Camp Farewell resulted in elimination of the following exposure pathways: groundwater to drinking water; groundwater to freshwater aquatic life; direct soil contact or ingestion; and indoor vapour transport. The majority of GNWT *de minimis* guidelines are based on protection of groundwater for drinking water or groundwater for freshwater aquatic life. These pathways were eliminated based on the shallow soil active zone where any groundwater would freeze annually, the permafrost barrier near 1.5 m, the distance to surface water bodies, and the remediation of surface soil to GNWT guidelines.

VOCs and barium (the only metal that exceeded a guideline) may also be ruled out as contaminants of concern in the subsoil because of elimination of the groundwater to drinking water and groundwater to freshwater aquatic life pathways. Concentrations of the VOCs and barium are well below thresholds for ecological direct contact.

For PHCs in subsoil, the remaining potential exposure pathway is ecological direct contact, after accounting for depth and associated mechanisms of contaminant transport. Maximum F2 and F3 in the tank farm area exceeded the GNWT subsoil eco contact guidelines – however, less than 4% of the 2015-2016 tank farm area samples exceeded these values. Leaving these higher concentrations of contaminants in place is expected to result in very low risks of exposures to F2 or F3 that could result in adverse effects for any ecological receptors. Additionally, further excavation is more likely to affect the integrity of the permafrost across the site. GPRA recommends leaving the remaining PHCs in the ground in the Tank Farm area. Remaining contaminants in all other areas are expected to contribute negligible exposures to terrestrial ecological receptors and people accessing the site for recreational purposes.

Introduction

Camp Farewell was used as an accommodation, storage, and staging site as part of the Shell Mackenzie Delta Drilling Program from 1971 until about 1994. Details of the site history are available in other reports [1]. Its location has a number of physical and temperate characteristics that require further consideration for the best approach to remediation. These include vegetation species, root zones, and soil organisms; wildlife receptors; human receptors and the most-likely human use scenarios. Each of these will be covered in the Problem Formulation, which is essentially a screening level risk assessment.

Surface soil across the contaminated areas of the site has been removed to a depth of 1.0 m. The following screening level risk assessment will evaluate future exposure pathways with the assumption that the removed soil will be put back in place following on-site remediation, and that contaminant concentrations will meet appropriate guidelines in this soil.

Scope

GatePost Risk Analysis (GPRA) was engaged by IEG Consultants Ltd to provide a risk assessment of the Camp Farewell site, with a goal of providing direction to IEG and their client on remediation activities. This assessment is a qualitative, screening level risk assessment, focused on site-appropriate exposure pathway elimination. No site-specific target levels are calculated in this assessment. Rather, we will evaluate the site characteristics of Camp Farewell against existing guidelines using a risk assessment approach, and apply protective contaminant concentration limits from existing sources that are most appropriate for the site. If site-specific target levels for Camp Farewell are required, GPRA will proceed with quantitative modeling and calculations to derive target levels as a second phase of this project.

Assumptions

GPRA is undertaking this risk assessment and associated recommendations with the following assumptions:

- Site chemistry data are used as received from IEG.
- Site data such as sample depths, locations, and categorization of samples with regard to areas of former use (e.g. tank farm, burn pit, etc) are used as denoted in data files received from IEG.
- Contaminated soil excavated from site areas will be treated on-site to achieve GNWT surface soil guidelines, put back into excavated areas, and graded for effective surface water drainage.

Site Setting

The site is on the main channel of the Mackenzie River Delta, approximately 100 km NW of Inuvik. It is a remote area, accessible by air, by water in the summer, or winter road on the river depending on ice

[1] IEG Consultants Ltd 2015. Shell Canada Energy, Camp Farewell 2015 Decommissioning and Soil Assessment Program: Section 3.

conditions. For guideline purposes, the regional land use would be considered residential/parkland as it will be reclaimed to a natural state.

The area is at the southern-most portion of the Kendall Island Migratory Bird Sanctuary[2], which was established by the Canadian Wildlife Service in 1961. The sanctuary is a summer breeding and nesting ground for over 100 species, including waterfowl (e.g. Lesser Snow Goose, Tundra Swan, Sandhill Crane) and shorebirds (e.g. Long-billed Dowitcher, Hudsonian Godwits), some of which are unique to this region.

Activities that could harm migratory birds, nests, or eggs are prohibited. Therefore, although the site represents a small fraction of the overall sanctuary area, remediation and reclamation activities should recognize and mitigate the exposure pathways of migratory birds as appropriate.

Guidelines and References

Provinces and territories have specified guidance for remediation of contaminated sites, most of them using the CCME [3] guidelines or modifications thereof for human and ecological protection from contaminants in soil and water. Often the remediation approaches can have more than one level – a generic, or Tier 1 level that specifies contaminant concentration levels that must be achieved; a site-specific, or Tier 2 level that allows some adjustment to certain parameters in the site remediation, depending on specific site factors; and full risk-based site specific target level development in which a quantitative human health and ecological risk assessment is completed to calculate site specific soil quality guidelines.

Risk assessment guidance from Health Canada[4] and Environment Canada[5] build on CCME guidelines to provide more detailed methods for human health- and ecological risk assessments. Some provinces have specific risk assessment guidance that is derived from those agencies' documents and refined to coordinate with provincial policies, however, NWT does not have territory-specific risk assessment guidance. Therefore, this screening level risk assessment is based on general methods and approaches from the above agencies.

As mentioned above, a number of provincial or territorial agencies allow for full risk-based site-specific target level development. In this approach, the default assumptions used in developing Tier 1 or equivalent soil quality guidelines are evaluated against actual conditions or parameters at the contaminated site. Sufficient and appropriate site-specific data may be used to replace default values. Examples of site-specific data may include: local diets of key wildlife species that have been observed on the site; recorded weather patterns such as snow cover days per year; human use such as hunting, camping, fishing, and accompanying information regarding days per year the site is used and ingestion amounts of game, fish, berries, etc.

Receptors and pathways can differ on a specific site compared to the generic scenarios that are anticipated in most guidelines. This is an important consideration for Arctic sites in particular. The

[2] Kendall Island Migratory Bird Sanctuary (https://www.ec.gc.ca/ap-pa/default.asp?lang=En&n=A885ADAF-1)

[3] CCME 2016. Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment. Volumes 1 through 4. Canadian Council of Ministers of the Environment.

[4] Health Canada 2012. Federal Contaminated Site Risk Assessment in Canada. Part I. Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA), Ver. 2.0, Revised 2012.

[5] Government of Canada, 2012. Federal Contaminated Sites Action Plan (FCSAP). Ecological Risk Assessment Guidance.

contaminated site soil quality guidelines derived by the CCME are predominantly based on organisms (plants, invertebrates, wildlife) whose habitat is in temperate and southern climates of Canada. For example, a key factor in a number of guideline values is toxicity to soil invertebrates – most commonly, earthworms, which do not exist in the active soil layer in the Arctic. Guidelines based on earthworm toxicity are likely overly conservative, which can lead to greater harm due to disruptive remediation activities than is likely to occur from ecotoxicological effects. Another important assumption is plant rooting depth, as the soil below the general maximum root depth is considered subsoil. Subsoil guidelines are adjusted to account for the greater depth to the contaminants in question, their mobility in soil and groundwater, and mechanisms for exposure to different receptors. CCME considers soil less than 1.5 m as surface soil because rooting depth of many crops may exceed 1.0 m. However, maximum root depth in the Arctic is less than 0.3 m; because of influences of permafrost, short summers, and other conditions in the Arctic, soil below 0.5 m is more appropriately considered as subsoil [6]. Based on these factors, GPRA makes the assumption that soil below 1.0 m is considered as subsoil.

For protecting human health, considerations for developing guidelines for volatile compounds and petroleum hydrocarbon include inhalation of vapours that may migrate into a residential building (whether real or hypothetical). Two scenarios are considered: basement construction or slab-on-grade construction. In an Arctic setting, neither of these is likely due to the restrictions that permafrost places on residential construction. Furthermore, the average soil temperature is much lower at Arctic locations, which would result in reduced transfer of hydrocarbon vapours from soil to air. Based on these considerations, significantly higher concentrations of volatile hydrocarbons could be present in surface soil and still present a low risk of adverse health effects.

Problem Formulation

In a standard environmental risk assessment, the problem formulation process is comprised of three steps: 1) identifying the chemicals of concern and the environmental media that are affected; 2) identifying the receptors (who or what could be exposed to those chemicals); and 3) identifying the possible pathways between the contaminants and the receptors. If all three components (contaminants; receptors; pathways) are present, risks of adverse effects may exist; however, further evaluation is needed to quantify those risks.

Conceptual Model

From the CCME Canada Wide Standard for Petroleum Hydrocarbons, a general conceptual model describes the major exposure pathways and ecological receptors at a PHC contaminated site (**Figure 1**). This type of schematic can be used to describe Camp Farewell, with appropriate amendments to receptors and geographical features. The initial conceptual model (**Figure 2**) of the Camp Farewell site depicts the overall site characteristics, the contaminants identified in Phase II site assessment activities, classes of possible receptors, and the exposure pathways that should be initially considered for this site. The site lease area is accessed from the Main Channel of the Mackenzie River. An airstrip lies on the east side of the site. Maps from previous reports show the locations of the tank farm, burn pit, laydown yard, and camp buildings. There is no surface water on the site. Exposure to contaminants identified in the Phase II sampling of 2015, which include petroleum hydrocarbons (PHCs), some volatile compounds

[6] INAC 2008. Abandoned Military Site Remediation Protocol, Volumes 1 and 2. Indian and Northern Affairs Canada, Northern Affairs Organization, Contaminated Sites Program.

such as toluene, and barium, would occur directly or indirectly via soil. Contaminants in surface soil may transfer into plants via roots, and then into herbivore species (lemming, arctic hare, caribou) and omnivore species (grizzly). Surface soil is consumed directly via incidental consumption in the case of most animals and birds, and beetles and soil-dwelling organisms may also absorb contaminants through their skin; in turn, birds and omnivorous animals consume insects and beetles. Carnivores, such as the arctic fox will prey or scavenge on all species; birds of prey may also be present and prey on small mammals and birds. Waterfowl and shorebirds, such as the snow goose and sandhill crane shown in the model, might use the area; however, primary nesting areas and food sources are not likely to be found on the site due to its distance from the river channel or the nearest wetlands.

Groundwater is likely to be transient on the site due to annual freezing depth and permafrost; direction and magnitude of groundwater flow was not determined during Phase II activities. Exposure to contaminants via groundwater is unlikely unless there is a direct link with a surface water body nearby.

Humans using the site would most likely be there for recreational or cultural/traditional purposes, and could be exposed to contaminants from surface soil-skin contact, incidental ingestion of surface soil, and through transfer to berries, game, or birds via surface soil.

We will refine this model following consideration of each of the components of the problem formulation.

Receptors

The region around Camp Farewell would be classified as residential/parkland from a regulatory perspective. This is a standard classification that is used for remote areas, and is often based on consideration of future use of the land. While the most sensitive land-use is agricultural use, this can be ruled out due to the climate on the Mackenzie River Delta.

Human

People using the area are most likely to be there for recreational use or traditional use: camping, hunting, fishing, gathering, and cultural activities. Because of its remoteness, building a permanent residence is unlikely. For people using the area for recreation or traditional purposes, a typical set of assumptions would include residing at the site for up to 2 months, gathering and consuming berries from the site, and hunting consuming game (e.g. caribou, waterfowl, and ptarmigan) from the area.

Wildlife

Currently there are no SARA listed species in the Kendall Island Migratory Bird Sanctuary.

Mammals that are likely to be found in the region (or are representative of the broad classes) include foxes and wolves (carnivores); caribou, lemmings, voles, and hares (herbivores); and grizzly bears (omnivores).

Insects include mosquitos, flies, butterflies and moths, and various beetles. Soil invertebrates such as earthworms do not occur in the far north: many of the ecological-based toxicity guidelines are based on toxicity studies with earthworms[7], under conditions that reflect southern Canadian climates. However, the ecology of the surface soil in the Arctic is substantially different than in soils of southern areas, therefore, the same parameters that may be generalized for most provincial regions are likely not

[7] CCME 2008. Canada-Wide Standards for PHCs in Soil: Scientific Rationale – Supporting Technical Document.

relevant for Arctic soils. This becomes relevant particularly for contaminants whose guidelines are derived from earthworm studies.

Birds include migratory waterfowl and shorebirds as noted above, birds of prey (snowy owl, falcon), and upland birds (ptarmigan).

Aquatic wildlife: Data do not extend to the shoreline and into the Mackenzie River channel adjacent to the site. The majority of the site and all contaminated areas are greater than 30m from the nearest surface water body. *This assessment will exclude direct evaluation of aquatic ecological receptors.*

Vegetation

Terrestrial vegetation on the Mackenzie River Delta is comprised of low shrubs (including some berries), sedges, grasses, mosses, and lichens. Some black spruce may be present, as well as various willow species.

Contaminant Exposure Pathways

A discussion of the potential exposure pathways follows, along with analysis of those pathways. Relevant and complete pathways will be retained for further risk evaluation; pathways that can be ruled out will be discussed.

Groundwater:

The shallow groundwater regime sampled on the site has not been assessed as a viable source of potable drinking water. Historical use of the site has not indicated any use of groundwater as a drinking water source. At least two of the installed sampling piezometers did not collect sufficient water to draw a sample. Furthermore, annual freezing in the active soil layer and the barrier of the underlying permafrost means that there would be no groundwater available for a significant portion of the year. The site is accessed from the main channel of the Mackenzie River, which would be more likely to be used for drinking water if people were occupying the site for any length of time.

Additionally, surface soil will be treated on-site to achieve GNWT surface soil guidelines, whose de minimus levels are based on protection of groundwater- based exposures. Therefore any plants, invertebrates, and terrestrial receptors will be protected.

Based on these factors, groundwater on the site would constitute an insignificant exposure pathway for human or ecological receptors. *Groundwater was not included as an exposure pathway.*

Surface water:

Surface water was not analyzed in the field programs. The site is accessed from the Mackenzie River Main Chanel, with the excavated areas more than 30m away from the shore (**Figure 3**). The nearest wetland is 100 m to the east, and upslope from the site, therefore *a groundwater to surface water route is effectively eliminated as a viable transport and exposure pathway.*

Our assumption is that during reclamation, the site will be graded to promote surface drainage. *Surface water is not evaluated as an exposure pathway.*

Soil and subsoil:

Surface soil and subsoil samples used for this assessment were collected during the 2015 and 2016 field seasons. Numerous areas on the site had hydrocarbons exceeding GNWT guidelines, and it was on the basis of the 2015 results that the remedial action plan (RAP) was developed.

As we have previously stated, our assumption is that the surface soil at the completion of the reclamation process will meet the appropriate guidelines for contaminants (PHCs, VOCs, and metals). *Certain human and wildlife exposure pathways can then be eliminated if we rule out surface soil as a source of hazardous concentrations of contaminants: direct skin exposure, inadvertent ingestion of soil, and indirect exposure via the food chain.*

Exposure to volatile contaminants in soil will be significantly reduced in this climate due to two main factors: average soil temperature is low and the soil is frozen or snow covered for a significant part of a year; and building construction methods do not normally use slab-on-grade or basements (in the unlikely event that residential construction would occur on this site in any case). Low soil temperature or frozen soil greatly reduces the movement of volatile contaminants within the soil to either the surface or into buildings. Constructing on pilings with an air space between the floor and the soil substantially reduces or eliminates the transfer of soil vapours into the building, where people spend the majority of time. *Vapour exposure will not be considered further as a viable exposure pathway.*

Vegetation:

The vegetation in the Mackenzie River Delta is a combination of grasses, sedges, willows and various shrubs. Some black spruce and balsam poplar is present. Berries may also grow in the area. As described above, the rooting zone of plants in the far north is very shallow, with maximum root depth less than 30 cm.

Our assumption is that soil ≤ 1.0 m on the site will be remediated to applicable GNWT guidelines; therefore, *contaminant exposure pathways via vegetation are not considered further.*

Terrestrial Food Chain:

The terrestrial food chain is an important factor in evaluating contaminant transport pathways. Some contaminants can transfer from surface soil or groundwater to plant roots and into the edible portion of plants, which are consumed by herbivorous species, and the herbivores in turn are consumed by carnivores. *Our assumption that surface soil will meet GNWT guidelines rules out significant contaminant transfer into the terrestrial food chain, therefore this pathway will not be considered.*

Summary of Exposure Pathways

The excavation and remediation of contaminated soils to 1.0 m depth effectively eliminates all direct exposure routes to human receptors and terrestrial plant, invertebrate, and animal species. We make the assumption that the vegetation and associated ecosystem established post reclamation will be consistent with the surrounding region, including the climate- and vegetation limited shallow rooting zone. With a maximum active soil depth (rooting zone and associated terrestrial invertebrates) of 0.3 m, it is appropriate to apply subsoil-based guidelines to the site for all soil > 1.0 m bgs.

There is no surface water body within 10 m of the site: the contaminated areas are all greater than 30 m from the Mackenzie River, and at least 100 m from the nearest wetland. Groundwater as a source of drinking water on the site is very unlikely, based on shallow permafrost, annual freezing down to the permafrost, and other sources of fresh water nearby. Therefore, the use of subsoil guidelines based on eco-soil contact is appropriate, rather than the *de minimis* value based on protection of groundwater for human or aquatic life.

Chemicals of Potential Concern

Historical site use, documented incidents (e.g. spills, fires, etc.), and knowledge of products typically used at various time periods in different industries can help assessors put together a preliminary list of

potential contaminants at a site. For oil and gas exploration and drilling operations there are a primary group of potential contaminants, including VOCs and PHCs from minor or major spilled crude oils, drilling fluids, fuels, and machine and motor oils. Some metals, such as lead from leaded gasoline or leaded paint, may also be a factor. Other persistent and ecologically toxic compounds may be present, based on customary practices in that time period. It is important to set up a sampling and analysis approach that accounts for the likely possible contaminants, and is sufficient to rule others out if they are not detected.

On-site activities related to chemicals of potential concern

Camp Farewell was operated as a storage, staging, and accommodations facility for seismic and drilling operations. Electricity was generated on-site. Fuel was stored in above ground storage tanks (AST). Equipment was stored or staged in a lay-down area. A burn pit was used for on-site disposal of various wastes.

General operations practices in the 1970s may not have held to today's environmental regulations and practices. For example, all used machine- or transformer oils may not have been transported off-site for disposal at a designated facility.

A diesel spill from the tank farm was reported in spring 1981: approximately 80,000 L of water mixed with diesel overflowed the berm and flowed over the site and onto the ice on the Mackenzie River. Pumping and absorbent pads were used to collect as much of the fuel as possible at the time. Subsequent investigations and partial site remediation have been described elsewhere.

In the time frame of the camp operations, polychlorinated biphenyl (PCB) lubricants marketed as Aroclors by Monsanto may have been used in the transformers employed in electrical generation via diesel generators. Aroclor 1254 or Aroclor 1260 were common formulations used in Northern Canada during that time. PCBs are very persistent organochlorine compounds that bioaccumulate in food chains and can have significant toxic effects. Many of the northern radar installations (e.g. Dew Line or Pole Vault) have had extensive PCB remediation efforts over the past 20 years. As reported below, *PCBs were below all guidelines in soil.*

Pesticides such as DDT were often used in northern camps to control mosquitos and flies. DDT is another persistent organochlorine compound that was linked to many ecological effects. Some sites in the north have been found to have significant DDT concentrations from early use of the pesticide. As reported below, *DDT and its by-products were not detected in soil.*

Metal contamination may have occurred due to different materials used: for example, leaded fuels, paints containing lead, barium in drilling fluids or muds, or dissolution, leaching, or degradation of paints, pesticides or herbicides, batteries, etc. used on the site.

For initial screening purposes, the maximum concentration of a contaminant is compared with relevant guidelines. Based on various site-specific considerations and professional judgment, a statistical value such as the 90th percentile concentration or the 95th upper confidence limit of the mean (UCLM) may be used when estimating exposures and subsequent risks. We have calculated the 90th percentile concentration for the different areas of activity or areas of potential concern (APECs) on the site (e.g. tank farm, laydown/storage, camp, burn pit, etc.). The maximum concentration may significantly over-estimate risks on a particular site or APEC; using the 90th percentile concentration reduces the bias toward unrealistically high risk characterizations (e.g. due to a single high concentration sample), while remaining sufficiently conservative in estimating risks to ensure protection of relevant receptors.

Data from the 2015 site assessment and 2016 site remediation have been combined to provide aggregate concentration data for the APECs as applicable.

Subsoil

Soil samples from 2015 and 2016 (see **Figure 4**) were combined into a dataset for evaluating chemicals of potential concern. Samples were analyzed for a standard suite of soil quality properties, metals, petroleum hydrocarbons (PHCs), volatile organic compounds (VOCs), and polycyclic aromatic hydrocarbons (PAHs), PCBs and organochlorine pesticides. Soil data were sorted according to site area and sample depth. Maximum and 90th percentile values were calculated for data below 1.0 m.

A chemical screening procedure was used to compare the contaminant concentrations from the APECs with appropriate screening criteria – usually the relevant regulatory guideline values. Chemicals were initially screened against GNWT generic criteria and only the compounds with maximum concentrations exceeding those criteria were carried over to the detailed screening – toluene, PHC fractions F1 through F4, and barium. Other metals, PCBs, or DDT and associated breakdown products were either not detected or were well below generic criteria in soil samples taken from the site during the 2016 remediation activities.

Table 1 shows the results of the screening. The maximum concentrations of VOCs, F2, and F3 exceed the lowest Tier 1 GNWT guidelines in at least one former area of activity on the site – mostly the tank farm area. For benzene, ethyl benzene and F3, the 90th percentile concentration does not exceed the lowest Tier 1 guideline. Barium is the only inorganic compound or metal that exceeds a guideline.

VOCs or barium do not have specified subsoil guidelines. However, considerations of viable exposure pathways allow for adoption of pathway-appropriate guideline values. The default soil quality guidelines for VOCs are based on protection of groundwater for drinking water (human health) or aquatic life (eco), because these result in the most conservative guideline values. In the Pathways discussion above, groundwater was ruled out as a viable exposure route at the site. Therefore, the next lowest toxicity based values are those derived for ecological direct contact. None of the VOCs or barium maxima in any site area exceeds ecological direct contact guidelines, therefore, these contaminants were eliminated from consideration as contaminants of concern in the subsoil.

Maximum concentrations of F2 and F3 in the Tank Farm area exceed the ecological direct contact thresholds listed by GNWT. The 90th percentile F2 and F3 concentrations are well below these guidelines – further calculations show that the 96th and the 98th percentile concentrations of F2 and F3, respectively, remain below the ecological direct contact subsoil threshold. Considered within the context of the Camp Farewell site, leaving the remaining contaminants in place in the Tank Farm area would present very low risks to ecological receptors. Because of the depth below the active soil layer (maximum rooting zone 0.3 m), the annual freeze cycle and low average soil temperature would inhibit diffusion-driven transport mechanisms and it is unlikely that F2 or F3 would result in exposures sufficient to result in adverse effects. Active digging by burrowing animals or by recreational users on the site would also have very low likelihood significant exposures. Finally, with the assumption of post-reclamation surface grading designed for efficient surface water drainage, short- and long term influence of surface water percolation and subsequent mobilization of remaining PHC will be minimized.

Summary of Chemicals of Potential Concern

The majority of contaminant concentrations below 1.0 m depth across the Camp Farewell site meet the lowest, groundwater protective, Tier 1 GNWT guidelines. Because of the site geo-climatic characteristics, shallow permafrost barrier, and distance from surface water bodies, groundwater is not considered to be a viable exposure pathway. Similarly, exposure to soil-volatiles in residential buildings was ruled out due to low soil temperatures and common construction practices. The next lowest Tier 1 guidelines are based on ecological direct contact. A small percentage of F2 and F3 concentrations in the Tank Farm exceeded these guidelines: risks from future exposures to F2 and F3 in the former tank farm area are expected to be very low.

Conceptual Model – refined

Returning to the site conceptual model from Figure 2, by remediating excavated surface soil to Tier 1 guidelines the primary routes of contaminant exposure on the Camp Farewell site are eliminated. Subsequent evaluation of ground water or volatile-based exposure pathways effectively eliminates the remaining mechanisms for ecological or human receptors accessing the Camp Farewell site to be exposed to any contaminants that may remain in the subsoil. **Figure 5** shows the conceptual model with all of the contaminant exposure arrows removed. With surface soil remediated to applicable guidelines, risks of adverse effects from PHCs, VOCs, or metals on vegetation, invertebrates, terrestrial animals, birds, or people using the area recreationally are expected to be negligible.

Conclusions and Recommendations

Our screening level risk assessment of the post-remediation scenario at Camp Farewell resulted in elimination of the following exposure pathways: groundwater to drinking water; groundwater to freshwater aquatic life; direct soil contact or ingestion; and indoor vapour transport. The majority of GNWT *de minimis* guidelines are based on protection of groundwater for drinking water or groundwater for freshwater aquatic life. These pathways were eliminated based on the shallow soil active zone where any groundwater would freeze annually, the permafrost barrier near 1.5 m, the distance to surface water bodies, and the remediation of surface soil to GNWT guidelines.

VOCs and barium (the only metal that exceeded a guideline) may also be ruled out as contaminants of concern in the subsoil because of elimination of the groundwater to drinking water and groundwater to freshwater aquatic life pathways. Concentrations of the VOCs and barium are well below thresholds for ecological direct contact.

For PHCs in subsoil, the remaining potential exposure pathway is consideration of ecological direct contact, after accounting for depth and associated mechanisms of contaminant transport. Maximum F2 and F3 in the tank farm area exceeded the GNWT subsoil eco contact guidelines – however, less than 4% of the 2015-2016 tank farm area samples exceeded these values. Leaving these higher concentrations of contaminants in place is expected to result in very low risks of exposures to F2 or F3 that could result in adverse effects for any ecological receptors. Additionally, further excavation is more likely to affect the integrity of the permafrost across the site. Therefore, GPRA recommends leaving the remaining PHCs in the ground in the Tank Farm area.

Limitations and Qualifications

This document is intended for the exclusive use of IEG Consultants Ltd. and the primary client, Shell Canada Energy. GatePost Risk Analysis does not accept any responsibility to any third party for the use of information presented in this report, or decisions made or actions taken based on its content. Other than by the named client, copying or distribution of this report or use of or reliance on the information contained herein, in whole or in part, is not permitted without the expressed written permission of GatePost Risk Analysis. Nothing in this report is intended to constitute or provide a "legal opinion".

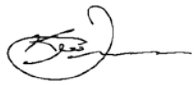
In conducting the risk assessment, GatePost Risk Analysis has exercised reasonable skill, care, and diligence to assess the information acquired during the preparation of this report. There are no assurances regarding the accuracy and completeness of this information. All information received from the client or third parties in the preparation of this report has been assumed by GatePost Risk Analysis to be correct. GatePost Risk Analysis assumes no responsibility for any deficiency or inaccuracy in information received from others. No other representations, warranties or guarantees are made concerning the accuracy or completeness of the data or conclusions contained within this report.

Conclusions made within this report are a professional opinion at the time of the writing of this report, not a certification of the property's environmental condition.

Closure

We trust this information meets your present requirements. Should you have any questions, please contact me at 403.969.9716 or klfroese@gmail.com.

Prepared By:



Ken Froese, PhD, PChem (AB & BC)
Principal and Senior Risk Analyst
GatePost Risk Analysis

Table 1. Screening table for site maxima and 90th percentile concentrations. Data have been rounded to two significant figures. Bold numbers exceed any guideline.

Compound	Subsoil[1] Guidelines (mg/kg)				Site Data (mg/kg)												Retain as COC?
					Shed (1.0-1.5m)		Airstrip (1.0-1.5m)		Laydown/ Storage (0.6 - 1.5)		Camp (0.6-1.5m)		Burn Pit (1.0-1.5m)		Tank Farm (1.0-3.0m)		Yes / No
	GNWT	GNWT (eco soil contact)	CCME[4] AEP[6]	BC MOE	Maximum	90th percentile	Maximum	90th percentile	Maximum	90th percentile	Maximum	90th percentile	Maximum	90th percentile	Maximum	90th percentile	
Benzene	0.5		62 SQG_E		0.005	0.005	0.005	0.005	0.023	0.005	0.005	0.005	0.005	0.005	***3.3***	0.26	No. Max is > GNWT but guideline is based on drinking water protection. Eco soil contact is next most conservative.
Toluene	0.8		150 SQG_E		0.08	0.07	***53***	***24***	***8.0***	0.15	0.13	0.09	0.05	0.05	***13***	***1.4***	No. Max is > GNWT but guideline is based on drinking water protection. Eco soil contact is next most conservative.
Ethyl benzene	1.2		110 SQG_E		0.01	0.01	0	0.01	***3.5***	0.01	0.01	0.01	0.01	0.01	***15***	0.36	No. Max is > GNWT but guideline is based on drinking water protection. Eco soil contact is next most conservative.
Xylenes	1		190 SQG_E		0.05	0.05	0	0.05	***20***	0.05	0.05	0.05	0.1	0.07	***62***	***1***	No. Max is > GNWT but guideline is based on drinking water protection. Eco soil contact is next most conservative.
F1	230[2]	350			10	10	53	27	31	10	10	10	10	10	98	10	No. Max F2 and F3 are > eco soil contact guideline, but small fraction of tank farm samples (< 4%) exceeds guideline. Eco receptor exposures above guidelines very unlikely.
F2	150[2]	1500			10	10	10	10	***520***	10	10	10	48	25	***11000***	***180*** [7]	
F3		2500			10	10	1200	650	980	290	370	230	130	67	***3000***	600 [7]	
F4		10000			13	12	830	520	520	170	160	100	60	35	1300	180	No
Barium	500[3]		9800 SQG_{HH}	1000 SQG_E[5]	130	nc	340	320	***540***	240	170	150	130	120	na	na	No. Pathway elimination due to permafrost and remediation of surface soil; BC MOE SQG_E protective of any unlikely invertebrate or plant contact.
Other metals	1.0 - 200				no GNWT guideline exceedances												No
PAHs	0.7 - 10																No
PCBs	1.3																No
DDT	0.7																No

[1] soil depth greater than 1.5 m bgs
[2] soil quality guidelines for protection of freshwater aquatic life assuming surface water body 10m from site.
[3] barium interim soil quality guideline CCME 1991.
[4] CCME subsoil quality guidelines that are not based on vapour exposure, drinking water, or groundwater for aquatic life criteria. SQG_E: ecological direct contact; SQG_{HH}: human direct contact.
[5] BC MOE barium guideline for soil invertebrates and plants.
[6] AEP (Alberta Environment and Parks) subsoil guidelines for Natural Area Land Use that are not based on vapour exposure, drinking water, or groundwater for aquatic life criteria.
[7] 96th percentile F2 calculated at 850 mg/kg, still well below GNWT eco soil contact guideline of 1500 mg/kg. 98th percentile F3 calculated at 2300 mg/kg, below GNWT eco soil contact guideline of 2500 mg/kg.
nc = not calculated; na = not analysed

Figures

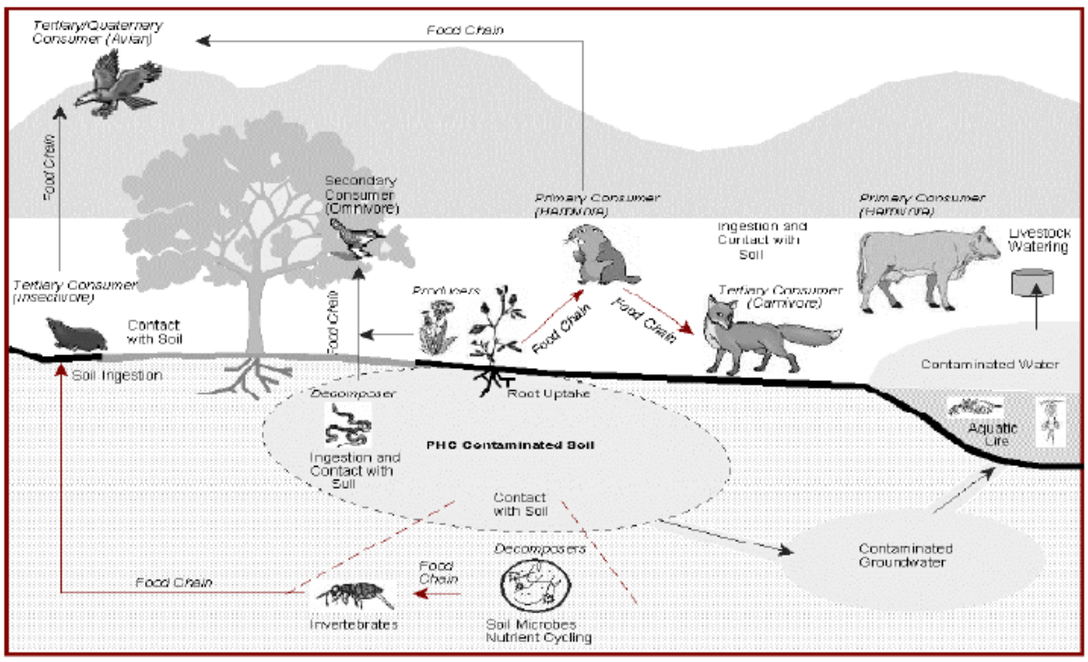
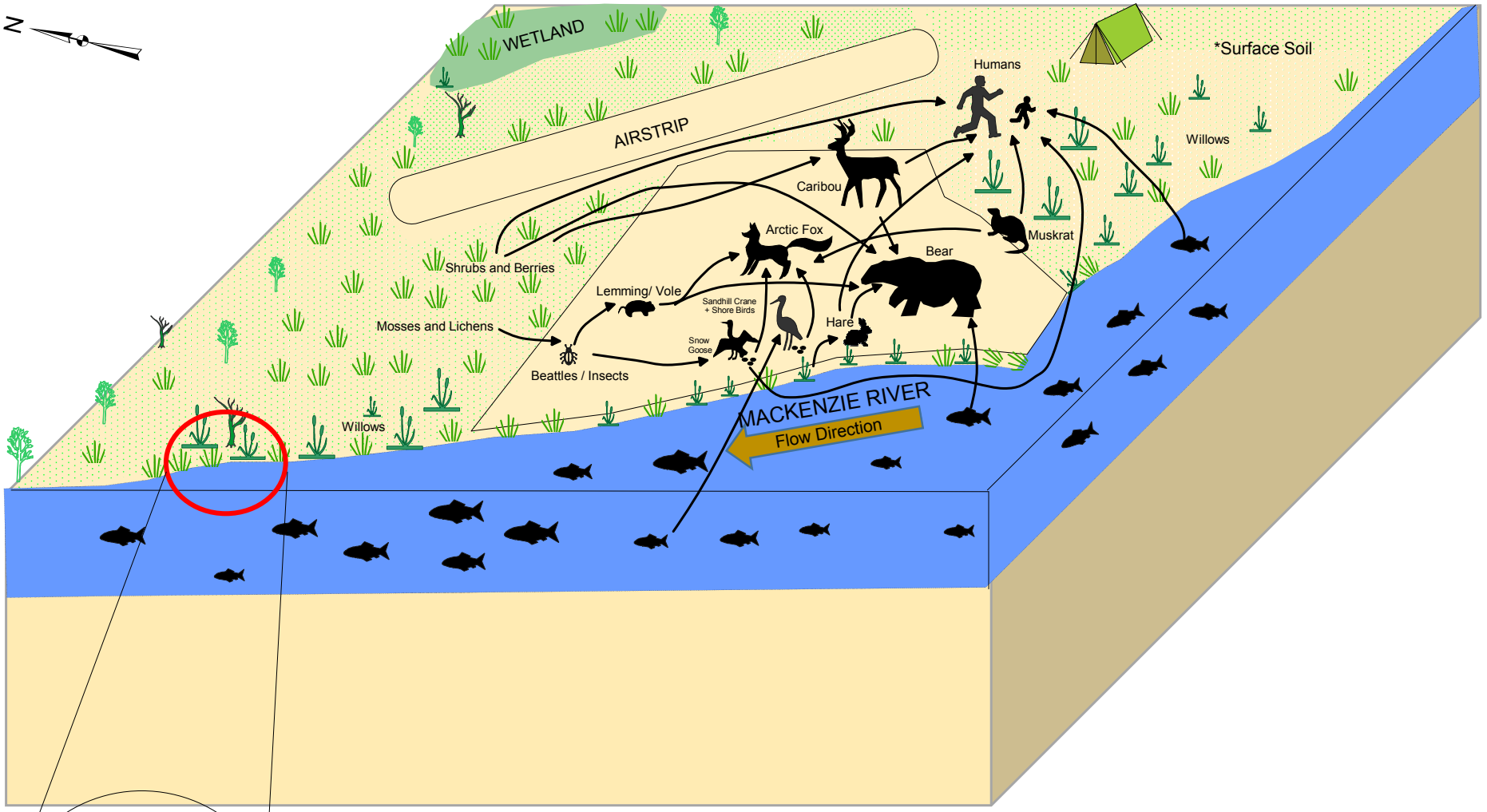


Figure 1. Conceptual model of a PHC contaminated site, taken from CWS-PHC [8] (Figure 4.1).

[8] CCME 2008. Canada-Wide Standard for Petroleum Hydrocarbons in Soil (PHC CWS): Scientific Rational, Supporting Technical Document. Canadian Council for Ministers of the Environment.

Figure 2. Conceptual model of the Camp Farewell site showing representative receptor groups and the possible pathways of contaminant exposure from soil to the different receptors.



NOT FOR CONSTRUCTION

NOTES

* Surface soil is the primary source of contaminants to all receptors, either by direct contact and ingestion, or by indirect transfer in the food chain.

CLIENT

Shell Canada Energy

IEG CONSULTANTS LTD.

PROJECT

Risk-Based Remediation for Camp Farewell, Mackenzie Delta, Northwest Territories

TITLE

Conceptual Model Diagram

SCALE	PROJECT No.	FIG. No.
-	A04012A08	2

Time: 15:16:07
Date: 01/11/17
File:

Figure 3. Camp Farewell site schematic indicating 30m buffer line from excavation areas to surface water (Mackenzie River) and distance to wetland areas north or east of the airstrip.

N

WETLAND

>100m

TUNDRA

>100m

WETLAND

AIRSTRIP

AIRSTRIP SURFACE

30m

EDGE OF GRAVEL PAD

TANK FARM

TUNDRA

WILLOWS

FUEL TANK

REMEDIATED LAGOON

CAMP BUILDING

SHED #1

SHED #2

SHED #3

ROAD (GRASS) WINTER ACCESS

MACKENZIE RIVER

ROAD (GRAVEL) SUMMER ACCESS

BOLLARDS

Legend

- Former Aboveground Storage Tank
- Airstrip
- Removed infrastructure
- Power Pole
- Control Box
- Boundary
- Edge of Gravel
- River
- Sand
- Top of Bank
- Excavation Areas
- Impacted (F2 - 2780 mg/Kg, F3 - 2120 mg/Kg)
- Impacted (F2 - 3250 mg/Kg, F3 - 2420 mg/Kg)
- 30m Buffer Line

0 100 m

NOT FOR CONSTRUCTION

NOTES:
1. HORIZONTAL DATUM: NAD83
2. GRID ZONE: UTM8N
3. SOURCE: Site survey plan prepared for Shell Canada Limited by Inukshuk Geomatics Inc.; original scale 1:2000.

CLIENT: Shell Canada Energy

IEG CONSULTANTS LTD.

PROJECT: Risk-Based Remediation for Camp Farewell, Mackenzie Delta, Northwest Territories

TITLE: Camp Farewell Site Schematic indicating 30m Buffer Line from Excavation Areas to Surface Water and Wetland Areas

SCALE	PROJECT No.	FIG No.
1:2,500	A04012A08	3

File: Z:\AGS\YA\Alberta\A04012A08 SCE Camp Farewell 2016 REM Prg\400 Drawings\Risk Assessment Figures\Figure 3A04012A08_SitePlanwithExcavation_170111.mxd Date: January 11, 2017 Time: 15:28:01 PM Creator: : tchung

Figure 4. Camp Farewell site schematic showing areas of contamination and borehole sites for soil characterization.

N

TUNDRA

AIRSTRIP

EDGE OF GRAVEL PAD

AIRSTRIP SURFACE

WILLOWS

TUNDRA

TANK FARM

FUEL TANK

REMEDIATED LAGOON

PUMP BUILDING

SHED #1

SHED #2

SHED #3

ROAD (GRASS) WINTER ACCESS

ROAD (GRAVEL) SUMMER ACCESS

MACKENZIE RIVER

BOLLARDS

GS16-119, GS16-118, GS16-125, GS16-123, GS16-158, GS16-159, GS16-114, GS16-113, GS16-121, GS16-004, GS16-120, GS16-117, GS16-008, GS16-127, GS16-003, GS16-128, GS16-007, GS16-002, GS16-001, GS16-012, GS16-126, GS16-006, GS16-124, GS16-110, GS16-115, GS16-116, GS16-005, GS16-111, GS16-112, GS16-010, GS16-107, GS16-009, GS16-011, GS16-108, GS16-109, GS16-015, GS16-016, GS16-014, GS16-020, GS16-106, GS16-122, GS16-013, GS16-019, GS16-105, GS16-104, GS16-018, GS16-101, GS16-103, GS16-024, GS16-017, GS16-023, GS16-102, GS16-100, GS16-022, GS16-027, GS16-099, GS16-021, GS16-026, GS16-098, GS16-097, GS16-025, GS16-096, GS16-028, GS16-029, GS16-030, GS16-095, GS16-093, GS16-094, GS16-078, GS16-079, GS16-080, GS16-090, GS16-091, GS16-081, GS16-082, GS16-092, GS16-088, GS16-087, GS16-155, GS16-153, GS16-156, GS16-152, GS16-089, GS16-086, GS16-154, GS16-151, GS16-083, GS16-085, GS16-084, GS16-157

Legend

- Sample Locations
- Former Aboveground Storage Tank
- Airstrip
- Removed infrastructure
- Power Pole
- Control Box
- Boundary
- Edge of Gravel
- River
- Sand
- Top of Bank

0 100 m

NOT FOR CONSTRUCTION

NOTES:
1. HORIZONTAL DATUM: NAD83
2. GRID ZONE: UTM8N
3. SOURCE: Site survey plan prepared for Shell Canada Limited by Inukshuk Geomatics Inc.; original scale 1:2000.

CLIENT: Shell Canada Energy

IEG CONSULTANTS LTD.

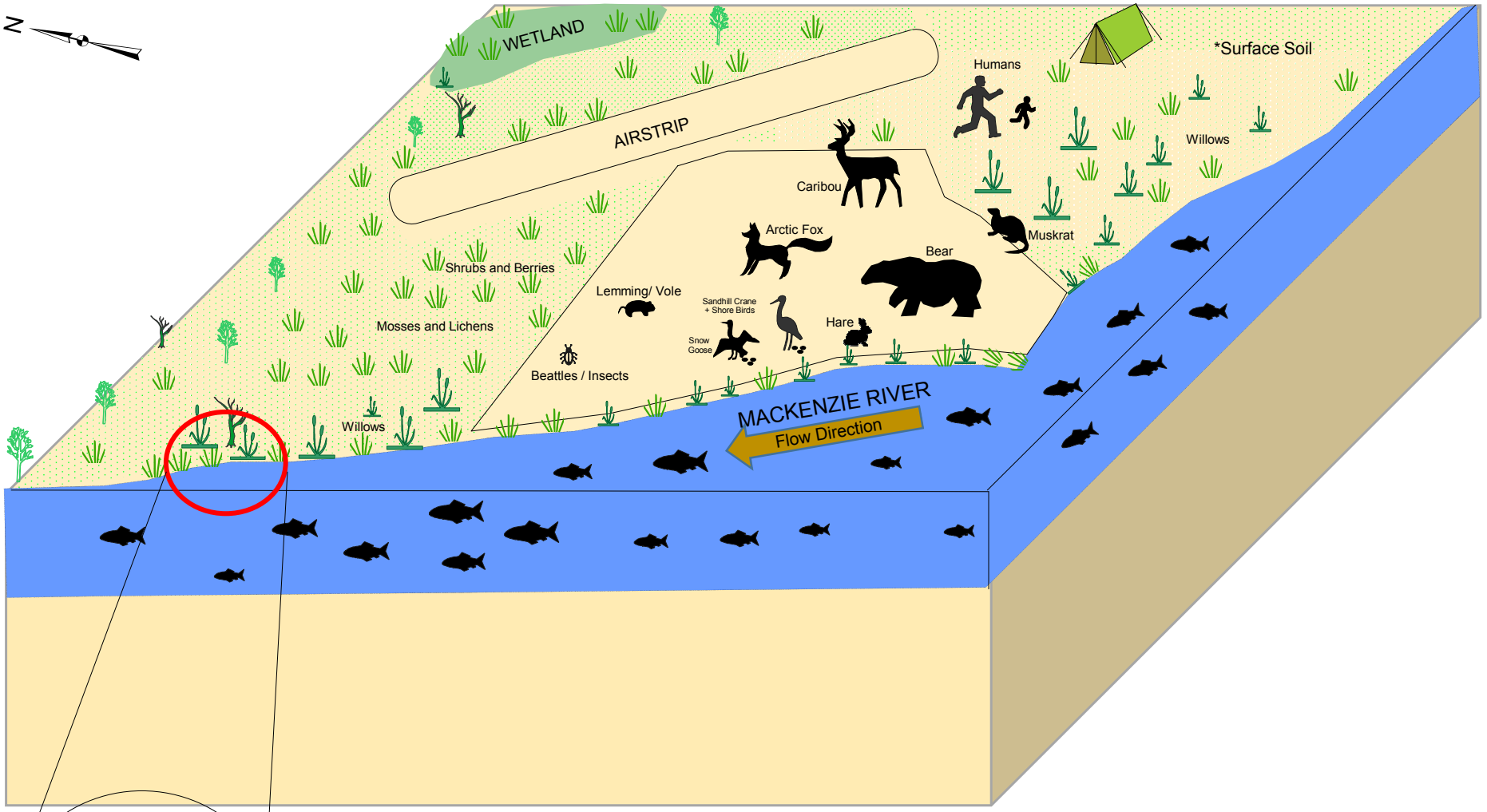
PROJECT: Risk-Based Remediation for Camp Farewell, Mackenzie Delta, Northwest Territories

TITLE: Site Plan with Sample Locations

SCALE: 1:2,500 | PROJECT No.: A04012A08 | FIG No.: 4

File: Z:\AIO\GY\Alberta\A04012A08 SCE Camp Farewell 2016 REM Prg\400 Drawings\Risk Assessment Figures\Figure 4 A04012A08_SitePlan_170111.mxd Date: January 11, 2017 Time: 15:20:47 PM Creator: : tchung

Figure 5. Revised conceptual model of the Camp Farewell site with the contaminant transport pathways eliminated. By eliminating groundwater to drinking water and groundwater to freshwater aquatic life as exposure pathways, surface soil is the only viable matrix for receptors to be exposed to contaminants. The surface soil (to a depth of 1.5 m) will be treated onsite to achieve guidelines that protect receptors from adverse effects of direct soil contact. Risks to any individual receptor or group of receptors via direct soil ingestion or indirectly through the food chain will be negligible under this post-remediation scenario.



NOT FOR CONSTRUCTION

NOTES

* Surface soil is the primary source of contaminants to all receptors, either by direct contact and ingestion, or by indirect transfer in the food chain.

The surface soil (to a depth of 1.5 m) will be treated onsite to achieve guidelines that protect receptors from adverse effects of direct soil contact.

CLIENT

Shell Canada Energy

IEG CONSULTANTS LTD.

PROJECT

Risk-Based Remediation for Camp Farewell, Mackenzie Delta, Northwest Territories

TITLE

Revised Conceptual Model Diagram

SCALE	PROJECT No.	FIG. No.
-	A04012A08	5

Time: 15:18:57
Date: 01/11/17
File:

APPENDIX V

Quality Assurance/Quality Control

Appendix V
Camp Quality Assurance/Quality Control

I-1 QUALITY ASSURANCE/QUALITY CONTROL

As part of routine Quality Assurance/Quality Control (QA/QC), 20 field replicate soil samples were collected during the remediation program and sent to the laboratory for analysis. The replicate samples were collected at the same time as the initial soil sample and following the same sampling procedures.

The purpose of the replicate samples is to ensure consistency in the analytical results that the laboratory produces. Large variances between replicate results and the original sampling results could indicate errors in the testing process conducted by the laboratory. Variances in results are investigated further with the laboratory.

Precision in analytical results may be evaluated by calculating the relative percent difference (RPD) or absolute difference (AD) of replicate samples using the following formulae:

$$RPD = \frac{(S - D)}{(S + D) / 2} \; x\,100 \qquad AD = (S - D)$$

where: RPD and AD are absolute values,
S is the original sample result (mg/kg), and,
D is the replicate sample result (mg/kg).

Zeiner's *Environmental Standard's Field Duplicate Criteria* has been applied in order to evaluate the precision of the results (Zeiner 1994).

If both the original and replicate soil sample concentrations are greater than five times the method detection limit (MDL) for a given parameter, the RPD must be less than or equal to 40% to be considered precise. If the results lie outside of the range, they should be considered estimates only.

If at least one of the sample concentrations is less than or equal to five times the MDL for a given parameter, the AD should be less than or equal to two times the MDL. If the AD is greater than two times the MDL, the results should be considered estimates only.

If one of the sample concentrations is positive and its replicate sample concentration is less than the MDL, the AD between the reported concentration and one-half the MDL should be less than or equal to two times the MDL. If the AD is greater than two times the MDL, the results should be considered estimates only.

Chain-of-custody (CoC) procedures were followed throughout the sampling program. CoC forms were provided by AGAT and filled out by KCB personnel for each sample delivered to the laboratory.

AGAT has internal QA/QC protocols and procedures to ensure accuracy and consistency of results. These procedures include COC tracking, storage and holding times, instrument calibration, surrogate matrix spikes, blanks, and laboratory duplicates.

APPENDIX VI

Laboratory Analytical Reports

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: KLOHN CRIPPEN
500-2618 HOPEWELL PLACE NE
CALGARY, AB T1Y7J7
(403) 274-3424

ATTENTION TO: Konrad Ross

PROJECT: A04012A08

AGAT WORK ORDER: 16E117223

ASBESTOS REVIEWED BY: Ian Seddon, Analyst

DATE REPORTED: Jul 20, 2016

PAGES (INCLUDING COVER): 6

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 16E117223

PROJECT: A04012A08

CLIENT NAME: KLOHN CRIPPEN

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Bulk Asbestos

DATE RECEIVED: 2016-07-19

DATE REPORTED: 2016-07-20

		SAMPLE DESCRIPTION:		GS16-INS
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		7/15/2016
Parameter	Unit	G / S	RDL	7714683
Asbestos (Bulk)	%		0.5	ND

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

7714683 Condition of sample was satisfactory at time of arrival in laboratory. Analysis done at AGAT 5623 McAdam Road Mississauga location.
"ND" - Not Detected

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: KLOHN CRIPPEN

AGAT WORK ORDER: 16E117223

PROJECT: A04012A08

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Asbestos (Bulk)	INORG 93-6010	EPA 600/R-93/116 & NIOSH 9002	PLM

AGAT Laboratories
2910 12 Street NE
Calgary, Alberta T2E 7P7
P: 403.735.2005 • F: 403.735.2771
webearth.agatlabs.com

Chain of Custody Record

Emergency Support Services Hotline 1-855-AGAT 245 (1-855-242-8245)

Laboratory Use Only
Arrival Temperature:
AGAT Job Number: 16E117223
Date and Time: '16 JUL 19 10:05

Report Information

Company: KCB
Contact: Konrad Ross
Address: 2618 Hopewell Place NE
Calgary
Phone: 403-464-7677 Fax:
LSD:
Client Project #: A04012A08

Report Information

1. Name: Konrad Ross
Email: Kross@klohn.com
2. Name: Nicole Wills
Email: nwills@klohn.com
3. Name:
Email:

Report Format

☐ Single Sample per Page
☐ Multiple Samples per Page

Turnaround Time Required (TAT)

Regular TAT ☐ 5-7 Business Days
Rush TAT (Surcharge) ☑ Less than 24 Hours (200%) ☐ Less than 48 Hours (100%) ☐ Less than 72 Hours (50%)
Date Required:

Invoice To

Same ☑ Yes ☐ No

Company:
Contact:
Address:
Phone: Fax:
PO/AFE#

Requirements (Selection may impact detection limits)

☐ CCME
☐ Agricultural ☐ Industrial ☐ Residential/ Park ☐ Commercial ☐ Drinking Water ☐ FWAL

☐ AB Tier 1
☐ Agricultural ☐ Industrial ☐ Residential/ Park ☐ Commercial ☐ Natural Area
☐ AB Surface Water

☐ BC CSR
☐ AW ☐ IW ☐ LW ☐ DW

☐ Other:
☐ D50 (Drilling) ☐ SPIGEC ☐

LABORATORY USE (LAB ID#)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/ TIME SAMPLED	COMMENTS- SITE SAMPLE INFO, SAMPLE CONTAINMENT	# of CONTAINERS	Detailed Soil Salinity (Saturated Paste)	CCME BTEX/ F1-F4	Soil Metals: ☐ HWS-B ☐ Cr^{6+} ☐ Hg	Water Metals: ☐ Dissolved ☐ Total ☐ Hg ☐ Cr^{6+}	Routine Water Potability	AB Class 2 Landfill	BC Landfill	D50 Detailed Salinity (As Received)	Microtox	☐ BTEXS/VPH/EPH ☐ LEPH/HEPH	Asbestos	HOLD FOR 60 DAYS	PRESERVED	CONTAMINATED/ HAZARDOUS
7714683	GS16-INS		15-Jul-16		1											X			

Samples Relinquished By (Print Name and Sign): A. BENJAMIN — Date/ Time: 19 JUL 16 @ 10:05
Samples Relinquished By (Print Name and Sign): — Date/ Time:
Samples Relinquished By (Print Name and Sign): — Date/ Time:

Page of

E 08736

Document ID: DIV-50-1507.003

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM

RECEIVING BASICS - Shipping

Company/Consultant: KCB

Courier: CANADIAN NORTH (Prepaid) Collect

Waybill# 518-YEV-7061-5269

Branch: (EDM) GP FN FM RD VAN LYD FSJ EST Other:____

If multiple sites were submitted at once: Yes (No)

Custody Seal Intact: Yes No (NA)

TAT: (<24hr) 24-48hr 48-72hr Reg Other_____

Cooler Quantity: 1 BAG

TIME SENSITIVE ISSUES - Shipping

ALREADY EXCEEDED HOLD TIME? Yes (No)

Inorganic Tests (Please Circle): Mibi , BOD , Nitrate/Nitrite , Turbidity , Microtox , Ortho PO4 , Tedlar Bag , Residual Chlorine , Chlorophyll* , Chloroamines*

Earliest Expiry:_____

Hydrocarbons: Earliest Expiry _____

SAMPLE INTEGRITY - Shipping

Hazardous Samples: YES (NO) Precaution Taken:_____

Legal Samples: Yes (No)

International Samples: Yes (No)

Tape Sealed: Yes (No)

Coolant Used: Icepack Bagged Ice Free Ice Free Water (None)

Temperature (Bottles/Jars only) N/A if only Soil Bags Received

FROZEN (Please Circle if samples received Frozen)

1 (Bottle/Jar)___+___+___=____°C 2(Bottle/Jar)___+___+___=____°C

3 (Bottle/Jar)___+___+___=____°C 4 (Bottle/Jar)___+___+___=____°C

5 (Bottle/Jar)___+___+___=____°C 6 (Bottle/Jar)___+___+___=____°C

7 (Bottle/Jar)___+___+___=____°C 8 (Bottle/Jar)___+___+___=____°C

9 (Bottle/Jar)___+___+___=____°C 10 (Bottle/Jar)___+___+___=____°C

(If more than 10 coolers are received use another sheet of paper and attach)

LOGISTICS USE ONLY

Workorder No: 16E117223

Samples Damaged: Yes (No) If YES why?

No Bubble Wrap Frozen Courier

Other: _____

Account Project Manager: _____ have they been notified of the above issues: Yes No

Whom spoken to: _____ Date/Time: _____

CPM Initial_____

General Comments: _____

* Subcontracted Analysis (See CPM)

518-YEV-7061-5269

SHIPPER'S NAME AND ADDRESS

Northwind Industries Inc.
146 Navy Rd.
PO Box 1130
Inuvik, NT X0E 0T0
Canada
Fred Bailey 867-777-2426
Registered

SHIPPER'S ACCOUNT NUMBER: NOR178CW

NOT NEGOTIABLE
AIR WAYBILL
(AIR CONSIGNMENT NOTE)

Canadian North
101 3731 52 Ave E
Edmonton Int Arpt, AB T9E 0V4
Canada

GST #: R 892440629

Copies 1, 2 and 3 of this Air Waybill are originals and have the same validity.

It is agreed that the goods described herein are accepted in apparent good order and condition (except as noted) for carriage SUBJECT TO THE CONDITIONS OF CONTRACT ON THE REVERSE HEREOF. ALL GOODS MAY BE CARRIED BY ANY OTHER MEANS INCLUDING ROAD OR ANY OTHER CARRIER UNLESS SPECIFIC CONTRARY INSTRUCTIONS ARE GIVEN HEREON BY THE SHIPPER, AND THE SHIPPER AGREES THAT THE SHIPMENTS MAY BE CARRIED VIA INTERMEDIATE STOPPING PLACES WHICH THE CARRIER DEEMS APPROPRIATE. THE SHIPPER'S ATTENTION IS DRAWN TO THE NOTICE CONCERNING CARRIER'S LIMITATION OF LIABILITY. Shipper may increase such limitation of liability by declaring a higher value for carriage and paying a supplemental charge if required.

CONSIGNEE'S NAME AND ADDRESS

AGAT Laboratories Ltd
6310 Roper Road
Edmonton, AB T6B 3P9
Canada
780-395-2525 403-735-2745

CONSIGNEE'S ACCOUNT NUMBER: AGA100CW

SIGNATURE | RECEIVED IN GOOD ORDER | PLACE | DATE/TIME

PRINTED NAME

ISSUING CARRIER'S AGENT NAME AND CITY

ALSO NOTIFY: NAME AND ADDRESS *(OPTIONAL ACCOUNTING INFORMATION)*

AGENT'S IATA CODE | ACCOUNT NO.

TO EXPEDITE MOVEMENT, SHIPMENT MAY BE DIVERTED TO MOTOR OR OTHER CARRIER UNLESS SHIPPER GIVES OTHER INSTRUCTIONS HEREON.

DOMESTIC LIABILITY:

AIRPORT OF DEPARTURE (ADDR OF FIRST CARRIER) AND REQUESTED ROUTING

Inuvik

ROUTING AND DESTINATION

TO	BY FIRST CARRIER	TO	BY	TO	BY
YEG	Canadian North				

CURRENCY	CHGS Code	WT/VAL PPD	WT/VAL COLL	OTHER PPD	OTHER COLL	DECLARED VALUE FOR CARRIAGE	DECLARED VALUE FOR CUSTOMS
CAD	PX	X		X		NVD	NCV

AIRPORT OF DESTINATION: Edmonton

FOR CARRIER USE ONLY: FLIGHT/DATE | FLIGHT/DATE

AMOUNT OF INSURANCE: NIL

INSURANCE - If carrier offers insurance, and such insurance is requested in accordance with the conditions thereof, indicate amount to be insured in figures in box marked "Amount of Insurance".

INSURANCE DECLINED — INITIALS

HANDLING INFORMATION These commodities licensed by US for ultimate destination

HFPU

on the #6 shelf

DUPLICATE COPY

GEN

NO. OF PIECES RCP	GROSS WEIGHT	kg/lb	RATE CLASS	COMMODITY ITEM NO.	CHARGEABLE WEIGHT	RATE / CHARGE	TOTAL	NATURE AND QUANTITY OF GOODS (INCL. DIMENSIONS OR VOLUME)
1	1	K	M	GCR 35	2	MIN	37.90	Samples DIMS 18x12x2IN (bulk)
1	1						37.90	

PREPAID	WEIGHT CHARGE	COLLECT	P-UP ZONE	PICKUP CHARGES	ORIGIN ADVANCE CHARGES	DESCRIPTION OF ORIGIN ADVANCE
	37.90	0.00		0.00	0.00	

	VALUATION CHARGE		DEL ZONE	DELIVERY CHARGES	DEST. ADVANCE CHARGES	DESCRIPTION OF DEST. ADVANCE
	0.00	0.00		0.00	0.00	

	TAX		OTHER CHARGES AND DESCRIPTION	ITEMS PREPAID	ITEMS COLLECT
	2.46	0.00	11.38 Nav Canada, Fuel Surcharg		

	TOTAL OTHER CHARGES DUE AGENT	
	0.00	0.00

Shipper certifies that the particulars on the face hereof are correct and that insofar as any part of the consignment contains dangerous goods, such part is properly described by name and is in proper condition for carriage by air according to the applicable Dangerous Goods Regulations.

	TOTAL OTHER CHARGES DUE CARRIER	
	11.38	0.00

RE-WEIGH/DIMENSIONAL WEIGHT AND SHIPPER GUARANTEES ALL CHARGES
SUBJECT TO RATE AUDIT

COD →	CURRENCY	
	CAD	0.00

TOTAL PREPAID	TOTAL COLLECT
51.74	0.00

PRINTED NAME _____ SIGNATURE _____

SIGNATURE OF SHIPPER ABOVE AND INITIAL APPLICABLE BOX BELOW

[X] THIS SHIPMENT DOES NOT CONTAIN DANGEROUS GOODS REGULATED IN AIR TRANSPORT.

[ ] THIS SHIPMENT DOES CONTAIN DANGEROUS GOODS REGULATED IN AIR TRANSPORT.

CURRENCY CONVERSION RATES	TOTAL COLLECT IN DESTINATION CURRENCY	EXECUTED ON (Date) 7/18/2016 (Time) 09:28	at (Place)	992091 SIGNATURE OF ISSUING CARRIER OR ITS AGENT
FOR CARRIERS USE ONLY AT DESTINATION (ALL COLLECT CHARGES IN DESTINATION CURRENCY)	CHARGES AT DESTINATION	TOTAL COLLECT CHARGES		

518-YEV-7061-5269

AGAT Laboratories

6310 ROPER ROAD
EDMONTON, ALBERTA
CANADA T6B 3P9
TEL (780)395-2525
FAX (780)462-2490
http://www.agatlabs.com

CLIENT NAME: IEG CONSULTANTS LTD
500-2618 HOPEWELL PLACE NE
CALGARY, AB T1Y7J7
(403) 262-5505

ATTENTION TO: Konrad Ross

PROJECT: A04012A08

AGAT WORK ORDER: 16E119478

TRACE ORGANICS REVIEWED BY: Laarni Hafso, Laboratory Manager

DATE REPORTED: Jul 28, 2016

PAGES (INCLUDING COVER): 23

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (780) 395-2525

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 16E119478

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-07-25

DATE REPORTED: 2016-07-28

SAMPLE DESCRIPTION:				GS16-001	GS16-002	GS16-003	GS16-004	GS16-005	GS16-006	GS16-007	GS16-008
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016
Parameter	Unit	G / S	RDL	7730258	7730259	7730260	7730262	7730263	7730266	7730267	7730268
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	0.62	5.03	0.28	<0.05	0.31	<0.05	0.32	1.33
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	<10	<10	<10	<10	769	13
C16 - C34 (F3)	mg/kg		10	16	450	27	<10	34	426	729	81
C34 - C50 (F4)	mg/kg		10	10	205	12	<10	14	159	73	29
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	15	44	11	17	19	42	55	37
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		109	108	109	105	106	105	106	105
Ethylbenzene-d10 (BTEX)	%	50-150		105	108	89	88	100	107	110	112
o-Terphenyl (F2-F4)	%	50-150		84	86	105	82	88	92	109	109

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 16E119478

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-07-25

DATE REPORTED: 2016-07-28

		SAMPLE DESCRIPTION:		GS16-009	GS16-010	GS16-011	GS16-012	GS16-013	GS16-014	GS16-015	GS16-016
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016
Parameter	Unit	G / S	RDL	7730269	7730270	7730271	7730272	7730273	7730274	7730275	7730276
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	0.19	0.27	0.14	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.39
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	1.89
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	98
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	95
C10 - C16 (F2)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	3060
C16 - C34 (F3)	mg/kg		10	11	14	25	<10	11	<10	20	2130
C34 - C50 (F4)	mg/kg		10	<10	<10	18	<10	<10	<10	10	22
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	14	20	14	16	15	18	13	16
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		108	107	107	105	107	107	106	109
Ethylbenzene-d10 (BTEX)	%	50-150		100	91	99	102	93	97	85	101
o-Terphenyl (F2-F4)	%	50-150		83	117	102	94	111	120	100	109

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 16E119478

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-07-25

DATE REPORTED: 2016-07-28

		SAMPLE DESCRIPTION:		GS16-017	GS16-018	GS16-019	GS16-020	GS16-021	GS16-022	GS16-023	GS16-024
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016
Parameter	Unit	G / S	RDL	7730277	7730278	7730279	7730280	7730281	7730282	7730283	7730284
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	0.81	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	0.08
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	11	<10	<10	<10	<10	<10
C16 - C34 (F3)	mg/kg		10	73	<10	56	10	12	<10	<10	<10
C34 - C50 (F4)	mg/kg		10	32	<10	18	15	<10	<10	<10	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	24	15	13	9	13	10	11	17
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		105	107	107	107	107	107	109	109
Ethylbenzene-d10 (BTEX)	%	50-150		97	98	108	92	89	98	80	90
o-Terphenyl (F2-F4)	%	50-150		105	110	107	110	114	104	96	97

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 16E119478

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-07-25

DATE REPORTED: 2016-07-28

SAMPLE DESCRIPTION:				GS16-025	GS16-026	GS16-027	GS16-028	GS16-029	GS16-030	GS16-031	GS16-032
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016
Parameter	Unit	G / S	RDL	7730286	7730287	7730288	7730289	7730290	7730291	7730292	7730295
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	0.07	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.08
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	18
C16 - C34 (F3)	mg/kg		10	36	<10	<10	<10	<10	89	31	162
C34 - C50 (F4)	mg/kg		10	19	<10	<10	<10	<10	29	17	72
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	14	15	16	16	10	8	5	14
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		109	109	109	108	103	106	101	105
Ethylbenzene-d10 (BTEX)	%	50-150		90	85	88	91	97	99	81	89
o-Terphenyl (F2-F4)	%	50-150		93	95	97	99	95	85	91	92

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 16E119478

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-07-25

DATE REPORTED: 2016-07-28

SAMPLE DESCRIPTION:				GS16-033	GS16-034	GS16-035	GS16-036	GS16-037	GS16-038	GS16-039	GS16-040
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016
Parameter	Unit	G / S	RDL	7730296	7730297	7730298	7730299	7730301	7730303	7730304	7730305
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	14	26	20	<10	19	126	134	13
C16 - C34 (F3)	mg/kg		10	166	77	68	47	73	219	243	68
C34 - C50 (F4)	mg/kg		10	80	32	32	28	27	23	30	38
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	13	8	8	6	6	8	5	14
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		106	107	107	108	108	108	107	112
Ethylbenzene-d10 (BTEX)	%	50-150		94	92	89	82	86	92	92	125
o-Terphenyl (F2-F4)	%	50-150		90	86	84	90	95	100	94	93

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 16E119478

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-07-25

DATE REPORTED: 2016-07-28

SAMPLE DESCRIPTION:				GS16-041	GS16-042	GS16-043	GS16-044	GS16-045	GS16-046	GS16-047	GS16-048
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016
Parameter	Unit	G / S	RDL	7730306	7730307	7730308	7730309	7730312	7730313	7730314	7730315
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	12	47	22	<10	116	10	36	<10
C16 - C34 (F3)	mg/kg		10	109	105	91	34	184	35	63	42
C34 - C50 (F4)	mg/kg		10	29	21	13	15	45	15	32	24
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	5	5	8	4	5	6	7	5
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		108	108	103	105	104	103	102	105
Ethylbenzene-d10 (BTEX)	%	50-150		121	106	94	90	88	101	90	95
o-Terphenyl (F2-F4)	%	50-150		95	90	71	70	62	84	83	78

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AGAT WORK ORDER: 16E119478

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-07-25

DATE REPORTED: 2016-07-28

		SAMPLE DESCRIPTION:		GS16-049	GS16-050	GS16-051	GS16-052	GS16-053	GS16-054	GS16-055	GS16-056
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016
Parameter	Unit	G / S	RDL	7730316	7730317	7730318	7730319	7730320	7730321	7730322	7730323
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	11	<10	23	<10	172	<10	<10
C16 - C34 (F3)	mg/kg		10	30	41	82	370	48	316	165	47
C34 - C50 (F4)	mg/kg		10	24	18	48	188	24	44	60	26
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	6	6	8	22	5	10	8	5
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		103	103	104	97	108	108	108	77
Ethylbenzene-d10 (BTEX)	%	50-150		88	96	98	101	102	110	107	62
o-Terphenyl (F2-F4)	%	50-150		79	70	74	92	84	71	64	61

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AGAT WORK ORDER: 16E119478

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-07-25

DATE REPORTED: 2016-07-28

SAMPLE DESCRIPTION:				GS16-057	GS16-058	GS16-060	GS16-061	GS16-062	GS16-063	GS16-064	GS16-065
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				7/19/2016	7/19/2016	7/21/2016	7/21/2016	7/21/2016	7/19/2016	7/19/2016	7/19/2016
Parameter	Unit	G / S	RDL	7730324	7730325	7730327	7730328	7730329	7730330	7730331	7730332
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.03
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	0.11	<0.05	<0.05	0.20	0.32
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	15	17
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	15	17
C10 - C16 (F2)	mg/kg		10	<10	<10	<10	1030	<10	1790	3250	1750
C16 - C34 (F3)	mg/kg		10	38	112	11	759	234	985	1690	684
C34 - C50 (F4)	mg/kg		10	26	77	<10	36	423	42	38	39
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	3	5	5	7	17	8	6	6
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		108	107	104	105	106	103	102	103
Ethylbenzene-d10 (BTEX)	%	50-150		107	102	111	98	114	100	93	101
o-Terphenyl (F2-F4)	%	50-150		70	69	60	76	65	69	94	88

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AGAT WORK ORDER: 16E119478

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-07-25

DATE REPORTED: 2016-07-28

SAMPLE DESCRIPTION:				GS16-066	GS16-067	GS16-068	GS16-069	GS16-070	GS16-071	GS16-072	GS16-073
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016
Parameter	Unit	G / S	RDL	7730333	7730334	7730335	7730336	7730337	7730338	7730339	7730340
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	1340	778	10	14	14	24	11	42
C16 - C34 (F3)	mg/kg		10	1120	535	118	98	57	68	64	82
C34 - C50 (F4)	mg/kg		10	46	46	59	53	26	28	22	16
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	5	13	10	9	7	6	5	6
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		103	106	102	107	102	92	92	92
Ethylbenzene-d10 (BTEX)	%	50-150		102	120	115	109	110	89	89	86
o-Terphenyl (F2-F4)	%	50-150		108	81	81	77	88	78	83	81

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AGAT WORK ORDER: 16E119478

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-07-25

DATE REPORTED: 2016-07-28

SAMPLE DESCRIPTION:				GS16-074	GS16-075	GS16-076	GS16-077	Dup 1	Dup 2	Dup 3	Dup 4
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016	7/19/2016
Parameter	Unit	G / S	RDL	7730341	7730342	7730343	7730344	7730412	7730413	7730414	7730415
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	0.18	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	0.15	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	25	23	14	28	14	<10	<10	36
C16 - C34 (F3)	mg/kg		10	40	45	34	46	77	<10	<10	98
C34 - C50 (F4)	mg/kg		10	12	11	<10	16	18	<10	<10	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	5	12	5	6	19	16	16	8
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		107	92	92	104	104	107	108	107
Ethylbenzene-d10 (BTEX)	%	50-150		110	88	91	102	89	90	98	85
o-Terphenyl (F2-F4)	%	50-150		81	66	66	88	101	87	85	82

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AGAT WORK ORDER: 16E119478

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-07-25

DATE REPORTED: 2016-07-28

		SAMPLE DESCRIPTION:		Dup 5	Dup 6	Dup 7
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		7/19/2016	7/21/2016	7/21/2016
Parameter	Unit	G / S	RDL	7730416	7730417	7730418
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	10	<10	14
C16 - C34 (F3)	mg/kg		10	176	43	40
C34 - C50 (F4)	mg/kg		10	16	<10	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A
Moisture Content	%		1	7	5	6
Surrogate	Unit	Acceptable Limits				
Toluene-d8 (BTEX)	%	50-150		107	106	108
Ethylbenzene-d10 (BTEX)	%	50-150		86	90	96
o-Terphenyl (F2-F4)	%	50-150		75	82	89

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

7730258-7730418 Results are based on the dry weight of the sample.
The C6-C10 (F1) fraction is calculated using toluene response factor.
The C10 - C16 (F2), C16 - C34 (F3), and C34 - C50 (F4) fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons (F4g) are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
Total C6 - C50 results are corrected for BTEX and PAH contributions (if requested).
Quality control data is available upon request.
Assistance in the interpretation of data is available upon request.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
The chromatogram returned to baseline by the retention time of nC50.
Extraction and holding times were met for this sample.
C6 –C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX.
Xylenes is a calculated parameter. The calculated value is the sum of m&p-Xylenes + o-Xylene.

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Quality Assurance

CLIENT NAME: IEG CONSULTANTS LTD

AGAT WORK ORDER: 16E119478

PROJECT: A04012A08

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: Jul 28, 2016

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)															
Benzene	1372	7730269	< 0.005	< 0.005	NA	< 0.005	94%	80%	120%	85%	80%	120%	98%	60%	140%
Toluene	1372	7730269	0.19	0.20	NA	< 0.05	90%	80%	120%	81%	80%	120%	95%	60%	140%
Ethylbenzene	1372	7730269	< 0.01	< 0.01	NA	< 0.01	87%	80%	120%	83%	80%	120%	94%	60%	140%
Xylenes	1372	7730269	< 0.05	< 0.05	NA	< 0.05	91%	80%	120%	85%	80%	120%	90%	60%	140%
C6 - C10 (F1)	1372	7730269	< 10	< 10	NA	< 10	98%	80%	120%	107%	80%	120%	124%	60%	140%
C10 - C16 (F2)	728	7730269	< 10	< 10	NA	< 10	91%	80%	120%	108%	80%	120%	126%	60%	140%
C16 - C34 (F3)	728	7730269	11	15	NA	< 10	94%	80%	120%	105%	80%	120%	134%	60%	140%
C34 - C50 (F4)	728	7730269	< 10	< 10	NA	< 10	93%	80%	120%	104%	80%	120%	136%	60%	140%
Moisture Content	728	7730269	14	14	0.0%	< 1									

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)															
Benzene	1125	7730284	< 0.005	< 0.005	NA	< 0.005	117%	80%	120%	100%	80%	120%	115%	60%	140%
Toluene	1125	7730284	0.08	0.09	NA	< 0.05	89%	80%	120%	82%	80%	120%	88%	60%	140%
Ethylbenzene	1125	7730284	< 0.01	< 0.01	NA	< 0.01	87%	80%	120%	82%	80%	120%	84%	60%	140%
Xylenes	1125	7730284	< 0.05	< 0.05	NA	< 0.05	91%	80%	120%	83%	80%	120%	82%	60%	140%
C6 - C10 (F1)	1125	7730284	< 10	< 10	NA	< 10	81%	80%	120%	110%	80%	120%	136%	60%	140%
C10 - C16 (F2)	1001	7730284	< 10	< 10	NA	< 10	89%	80%	120%	99%	80%	120%	94%	60%	140%
C16 - C34 (F3)	1001	7730284	< 10	< 10	NA	< 10	90%	80%	120%	88%	80%	120%	86%	60%	140%
C34 - C50 (F4)	1001	7730284	< 10	< 10	NA	< 10	89%	80%	120%	91%	80%	120%	87%	60%	140%
Moisture Content	1001	7730284	17	16	6.1%	< 1									

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)															
Benzene	995	7730308	< 0.005	< 0.005	NA	< 0.005	81%	80%	120%	90%	80%	120%	95%	60%	140%
Toluene	995	7730308	< 0.05	< 0.05	NA	< 0.05	96%	80%	120%	88%	80%	120%	96%	60%	140%
Ethylbenzene	995	7730308	< 0.01	< 0.01	NA	< 0.01	113%	80%	120%	111%	80%	120%	118%	60%	140%
Xylenes	995	7730308	< 0.05	< 0.05	NA	< 0.05	116%	80%	120%	98%	80%	120%	103%	60%	140%
C6 - C10 (F1)	995	7730308	< 10	< 10	NA	< 10	118%	80%	120%	114%	80%	120%	116%	60%	140%
C10 - C16 (F2)	818	7730308	22	25	13.0%	< 10	101%	80%	120%	117%	80%	120%	81%	60%	140%
C16 - C34 (F3)	818	7730308	91	84	8.0%	< 10	93%	80%	120%	103%	80%	120%	72%	60%	140%
C34 - C50 (F4)	818	7730308	13	15	14.0%	< 10	92%	80%	120%	108%	80%	120%	75%	60%	140%
Moisture Content	818	7730308	8	8	0.0%	< 1									

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)															
Benzene	1125	7731266	< 0.005	< 0.005	NA	< 0.005	117%	80%	120%	100%	80%	120%	120%	60%	140%
Toluene	1125	7731266	< 0.05	< 0.05	NA	< 0.05	89%	80%	120%	81%	80%	120%	96%	60%	140%
Ethylbenzene	1125	7731266	< 0.01	< 0.01	NA	< 0.01	87%	80%	120%	82%	80%	120%	93%	60%	140%
Xylenes	1125	7731266	< 0.05	< 0.05	NA	< 0.05	91%	80%	120%	84%	80%	120%	90%	60%	140%

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Quality Assurance

CLIENT NAME: IEG CONSULTANTS LTD

AGAT WORK ORDER: 16E119478

PROJECT: A04012A08

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Jul 28, 2016			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
C6 - C10 (F1)	1125	7731266	< 10	< 10	NA	< 10	81%	80%	120%	117%	80%	120%	134%	60%	140%

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)															
C10 - C16 (F2)	793	7730412	778	713	8.7%	< 10	89%	80%	120%	86%	80%	120%	90%	60%	140%
C16 - C34 (F3)	793	7730412	535	463	14.4%	< 10	94%	80%	120%	102%	80%	120%	108%	60%	140%
C34 - C50 (F4)	793	7730412	46	41	NA	< 10	93%	80%	120%	105%	80%	120%	104%	60%	140%
Moisture Content	793	7730412	13	13	0.0%	< 1									

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

Certified By:

AGAT Laboratories

6310 ROPER ROAD
EDMONTON, ALBERTA
CANADA T6B 3P9
TEL (780)395-2525
FAX (780)462-2490
http://www.agatlabs.com

Method Summary

CLIENT NAME: IEG CONSULTANTS LTD

AGAT WORK ORDER: 16E119478

PROJECT: A04012A08

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	ORG-170-5110/5140/5430/5440	EPA SW-846 8260-S	GC/MS
Toluene	ORG-170-5110/5140/5430/5440	EPA SW-846 8260-S	GC/MS
Ethylbenzene	ORG-170-5110/5140/5430/5440	EPA SW-846 8260-S	GC/MS
Xylenes	ORG-170-5110/5140/5430/5440	EPA SW-846 8260-S	GC/MS
C6 - C10 (F1)	ORG-170-5110/5140/5430/5440	CCME Tier 1 Method-S L	GC/FID
C6 - C10 (F1 minus BTEX)	ORG-170-5110/5140/5430/5440	CCME Tier 1 Method-S L	GC/FID
C10 - C16 (F2)	ORG-170-5120/5300	CCME Tier 1 Method-S H	GC/FID
C16 - C34 (F3)	ORG-170-5120/5300	CCME Tier 1 Method-S H	GC/FID
C34 - C50 (F4)	ORG-170-5120/5300	CCME Tier 1 Method-S H	GC/FID
Gravimetric Heavy Hydrocarbons	ORG-170-5120/5300	CCME Tier 1 Method-S H	GC/FID
Moisture Content	LAB-175-4002	CCME Tier 1 Method-S %	GRAVIMETRIC
Toluene-d8 (BTEX)	ORG-170-5110/5140/5430/5440	EPA SW-846 8260-S	GC/MS
Ethylbenzene-d10 (BTEX)	ORG-170-5110/5140/5430/5440	EPA SW-846 8260-S	GC/MS
o-Terphenyl (F2-F4)	ORG-170-5120/5300	CCME Tier 1 Method-S H	GC/FID

AGAT Laboratories
2910 12 Street NE
Calgary, Alberta T2E 7P7
P: 403.735.2005 • F: 403.735.2771
webearth.agatlabs.com

Laboratory Use Only
Arrival Temperature: 1.8°C
AGAT Job Number: 16E119478
Date and Time:

Chain of Custody Record

Emergency Support Services Hotline 1-855-AGAT 245 (1-855-242-8245)

Report Information

Company: KCB
Contact: Konrad Ross
Address: 2618 Hopewell Place NE
Calgary
Phone: 403-464-7677 Fax:
LSD:
Client Project #: A04012A08

Invoice To

Same ☑ Yes ☐ No

Company:
Contact:
Address:
Phone: Fax:
PO/AFE#

Report Information

1. Name: Konrad Ross
Email: Kross@klohn.com
2. Name: Nicole Wills
Email: nwills@klohn.com
3. Name:
Email:

Report Format

☐ Single Sample per Page
☐ Multiple Samples per Page

Turnaround Time Required (TAT)

Regular TAT ☑ 5-7 Business Days
Rush TAT (Surcharge) ☐ Less than 24 Hours (200%) ☐ Less than 48 Hours (100%) ☐ Less than 72 Hours (50%)
Date Required:

Requirements (Selection may impact detection limits)

☐ CCME ☐ Agricultural ☐ Industrial ☐ Residential/ Park ☐ Commercial ☐ Drinking Water ☐ FWAL
☐ AB Tier 1 ☐ Agricultural ☐ Industrial ☐ Residential/ Park ☐ Commercial ☐ Natural Area ☐ AB Surface Water
☐ BC CSR ☐ AW ☐ IW ☐ LW ☐ DW
☐ Other: ☐ D50 (Drilling) ☐ SPIGEC ☐

LABORATORY USE (LAB ID#)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/ TIME SAMPLED	COMMENTS- SITE SAMPLE INFO, SAMPLE CONTAINMENT	# of CONTAINERS	Detailed Soil Salinity (Saturated Paste)	CCME BTEX/ F1-F4	Soil Metals: ☐ HWS-B ☐ Cr^{6+} ☐ Hg	Water Metals: ☐ Dissolved ☐ Total ☐ Hg ☐ Cr^{6+}	Routine Water Potability	AB Class 2 Landfill	BC Landfill	D50 Detailed Salinity (As Received)	Microtox	☐ BTEXS/VPH/EPH ☐ LEPH/HEPH	HOLD FOR 60 DAYS	PRESERVED	CONTAMINATED/ HAZARDOUS
7730258	GS16-001	Soil	19-Jul-16		2		X											
259	GS16-002	Soil	19-Jul-16		2		X											
260	GS16-003	Soil	19-Jul-16		2		X											
262	GS16-004	Soil	19-Jul-16		2		X											
263	GS16-005	Soil	19-Jul-16		2		X											
266	GS16-006	Soil	19-Jul-16		2		X											
267	GS16-007	Soil	19-Jul-16		2		X											
268	GS16-008	Soil	19-Jul-16		2		X											
269	GS16-009	Soil	19-Jul-16		2		X											
270	GS16-010	Soil	19-Jul-16		2		X											
271	GS16-011	Soil	19-Jul-16		2		X											
272	GS16-012	Soil	19-Jul-16		2		X											

16 JUL 25 1638

Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:	Page	of
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:		
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:		

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Document ID: DIV-50-1507.003

AGAT Laboratories
2910 12 Street NE
Calgary, Alberta T2E 7P7
P: 403.735.2005 ▪ F: 403.735.2771
webearth.agatlabs.com

Chain of Custody Record

Emergency Support Services Hotline 1-855-AGAT 245 (1-855-242-8245)

Report to:

Company: _____ Same as COC#: _____

LABORATORY USE (LAB ID#)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/ TIME SAMPLED	COMMENTS- SITE SAMPLE INFO, SAMPLE CONTAINMENT	# of CONTAINERS	Detailed Soil Salinity (Saturated Paste)	CCME BTEX/ F1-F4	Soil Metals: ☐ HWS-B ☐ Cr6+ ☐ Hg	Water Metals: ☐ Dissolved ☐ Total ☐ Hg ☐ Cr6+	Routine Water Potability	AB Class 2 Landfill	BC Landfill	D50 Detailed Salinity (As Received)	Microtox	☐ BTEXS/VPH/EPH ☐ LEPH/HEPH	HOLD FOR 60 DAYS	PRESERVED	CONTAMINATED/ HAZARDOUS
273	GS16-013	Soil	19-Jul-16		2		X											
274	GS16-014	Soil	19-Jul-16		2		X											
275	GS16-015	Soil	19-Jul-16		2		X											
276	GS16-016	Soil	19-Jul-16		2		X											
277	GS16-017	Soil	19-Jul-16		2		X											
278	GS16-018	Soil	19-Jul-16		2		X											
279	GS16-019	Soil	19-Jul-16		2		X											
280	GS16-020	Soil	19-Jul-16		2		X											
281	GS16-021	Soil	19-Jul-16		2		X											
282	GS16-022	Soil	19-Jul-16		2		X											
283	GS16-023	Soil	19-Jul-16		2		X											
284	GS16-024	Soil	19-Jul-16		2		X											
286	GS16-025	Soil	19-Jul-16		2		X											
287	GS16-026	Soil	19-Jul-16		2		X											
288	GS16-027	Soil	19-Jul-16		2		X											
289	GS16-028	Soil	19-Jul-16		2		X											
290	GS16-029	Soil	19-Jul-16		2		X											
291	GS16-030	Soil	19-Jul-16		2		X											
292	GS16-031	Soil	19-Jul-16		2		X											
295	GS16-032	Soil	19-Jul-16		2		X											
296	GS16-033	Soil	19-Jul-16		2		X											
297	GS16-034	Soil	19-Jul-16		2		X											
298	GS16-035	Soil	19-Jul-16		2		X											
299	GS16-036	Soil	19-Jul-16		2		X											
301	GS16-037	Soil	19-Jul-16		2		X											

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Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time: 7/25/2016
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:

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Document ID: DIV-50-1507.002

AGAT Laboratories
2910 12 Street NE
Calgary, Alberta T2E 7P7
P: 403.735.2005 • F: 403.735.2771
webearth.agatlabs.com

Chain of Custody Record

Emergency Support Services Hotline 1-855-AGAT 245 (1-855-242-8245)

Report to:

Company: _____ Same as COC#: _____

LABORATORY USE (LAB ID#)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/ TIME SAMPLED	COMMENTS- SITE SAMPLE INFO, SAMPLE CONTAINMENT	# of CONTAINERS	Detailed Soil Salinity (Saturated Paste)	CCME BTEX/ F1-F4	Soil Metals: ☐ HWS-B ☐ Cr6+ ☐ Hg	Water Metals: ☐ Dissolved ☐ Total ☐ Cr6+ ☐ Hg	Routine Water Potability	AB Class 2 Landfill	BC Landfill	D50 Detailed Salinity (As Received)	Microtox	☐ BTEXS/VPH/EPH ☐ LEPH/HEPH							HOLD FOR 60 DAYS	PRESERVED	CONTAMINATED/ HAZARDOUS
303	GS16-038	Soil	19-Jul-16		2		X																
304	GS16-039	Soil	19-Jul-16		2		X																
305	GS16-040	Soil	19-Jul-16		2		X																
306	GS16-041	Soil	19-Jul-16		2		X																
307	GS16-042	Soil	19-Jul-16		2		X																
308	GS16-043	Soil	19-Jul-16		2		X																
309	GS16-044	Soil	19-Jul-16		2		X																
312	GS16-045	Soil	19-Jul-16		2		X																
313	GS16-046	Soil	19-Jul-16		2		X																
314	GS16-047	Soil	19-Jul-16		2		X																
315	GS16-048	Soil	19-Jul-16		2		X																
316	GS16-049	Soil	19-Jul-16		2		X																
317	GS16-050	Soil	19-Jul-16		2		X																
318	GS16-051	Soil	19-Jul-16		2		X																
319	GS16-052	Soil	19-Jul-16		2		X																
320	GS16-053	Soil	19-Jul-16		2		X											'16 JUL 25 15:38					
321	GS16-054	Soil	19-Jul-16		2		X																
322	GS16-055	Soil	19-Jul-16		2		X																
323	GS16-056	Soil	19-Jul-16		2		X																
324	GS16-057	Soil	19-Jul-16		2		X																
325	GS16-058	Soil	19-Jul-16		2		X																
326	GS16-059	Soil	19-Jul-16		2		X																
327	GS16-060	Soil	21-Jul-16		2		X																
328	GS16-061	Soil	21-Jul-16		2		X																
329	GS16-062	Soil	21-Jul-16		2		X																

Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:	Page
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:	
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:	

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Document ID: DIV-50-1507.002

AGAT Laboratories
2910 12 Street NE
Calgary, Alberta T2E 7P7
P: 403.735.2005 ▪ F: 403.735.2771
webearth.agatlabs.com

Chain of Custody Record

Emergency Support Services Hotline 1-855-AGAT 245 (1-855-242-8245)

Report to:

Company: _____ Same as COC#: _____

LABORATORY USE (LAB ID#)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/ TIME SAMPLED	COMMENTS- SITE SAMPLE INFO, SAMPLE CONTAINMENT	# of CONTAINERS	Detailed Soil Salinity (Saturated Paste)	CCME BTEX/ F1-F4	Soil Metals: ☐ HWS-B ☐ Cr6+ ☐ Hg	Water Metals: ☐ Dissolved ☐ Total ☐ Hg ☐ Cr6+	Routine Water Potability	AB Class 2 Landfill	BC Landfill	D50 Detailed Salinity (As Received)	Microtox	☐ BTEXS/VPH/EPH ☐ LEPH/HEPH	HOLD FOR 60 DAYS	PRESERVED	CONTAMINATED/ HAZARDOUS
330	GS16-063	Soil	19-Jul-16		2		X											
331	GS16-064	Soil	19-Jul-16		2		X											
332	GS16-065	Soil	19-Jul-16		2		X											
333	GS16-066	Soil	19-Jul-16		2		X											
334	GS16-067	Soil	19-Jul-16		2		X											
335	GS16-068	Soil	19-Jul-16		2		X											
336	GS16-069	Soil	19-Jul-16		2		X											
337	GS16-070	Soil	19-Jul-16		2		X											
338	GS16-071	Soil	19-Jul-16		2		X											
339	GS16-072	Soil	19-Jul-16		2		X											
340	GS16-073	Soil	19-Jul-16		2		X											
341	GS16-074	Soil	19-Jul-16		2		X											
342	GS16-075	Soil	19-Jul-16		2		X											
343	GS16-076	Soil	19-Jul-16		2		X											
344	GS16-077	Soil	19-Jul-16		2		X											
345	GS16-078	Soil	19-Jul-16		2		X									'16 JUL 25 16:30		
346	GS16-079	Soil	19-Jul-16		2		X											
347	GS16-080	Soil	19-Jul-16		2		X											
348	GS16-081	Soil	19-Jul-16		2		X											
349	GS16-082	Soil	19-Jul-16		2		X											
350	GS16-083	Soil	19-Jul-16		2		X											
373	GS16-084	Soil	19-Jul-16		2		X											
374	GS16-085	Soil	21-Jul-16		2		X											
375	GS16-086	Soil	21-Jul-16		2		X											
376	GS16-087	Soil	21-Jul-16		2		X											

Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time: 7/25/2016	Page	of
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:		
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:		

Document ID: DIV-50-1507.002

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AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM

RECEIVING BASICS - Shipping

Company/Consultant: KCB

Courier: Canada Post Prepaid Collect

Waybill# 518 - TEV - 7061 - 5650

Branch [EDM] GP FN FM RD VAN LYD FSJ EST Other:

If multiple sites were submitted at once: Yes No

Custody Seal Intact: Yes No (NA)

TAT: (<24hr) 24-48hr 48-72hr (Reg) Other

Cooler Quantity: 9

TIME SENSITIVE ISSUES - Shipping

ALREADY EXCEEDED HOLD TIME? Yes (No)

Inorganic Tests (Please Circle): Mibi , BOD , Nitrate/Nitrite , Turbidity , Microtox , Ortho PO4 , Tedlar Bag , Residual Chlorine , Chlorophyll* , Chloroamines*

Earliest Expiry:

Hydrocarbons: Earliest Expiry 7/26/2016

SAMPLE INTEGRITY - Shipping

Hazardous Samples: YES (NO) Precaution Taken:

Legal Samples: Yes (No)

International Samples: Yes (No)

Tape Sealed: Yes No

Coolant Used: Icepack (Bagged Ice) Free Ice Free Water None

Temperature (Bottles/Jars only) N/A if only Soil Bags Received

FROZEN (Please Circle if samples received Frozen) 1.8°C

1 (Bottle/~~Jar~~) 0.1 + 0.6 + 0.4 = 0.6 °C	2 (Bottle/~~Jar~~) 1.9 + 0.9 + 0.8 = 1.2 °C
3 (Bottle/~~Jar~~) 3.5 + 3.4 + 3.5 = 3.5 °C	4 (Bottle/~~Jar~~) 2.3 + 2.2 + 2.2 = 2.2 °C
5 (Bottle/Jar) ___ + ___ + ___ = ___ °C	6 (Bottle/Jar) ___ + ___ + ___ = ___ °C
7 (Bottle/Jar) ___ + ___ + ___ = ___ °C	8 (Bottle/Jar) ___ + ___ + ___ = ___ °C
9 (Bottle/Jar) ___ + ___ + ___ = ___ °C	10 (Bottle/Jar) ___ + ___ + ___ = ___ °C

(If more than 10 coolers are received use another sheet of paper and attach)

LOGISTICS USE ONLY

Workorder No: 16E119478

Samples Damaged: Yes (No) If YES why?

No Bubble Wrap Frozen Courier

Other:

Account Project Manager: have they been notified of the above issues: Yes No

Whom spoken to: Date/Time:

CPM Initial

General Comments: Missing samples GS16-078, 079, 080, 081, 082, 083, 084, 085, 086, 087. Did not receive. GS16-061 only 1x120ml jar recieved. Missing Dup jar. GS16-059 recieved 2x120ml jar with this label but no sample inside. Received 14 x 120ml jars of sample not on COC - label as Dup 1, Dup 2, Dup 3, Dup 4, Dup 5, Dup 6, Dup 7. Each sample name has duplicate. ie. 7 samples but 14 jars. Will put Hold until told otherwise.

* Subcontracted Analysis (See CPM)

Kevin Dishko

From: Anthony Espinoza-Torres
Sent: Monday, July 25, 2016 4:38 PM
To: Anthony Espinoza-Torres; Abegail Benjamino; AGAT Edmonton Env Shipping
Subject: RE: Chain of custody

And please log as 200% RUSH. The client contacted me to upgrade the rush status.

Thank you,

Anthony Espinoza-Torres, B.Sc.
Client Project Manager
AGAT Laboratories
Direct: 780-395-2527
Cell: 780-938-9917
Email: espinoza-torres@agatlabs.com

Canadian Science and Technology in Action, Coast to Coast

From: Anthony Espinoza-Torres
Sent: July-25-16 4:04 PM
To: Abegail Benjamino; AGAT Edmonton Env Shipping
Subject: RE: Chain of custody

Please log as IEG instead of KCB when they arrive.

Thank you,

Anthony Espinoza-Torres, B.Sc.
Client Project Manager
AGAT Laboratories
Direct: 780-395-2527
Cell: 780-938-9917
Email: espinoza-torres@agatlabs.com

Canadian Science and Technology in Action, Coast to Coast

From: Abegail Benjamino
Sent: July-25-16 3:31 PM
To: Anthony Espinoza-Torres; AGAT Edmonton Env Shipping
Subject: RE: Chain of custody

Hey Anthony,

As per our conversation Roy left 15 mins ago to pick up the coolers at Canadian north

Thank you!
Abbey Benjamino
Shipping Coordinator

AGAT Laboratories
Direct: 780.395.2537
Cell: 780.802.8858
Email: benjamino@agatlabs.com

Your Canadian National Laboratory

From: Anthony Espinoza-Torres
Sent: Monday, July 25, 2016 3:00 PM
To: AGAT Edmonton Env Shipping
Subject: FW: Chain of custody

FYI There should be samples for pickup at Canadian North. Samples are expiring tomorrow for BTEX/F1. If someone has the contact info for Canadian North please forward it to me and I can call to see if they are awaiting pickup

Thank you,

Anthony Espinoza-Torres, B.Sc.
Client Project Manager
AGAT Laboratories
Direct: 780-395-2527
Cell: 780-938-9917
Email: espinoza-torres@agatlabs.com

Canadian Science and Technology in Action, Coast to Coast

From: Ross, Konrad [mailto:kross@klohn.com]
Sent: July-25-16 2:56 PM
To: Anthony Espinoza-Torres
Subject: Chain of custody

Hi Anothy,

I tried to send this COC last Friday but I just realized it didn't send. The samples should be and Canadian North now for pick up. Would you be able to pick them up tomorrow morning. I believe some of the samples hold time may be running out tomorrow.

Thanks

Konrad Ross
Environmental Technician

Klohn Crippen Berger 500-2618 Hopewell Place NE, Calgary Alberta T1Y 7J7, CANADA
T 403.731.6853 | M 403.542.9356 | kross@klohn.com | www.klohn.com

ISO 9001 • ISO 14001 • OHSAS 18001

SHIPPER'S NAME AND ADDRESS

IEG Consultants

Calgary, AB
403 829 3048

SHIPPER'S ACCOUNT NUMBER

NOT NEGOTIABLE
AIR WAYBILL
(AIR CONSIGNMENT NOTE)

Canadian North
101 3731 52 Ave E
Edmonton Int Arpt, AB T9E 0V4
Canada

GST #: R 892440629

Copies 1, 2 and 3 of this Air Waybill are originals and have the same validity.

It is agreed that the goods described herein are accepted in apparent good order and condition (except as noted) for carriage SUBJECT TO THE CONDITIONS OF CONTRACT ON THE REVERSE HEREOF. ALL GOODS MAY BE CARRIED BY ANY OTHER MEANS INCLUDING ROAD OR ANY OTHER CARRIER UNLESS SPECIFIC CONTRARY INSTRUCTIONS ARE GIVEN HEREON BY THE SHIPPER, AND THE SHIPPER AGREES THAT THE SHIPMENTS MAY BE CARRIED VIA INTERMEDIATE STOPPING PLACES WHICH THE CARRIER DEEMS APPROPRIATE. THE SHIPPER'S ATTENTION IS DRAWN TO THE NOTICE CONCERNING CARRIER'S LIMITATION OF LIABILITY. Shipper may increase such limitation of liability by declaring a higher value for carriage and paying a supplemental charge if required.

CONSIGNEE'S NAME AND ADDRESS

AGAT Laboratories Ltd
6310 Roper Road
Edmonton, AB T6B 3P9
Canada
780-938-9917 Anthony Espinoza

CONSIGNEE'S ACCOUNT NUMBER
AGA100CW

SIGNATURE | RECEIVED IN GOOD ORDER | PLACE | DATE/TIME

PRINTED NAME

ISSUING CARRIER'S AGENT NAME AND CITY

ALSO NOTIFY: NAME AND ADDRESS *(OPTIONAL ACCOUNTING INFORMATION)*
Acc.#: AGA101CW
AGAT Laboratories Ltd.
Accounts Payable
2905 12 St. NE
Calgary,AB T2E 7J2

TO EXPEDITE MOVEMENT, SHIPMENT MAY BE DIVERTED TO MOTOR OR OTHER CARRIER UNLESS SHIPPER GIVES OTHER INSTRUCTIONS HEREON.

AGENT'S IATA CODE | ACCOUNT NO.

DOMESTIC LIABILITY:

AIRPORT OF DEPARTURE (ADDR OF FIRST CARRIER) AND REQUESTED ROUTING
Inuvik

ROUTING AND DESTINATION

TO	BY FIRST CARRIER	TO	BY	TO	BY
YEG	Canadian North				

CURRENCY	CHGS Code	WT/VAL PPD	WT/VAL COLL	OTHER PPD	OTHER COLL	DECLARED VALUE FOR CARRIAGE	DECLARED VALUE FOR CUSTOMS
CAD	3RD		X		X	NVD	NCV

AIRPORT OF DESTINATION
Edmonton

FOR CARRIER USE ONLY
FLIGHT/DATE | FLIGHT/DATE

AMOUNT OF INSURANCE
NIL

INSURANCE - If carrier offers insurance, and such insurance is requested in accordance with the conditions thereof, indicate amount to be insured in figures in box marked "Amount of Insurance".

INSURANCE DECLINED
INITIALS

HANDLING INFORMATION These commodities licensed by US for ultimate destination
HFPU

DUPLICATE COPY

NO. OF PIECES RCP	GROSS WEIGHT	kg/lb	RATE CLASS / COMMODITY ITEM NO.	CHARGEABLE WEIGHT	RATE / CHARGE	TOTAL	NATURE AND QUANTITY OF GOODS (INCL. DIMENSIONS OR VOLUME)
4	92	K	GAD 00	92	$7.42	682.64	Coolers W/ Samples DIMS 24x26x28IN (bulk)
4	92					682.64	

PREPAID	WEIGHT CHARGE	COLLECT	P-UP ZONE	PICKUP CHARGES	ORIGIN ADVANCE CHARGES	DESCRIPTION OF ORIGIN ADVANCE
0.00		682.64		0.00	0.00	
	VALUATION CHARGE		DEL ZONE	DELIVERY CHARGES	DEST. ADVANCE CHARGES	DESCRIPTION OF DEST. ADVANCE
0.00		0.00		0.00	0.00	
	TAX		OTHER CHARGES AND DESCRIPTION		ITEMS PREPAID	ITEMS COLLECT
0.00		45.06	218.59 Nav Canada Charge, Fuel S			
TOTAL OTHER CHARGES DUE AGENT			Shipper certifies that the particulars on the face hereof are correct and that insofar as any part of the consignment contains dangerous goods, such part is properly described by name and is in proper condition for carriage by air according to the applicable Dangerous Goods Regulations.			
0.00		0.00				
TOTAL OTHER CHARGES DUE CARRIER			**RE-WEIGH/DIMENSIONAL WEIGHT AND SHIPPER GUARANTEES ALL CHARGES SUBJECT TO RATE AUDIT**			
0.00		218.59				
COD →	CURRENCY					
	CAD	0.00				
TOTAL PREPAID		TOTAL COLLECT				
0.00		946.29				

PRINTED NAME _____ SIGNATURE _____

SIGNATURE OF SHIPPER ABOVE AND INITIAL APPLICABLE BOX BELOW

[X] THIS SHIPMENT DOES NOT CONTAIN DANGEROUS GOODS REGULATED IN AIR TRANSPORT.

[ ] THIS SHIPMENT DOES CONTAIN DANGEROUS GOODS REGULATED IN AIR TRANSPORT.

CURRENCY CONVERSION RATES	TOTAL COLLECT IN DESTINATION CURRENCY	EXECUTED ON			
		7/22/2016	12:07	at (Place)	992091
		(Date)	(Time)		SIGNATURE OF ISSUING CARRIER OR ITS AGENT

FOR CARRIERS USE ONLY AT DESTINATION (ALL COLLECT CHARGES IN DESTINATION CURRENCY)	CHARGES AT DESTINATION	TOTAL COLLECT CHARGES

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CLIENT NAME: IEG CONSULTANTS LTD
500-2618 HOPEWELL PLACE NE
CALGARY, AB T1Y7J7
(403) 262-5505

ATTENTION TO: Konrad Ross

PROJECT: A04012A08

AGAT WORK ORDER: 16E123918

TRACE ORGANICS REVIEWED BY: Oksana Gushyla, Trace Organics Lab Supervisor

DATE REPORTED: Aug 11, 2016

PAGES (INCLUDING COVER): 25

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (780) 395-2525

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

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Certificate of Analysis

AGAT WORK ORDER: 16E123918

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

AGAT Western Canada - OC Pesticides (Soil)

DATE RECEIVED: 2016-08-07

DATE REPORTED: 2016-08-11

		SAMPLE DESCRIPTION:		GS16-155	GS16-156	GS16-157	GS16-158	GS16-159
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016
Parameter	Unit	G / S	RDL	7756784	7756785	7756786	7756787	7756788
DDD (o,p')	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005
pp'-DDD	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005
DDD (o,p' + p,p')	µg/g		0.007	<0.007	<0.007	<0.007	<0.007	<0.007
op'-DDE	ug/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005
pp'-DDE	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005
DDE (Total)	µg/g		0.007	<0.007	<0.007	<0.007	<0.007	<0.007
op'-DDT	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005
pp'- DDT	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005
DDT (Total)	µg/g	0.7	0.007	<0.007	<0.007	<0.007	<0.007	<0.007
Moisture Content	%		0.1	4.3	3.4	5.9	7.4	9.5
Surrogate	Unit	Acceptable Limits						
TCMX	%	50-130		62	88	70	54	84
Decachlorobiphenyl	%	60-130		66	90	88	66	104

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Western Canada ABT1 Herb_Pest Soil Lowest Detection Limit

7756784-7756788 Results are based on the dry weight of the soil.

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AGAT WORK ORDER: 16E123918

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-08-07

DATE REPORTED: 2016-08-11

SAMPLE DESCRIPTION:				GS16-078	GS16-079	GS16-080	GS16-081	GS16-082	GS16-083	GS16-084	GS16-085
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016
Parameter	Unit	G / S	RDL	7756707	7756708	7756709	7756710	7756711	7756712	7756713	7756714
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.26
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	<10	90	<10	<10	<10	<10
C16 - C34 (F3)	mg/kg		10	201	<10	<10	139	31	95	57	62
C34 - C50 (F4)	mg/kg		10	88	<10	<10	35	14	42	<10	13
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	51	2	2	22	8	36	52	42
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		98	100	99	98	98	98	98	97
Ethylbenzene-d10 (BTEX)	%	50-150		109	89	93	103	91	102	128	114
o-Terphenyl (F2-F4)	%	50-150		96	94	98	97	98	95	93	92

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Certificate of Analysis

AGAT WORK ORDER: 16E123918

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-08-07

DATE REPORTED: 2016-08-11

SAMPLE DESCRIPTION:				GS16-086	GS16-087	GS16-088	GS16-089	GS16-090	GS16-091	GS16-092	GS16-093
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016
Parameter	Unit	G / S	RDL	7756715	7756716	7756717	7756718	7756719	7756720	7756721	7756722
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	0.07	0.12	<0.05	0.16	<0.05	0.09	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C16 - C34 (F3)	mg/kg		10	66	92	121	22	78	175	30	82
C34 - C50 (F4)	mg/kg		10	14	40	40	<10	22	88	15	26
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	4	43	54	3	31	59	39	59
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		99	98	98	100	98	97	97	97
Ethylbenzene-d10 (BTEX)	%	50-150		97	113	114	92	103	102	119	114
o-Terphenyl (F2-F4)	%	50-150		84	88	94	101	102	98	89	88

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AGAT WORK ORDER: 16E123918

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-08-07

DATE REPORTED: 2016-08-11

SAMPLE DESCRIPTION:				GS16-094	GS16-095	GS16-096	GS16-097	GS16-098	GS16-099	GS16-100	GS16-101
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016
Parameter	Unit	G / S	RDL	7756723	7756724	7756725	7756726	7756727	7756728	7756729	7756730
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	0.23	<0.05	<0.05	0.25	<0.05	0.10	0.42
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C16 - C34 (F3)	mg/kg		10	<10	239	61	49	247	91	61	255
C34 - C50 (F4)	mg/kg		10	<10	63	29	25	92	45	23	105
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	NA	NA	NA	NA
Moisture Content	%		1	2	53	13	12	58	24	5	45
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		101	97	97	98	105	106	105	102
Ethylbenzene-d10 (BTEX)	%	50-150		95	107	98	101	105	99	84	105
o-Terphenyl (F2-F4)	%	50-150		89	81	93	84	98	93	93	95

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AGAT WORK ORDER: 16E123918

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-08-07

DATE REPORTED: 2016-08-11

SAMPLE DESCRIPTION:				GS16-102	GS16-103	GS16-104	GS16-105	GS16-106	GS16-107	GS16-108	GS16-109
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016
Parameter	Unit	G / S	RDL	7756731	7756732	7756733	7756734	7756735	7756736	7756737	7756738
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	0.11	<0.05	0.10	<0.05	0.78	0.20	<0.05	0.07
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	<10	<10	<10	94	46	255
C16 - C34 (F3)	mg/kg		10	277	78	75	74	95	115	321	279
C34 - C50 (F4)	mg/kg		10	141	37	22	38	35	45	33	13
Gravimetric Heavy Hydrocarbons	mg/kg		1000	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%		1	27	17	27	4	30	22	5	22
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		103	106	104	106	106	106	107	106
Ethylbenzene-d10 (BTEX)	%	50-150		78	80	93	84	103	86	83	80
o-Terphenyl (F2-F4)	%	50-150		93	95	100	95	99	91	100	93

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Certificate of Analysis

AGAT WORK ORDER: 16E123918

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-08-07

DATE REPORTED: 2016-08-11

SAMPLE DESCRIPTION:				GS16-110	GS16-111	GS16-112	GS16-113	GS16-114	GS16-115	GS16-116	GS16-117
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016
Parameter	Unit	G / S	RDL	7756739	7756740	7756741	7756742	7756743	7756744	7756745	7756746
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	1.33	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	0.08	<0.01	0.03	<0.01	0.03	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	0.50	<0.05	0.18	<0.05	0.26	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	162	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	162	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	792	1020	402	341	5550	1240	2010	489
C16 - C34 (F3)	mg/kg		10	889	851	480	494	434	808	1200	586
C34 - C50 (F4)	mg/kg		10	42	21	47	33	<10	88	41	18
Gravimetric Heavy Hydrocarbons	mg/kg		1000	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%		1	14	15	58	18	7	41	21	8
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		106	103	106	112	106	104	106	102
Ethylbenzene-d10 (BTEX)	%	50-150		87	93	102	91	99	88	91	75
o-Terphenyl (F2-F4)	%	50-150		102	102	106	100	98	94	104	99

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Certificate of Analysis

AGAT WORK ORDER: 16E123918

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-08-07

DATE REPORTED: 2016-08-11

SAMPLE DESCRIPTION:				GS16-118	GS16-119	GS16-120	GS16-121	GS16-122	GS16-123	GS16-124	GS16-125
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016
Parameter	Unit	G / S	RDL	7756747	7756748	7756749	7756750	7756751	7756752	7756753	7756754
Benzene	mg/kg		0.005	<0.005	<0.005	0.037	<0.005	0.021	0.023	0.015	0.015
Toluene	mg/kg		0.05	<0.05	<0.05	0.44	<0.05	<0.05	<0.05	0.13	0.48
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	0.29	0.08	0.12	0.02	0.21	0.21
Xylenes	mg/kg		0.05	<0.05	<0.05	6.22	1.31	0.71	<0.05	1.29	2.33
C6 - C10 (F1)	mg/kg		10	10	30	470	160	<10	10	110	220
C6 - C10 (F1 minus BTEX)	mg/kg		10	10	30	460	160	<10	10	110	220
C10 - C16 (F2)	mg/kg		10	1320	1440	8130	2110	164	157	890	1700
C16 - C34 (F3)	mg/kg		10	2330	1240	2790	890	496	185	242	146
C34 - C50 (F4)	mg/kg		10	57	32	66	<10	208	84	17	38
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	16	11	25	7	26	58	16	50
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		95	91	89	103	93	99	100	98
Ethylbenzene-d10 (BTEX)	%	50-150		99	104	72	114	96	82	106	99
o-Terphenyl (F2-F4)	%	50-150		122	126	121	118	106	76	106	92

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Certificate of Analysis

AGAT WORK ORDER: 16E123918

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-08-07

DATE REPORTED: 2016-08-11

SAMPLE DESCRIPTION:				GS16-126	GS16-127	GS16-128	GS16-129	GS16-130	GS16-131	GS16-132	GS16-133
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016
Parameter	Unit	G / S	RDL	7756755	7756756	7756757	7756758	7756759	7756760	7756761	7756762
Benzene	mg/kg		0.005	0.405	0.073	0.207	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	20.2	1.86	3.75	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	6.16	0.42	0.57	0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	46.3	3.92	4.09	0.67	<0.05	0.06	0.16	<0.05
C6 - C10 (F1)	mg/kg		10	1920	470	120	110	50	50	40	60
C6 - C10 (F1 minus BTEX)	mg/kg		10	1850	470	120	110	50	50	40	60
C10 - C16 (F2)	mg/kg		10	10400	2670	682	2120	1240	1700	1360	2780
C16 - C34 (F3)	mg/kg		10	955	950	1020	1200	1160	1520	1420	2120
C34 - C50 (F4)	mg/kg		10	152	260	467	50	46	102	55	125
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	62	58	28	8	11	13	10	14
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		89	104	100	97	96	97	100	94
Ethylbenzene-d10 (BTEX)	%	50-150		105	100	95	106	103	114	119	120
o-Terphenyl (F2-F4)	%	50-150		109	108	105	127	124	127	106	116

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 16E123918

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-08-07

DATE REPORTED: 2016-08-11

SAMPLE DESCRIPTION:				GS16-134	GS16-135	GS16-136	GS16-137	GS16-138	GS16-139	GS16-140	GS16-141
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016
Parameter	Unit	G / S	RDL	7756763	7756764	7756765	7756766	7756767	7756768	7756769	7756770
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	0.13	0.06	0.12	0.13	0.07	0.23
Ethylbenzene	mg/kg		0.01	0.04	<0.01	0.01	<0.01	<0.01	<0.01	0.03	<0.01
Xylenes	mg/kg		0.05	0.48	<0.05	0.09	<0.05	<0.05	<0.05	0.42	<0.05
C6 - C10 (F1)	mg/kg		10	110	<10	60	<10	<10	<10	130	20
C6 - C10 (F1 minus BTEX)	mg/kg		10	110	<10	60	<10	<10	<10	130	20
C10 - C16 (F2)	mg/kg		10	1600	19	1640	229	331	228	3430	1380
C16 - C34 (F3)	mg/kg		10	1120	79	2040	665	1470	820	2610	2420
C34 - C50 (F4)	mg/kg		10	62	22	542	275	776	436	284	644
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	15	4	36	29	31	21	16	28
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		91	94	101	99	96	95	94	99
Ethylbenzene-d10 (BTEX)	%	50-150		92	104	113	95	98	100	98	109
o-Terphenyl (F2-F4)	%	50-150		120	106	121	111	104	103	108	109

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 16E123918

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-08-07

DATE REPORTED: 2016-08-11

SAMPLE DESCRIPTION:				GS16-142	GS16-143	GS16-144	GS16-145	GS16-146	GS16-147	GS16-148	GS16-149
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016
Parameter	Unit	G / S	RDL	7756771	7756772	7756773	7756774	7756775	7756776	7756777	7756778
Benzene	mg/kg		0.005	<0.005	0.009	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	3.83	0.17	<0.05	0.08	0.08	<0.05	0.08
Ethylbenzene	mg/kg		0.01	<0.01	0.11	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	0.51	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	10	10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	1330	344	94	32	47	32	148	317
C16 - C34 (F3)	mg/kg		10	1860	564	558	537	479	741	534	1000
C34 - C50 (F4)	mg/kg		10	192	153	282	354	322	466	339	440
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	11	22	21	20	23	26	29	20
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		98	95	96	93	97	98	98	95
Ethylbenzene-d10 (BTEX)	%	50-150		92	96	92	84	86	88	93	96
o-Terphenyl (F2-F4)	%	50-150		109	104	102	104	103	97	103	111

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Certificate of Analysis

AGAT WORK ORDER: 16E123918

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-08-07

DATE REPORTED: 2016-08-11

SAMPLE DESCRIPTION:				GS16-150	DUP - 8	DUP - 9	DUP - 10	DUP - 11	DUP - 12	DUP - 13
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016
Parameter	Unit	G / S	RDL	7756779	7756791	7756792	7756793	7756795	7756802	7756803
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	0.008	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	0.24	0.08	0.25	0.13	0.06
Ethylbenzene	mg/kg		0.01	0.01	<0.01	<0.01	<0.01	0.15	0.01	<0.01
Xylenes	mg/kg		0.05	0.19	<0.05	<0.05	<0.05	6.05	0.10	<0.05
C6 - C10 (F1)	mg/kg		10	50	<10	<10	<10	540	50	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	50	<10	<10	<10	540	50	<10
C10 - C16 (F2)	mg/kg		10	1880	<10	<10	335	13000	1350	32
C16 - C34 (F3)	mg/kg		10	1960	105	774	523	3830	1900	503
C34 - C50 (F4)	mg/kg		10	162	52	525	63	108	706	331
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	12	3.2	58	17	18	31	21
Surrogate	Unit	Acceptable Limits								
Toluene-d8 (BTEX)	%	50-150		95	93	97	99	87	98	101
Ethylbenzene-d10 (BTEX)	%	50-150		107	94	72	95	78	100	110
o-Terphenyl (F2-F4)	%	50-150		112	104	107	113	120	117	103

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AGAT WORK ORDER: 16E123918

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-08-07

DATE REPORTED: 2016-08-11

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

7756707-7756746 Results are based on the dry weight of the sample.
The C6-C10 (F1) fraction is calculated using toluene response factor.
The C10 - C16 (F2), C16 - C34 (F3), and C34 - C50 (F4) fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons (F4g) are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
Total C6 - C50 results are corrected for BTEX and PAH contributions (if requested).
Quality control data is available upon request.
Assistance in the interpretation of data is available upon request.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
The chromatogram returned to baseline by the retention time of nC50.
Extraction and holding times were met for this sample.
C6 –C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX.
Xylenes is a calculated parameter. The calculated value is the sum of m&p-Xylenes + o-Xylene.

7756747-7756803 Results are based on the dry weight of the sample.
The C6-C10 (F1) fraction is calculated using toluene response factor.
The C10 - C16 (F2), C16 - C34 (F3), and C34 - C50 (F4) fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons (F4g) are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
Quality control data is available upon request.
Assistance in the interpretation of data is available upon request.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
The chromatogram returned to baseline by the retention time of nC50.
C6 –C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX.
C>10 – C16 (F2- Napthalene) is a calculated parameter. The calculated value is F2 - Napthalene (if requested).
C>16 - C34 (F3-PAH) is a calculated parameter. The calculated value is F3-PAH (if requested).
Xylenes is a calculated parameter. The calculated value is the sum of m&p-Xylenes + o-Xylene.
Extraction and holding times were met for this sample.

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AGAT WORK ORDER: 16E123918

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Polychlorinated Biphenyls Analysis - Soil

DATE RECEIVED: 2016-08-07

DATE REPORTED: 2016-08-11

		SAMPLE DESCRIPTION:		GS16-151	GS16-152	GS16-153	GS16-154
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		8/4/2016	8/4/2016	8/4/2016	8/4/2016
Parameter	Unit	G / S	RDL	7756780	7756781	7756782	7756783
Aroclor 1242	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1254	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1260	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05
Total Polychlorinated Biphenyls	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05
Surrogate	Unit	Acceptable Limits					
Decachlorobiphenyl	%	50-150		98	102	103	77

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

7756780-7756783 Results are based on the dry weight of the sample.

Certified By:

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Quality Assurance

CLIENT NAME: IEG CONSULTANTS LTD

AGAT WORK ORDER: 16E123918

PROJECT: A04012A08

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: Aug 11, 2016			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)															
Benzene	1383	7756712	< 0.005	< 0.005	NA	< 0.005	101%	80%	120%	87%	80%	120%	86%	60%	140%
Toluene	1383	7756712	< 0.05	< 0.05	NA	< 0.05	108%	80%	120%	83%	80%	120%	83%	60%	140%
Ethylbenzene	1383	7756712	< 0.01	< 0.01	NA	< 0.01	113%	80%	120%	87%	80%	120%	87%	60%	140%
Xylenes	1383	7756712	< 0.05	< 0.05	NA	< 0.05	113%	80%	120%	91%	80%	120%	91%	60%	140%
C6 - C10 (F1)	1383	7756712	< 10	< 10	NA	< 10	115%	80%	120%	116%	80%	120%	125%	60%	140%
C10 - C16 (F2)	1013	7756712	< 10	< 10	NA	< 10	87%	80%	120%	92%	80%	120%	82%	60%	140%
C16 - C34 (F3)	1013	7756712	95	90	5.4%	< 10	89%	80%	120%	83%	80%	120%	75%	60%	140%
C34 - C50 (F4)	1013	7756712	42	41	NA	< 10	89%	80%	120%	85%	80%	120%	75%	60%	140%
Moisture Content	1013	7756712	36	36	0.0%	< 1									
Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.															
Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)															
Benzene	4171	7756761	<0.005	<0.005	NA	< 0.005	108%	80%	120%	114%	80%	120%	99%	60%	140%
Toluene	4171	7756761	<0.05	<0.05	NA	< 0.05	107%	80%	120%	109%	80%	120%	83%	60%	140%
Ethylbenzene	4171	7756761	<0.01	0.01	NA	< 0.01	108%	80%	120%	119%	80%	120%	86%	60%	140%
Xylenes	4171	7756761	0.16	0.12	NA	< 0.05	90%	80%	120%	116%	80%	120%	71%	60%	140%
C6 - C10 (F1)	4171	7756761	40	40	NA	< 10	89%	80%	120%	87%	80%	120%	79%	60%	140%
C10 - C16 (F2)	907	7756761	1360	1390	2.2%	< 10	104%	80%	120%	93%	80%	120%	88%	60%	140%
C16 - C34 (F3)	907	7756761	1420	1450	2.1%	< 10	104%	80%	120%	95%	80%	120%	90%	60%	140%
C34 - C50 (F4)	907	7756761	55	64	15.1%	< 10	104%	80%	120%	91%	80%	120%	86%	60%	140%
Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.															
Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)															
Benzene	4170	7756774	<0.005	<0.005	NA	< 0.005	111%	80%	120%	104%	80%	120%	113%	60%	140%
Toluene	4170	7756774	<0.05	0.05	NA	< 0.05	113%	80%	120%	108%	80%	120%	118%	60%	140%
Ethylbenzene	4170	7756774	<0.01	<0.01	NA	< 0.01	107%	80%	120%	119%	80%	120%	125%	60%	140%
Xylenes	4170	7756774	<0.05	<0.05	NA	< 0.05	102%	80%	120%	115%	80%	120%	119%	60%	140%
C6 - C10 (F1)	4170	7756774	<10	<10	NA	< 10	85%	80%	120%	85%	80%	120%	77%	60%	140%
C10 - C16 (F2)	907	7756774	32	46	NA	< 10	98%	80%	120%	106%	80%	120%	103%	60%	140%
C16 - C34 (F3)	907	7756774	537	469	13.5%	< 10	98%	80%	120%	110%	80%	120%	105%	60%	140%
C34 - C50 (F4)	907	7756774	354	311	12.9%	< 10	98%	80%	120%	107%	80%	120%	109%	60%	140%
Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.															
Polychlorinated Biphenyls Analysis - Soil															
Aroclor 1242	100	7756780	<0.05	<0.05	NA	< 0.05	128%	70%	130%	103%	70%	130%	67%	50%	150%
Aroclor 1254	100	7756780	<0.05	<0.05	NA	< 0.05	108%	70%	130%	108%	70%	130%	62%	50%	150%
Aroclor 1260	100	7756780	<0.05	<0.05	NA	< 0.05	90%	70%	130%	96%	70%	130%	88%	50%	150%
Total Polychlorinated Biphenyls	100	7756780	<0.05	<0.05	NA	< 0.05	109%	70%	130%	102%	70%	130%	73%	50%	150%
Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.															

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Quality Assurance

CLIENT NAME: IEG CONSULTANTS LTD

AGAT WORK ORDER: 16E123918

PROJECT: A04012A08

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Aug 11, 2016			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
AGAT Western Canada - OC Pesticides (Soil)															
DDD (o,p')	7757177		< 0.005	< 0.005	NA	< 0.005	106%	60%	140%	84%	60%	140%	88%	60%	140%
pp'-DDD	7757177		< 0.005	< 0.005	NA	< 0.005	75%	60%	140%	76%	60%	140%	85%	60%	140%
DDD (o,p' + p,p')	7757177		< 0.007	< 0.007	NA	< 0.007	91%	60%	140%	77%	60%	140%	87%	60%	140%
op'-DDE	7757177		< 0.005	< 0.005	NA	< 0.005	107%	60%	140%	86%	60%	140%	96%	60%	140%
pp'-DDE	7757177		< 0.005	< 0.005	NA	< 0.005	82%	60%	140%	74%	60%	140%	92%	60%	140%
DDE (Total)	7757177		< 0.007	< 0.007	NA	< 0.007	97%	60%	140%	79%	60%	140%	94%	60%	140%
op'-DDT	7757177		< 0.005	< 0.005	NA	< 0.005	107%	60%	140%	100%	60%	140%	86%	60%	140%
pp'- DDT	7757177		< 0.005	< 0.005	NA	< 0.005	88%	60%	140%	110%	60%	140%	88%	60%	140%
DDT (Total)	7757177		< 0.007	< 0.007	NA	< 0.007	98%	60%	140%	105%	60%	140%	87%	60%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

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Method Summary

CLIENT NAME: IEG CONSULTANTS LTD

AGAT WORK ORDER: 16E123918

PROJECT: A04012A08

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
DDD (o,p')	ORG-91-5113	EPA SW - 846 3541/8081	GC/ECD
pp'-DDD	ORG-91-5113	EPA SW - 846 3541/8081	GC/ECD
DDD (o,p' + p,p')	ORG-91-5113	EPA SW - 846 3541/8081	GC/ECD
op'-DDE	ORG-91-5113	EPA SW - 846 3541/8081	GC/ECD
pp'-DDE	ORG-91-5113	EPA SW - 846 3541/8081	GC/ECD
DDE (Total)	ORG-91-5113	EPA SW - 846 3541/8081	GC/ECD
op'-DDT	ORG-91-5113	EPA SW - 846 3541/8081	GC/ECD
pp'- DDT	ORG-91-5113	EPA SW - 846 3541/8081	GC/ECD
DDT (Total)	ORG-91-5113	EPA SW - 846 3541/8081	GC/ECD
Moisture Content		MOE E3139	BALANCE
TCMX	ORG-91-5112	EPA SW-846 3541 & 8081	GC/ECD
Decachlorobiphenyl	ORG-91-5113	EPA SW - 846 3541/8081	GC/ECD
Benzene	ORG-170-5110/5140/5430/5440	EPA SW-846 8260-S	GC/MS
Benzene	TO 0570	EPA SW-846 8260-S	GC/MS
Toluene	ORG-170-5110/5140/5430/5440	EPA SW-846 8260-S	GC/MS
Ethylbenzene	ORG-170-5110/5140/5430/5440	EPA SW-846 8260-S	GC/MS
Toluene	TO 0570	EPA SW-846 8260-S	GC/MS
Xylenes	ORG-170-5110/5140/5430/5440	EPA SW-846 8260-S	GC/MS
C6 - C10 (F1)	ORG-170-5110/5140/5430/5440	CCME Tier 1 Method-S L	GC/FID
Ethylbenzene	TO 0570	EPA SW-846 8260-S	GC/MS
C6 - C10 (F1 minus BTEX)	ORG-170-5110/5140/5430/5440	CCME Tier 1 Method-S L	GC/FID
Xylenes	TO 0570	EPA SW-846 8260-S	GC/MS
C10 - C16 (F2)	ORG-170-5120/5300	CCME Tier 1 Method-S H	GC/FID
C6 - C10 (F1)	TO 0570	CCME Tier 1 Method-S L	GC/FID
C16 - C34 (F3)	ORG-170-5120/5300	CCME Tier 1 Method-S H	GC/FID
C6 - C10 (F1 minus BTEX)	TO 0570	CCME Tier 1 Method-S L	GC/FID
C34 - C50 (F4)	ORG-170-5120/5300	CCME Tier 1 Method-S H	GC/FID
C10 - C16 (F2)	TO-0560	CCME Tier 1 Method-S H	GC/FID
Gravimetric Heavy Hydrocarbons	ORG-170-5120/5300	CCME Tier 1 Method-S H	GC/FID
C16 - C34 (F3)	TO-0560	CCME Tier 1 Method-S H	GC/FID
Moisture Content	LAB-175-4002	CCME Tier 1 Method-S %	GRAVIMETRIC
C34 - C50 (F4)	TO-0560	CCME Tier 1 Method-S H	GC/FID
Gravimetric Heavy Hydrocarbons	TO-0560	CCME Tier 1 Method-S H	GC/FID
Toluene-d8 (BTEX)	ORG-170-5110/5140/5430/5440	EPA SW-846 8260-S	GC/MS
Moisture Content	TO-0560	CCME Tier 1 Method-S %	GRAVIMETRIC
Ethylbenzene-d10 (BTEX)	ORG-170-5110/5140/5430/5440	EPA SW-846 8260-S	GC/MS
o-Terphenyl (F2-F4)	ORG-170-5120/5300	CCME Tier 1 Method-S H	GC/FID
Toluene-d8 (BTEX)	TO 0570	EPA SW-846 8260-S	GC/MS
Ethylbenzene-d10 (BTEX)	TO 0570	EPA SW-846 8260-S	GC/MS
o-Terphenyl (F2-F4)	TO 0560	CCME Tier 1 Method-S H	GC/FID
Aroclor 1242	TO-0410	EPA SW-846 8082	GC/ECD
Aroclor 1254	TO-0410	EPA SW-846 8082	GC/ECD
Aroclor 1260	TO-0410	EPA SW-846 8082	GC/ECD

6310 ROPER ROAD
EDMONTON, ALBERTA
CANADA T6B 3P9
TEL (780)395-2525
FAX (780)462-2490
http://www.agatlabs.com

Method Summary

CLIENT NAME: IEG CONSULTANTS LTD

AGAT WORK ORDER: 16E123918

PROJECT: A04012A08

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Polychlorinated Biphenyls	TO-0410	EPA SW-846 8082	GC/ECD
Decachlorobiphenyl	TO-0410	EPA SW-846 8082	GC/ECD

AGAT Laboratories
2910 12 Street NE
Calgary, Alberta T2E 7P7
P: 403.735.2005 • F: 403.735.2771
webearth.agatlabs.com

Laboratory Use Only
Arrival Temperature: 19.5°C
AGAT Job Number: 16E123918
Date and Time:

Chain of Custody Record

Emergency Support Services Hotline 1-855-AGAT 245 (1-855-242-8245)

Report Information

Company: IEG
Contact: Konrad Ross
Address: 2618 Hopewell Place NE
Calgary
Phone: 403-464-7677 Fax:
LSD:
Client Project #: A04012A08

Invoice To

Same ☑ Yes ☐ No

Company:
Contact:
Address:
Phone: Fax:
PO/AFE#

Report Information

1. Name: Konrad Ross
Email: Kross@klohn.com
2. Name: Nicole Wills
Email: nwills@klohn.com
3. Name:
Email:

Report Format

☐ Single Sample per Page
☐ Multiple Samples per Page

Turnaround Time Required (TAT)

Regular TAT ☐ 5-7 Business Days
Rush TAT (Surcharge) ☑ Less than 24 Hours (200%) ☐ Less than 48 Hours (100%) ☐ Less than 72 Hours (50%)
Date Required:

Requirements (Selection may impact detection limits)

☐ CCME ☑ AB Tier 1 ☐ BC CSR
☐ Agricultural ☐ Agricultural ☐ AW
☐ Industrial ☐ Industrial ☐ IW
☐ Residential/ Park ☐ Residential/ Park ☐ LW
☐ Commercial ☐ Commercial ☐ DW
☐ Drinking Water ☐ Natural Area
☐ FWAL ☐ AB Surface Water
☐ Other:
☐ D50 (Drilling) ☐ SPIGEC ☐

LABORATORY USE (LAB ID#)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/ TIME SAMPLED	COMMENTS- SITE SAMPLE INFO, SAMPLE CONTAINMENT	# of CONTAINERS	Detailed Soil Salinity (Saturated Paste)	CCME BTEX/ F1-F4	Soil Metals: ☐ HWS-B ☐ Cr^{6+} ☐ Hg	Water Metals: ☐ Dissolved ☐ Total ☐ Hg ☐ Cr^{6+}	Routine Water Potability	AB Class 2 Landfill	BC Landfill	D50 Detailed Salinity (As Received)	Microtox	☐ BTEXS/VPH/EPH ☐ LEPH/HEPH	F3	Toluene					HOLD FOR 60 DAYS	PRESERVED	CONTAMINATED/ HAZARDOUS
7756707	GS16-078	soil	4-Aug-16		2											X	X							
708	GS16-079	soil	4-Aug-16		2											X	X							
709	GS16-080	soil	4-Aug-16		2											X	X							
710	GS16-081	soil	4-Aug-16		2											X	X							
711	GS16-082	soil	4-Aug-16		2											X	X							
712	GS16-083	soil	4-Aug-16		2											X	X							
713	GS16-084	soil	4-Aug-16		2											X	X							
714	GS16-085	soil	4-Aug-16		2											X	X							
715	GS16-086	soil	4-Aug-16		2											X	X							
716	GS16-087	soil	4-Aug-16		2											X	X							
717	GS16-088	soil	4-Aug-16		2											X	X							
718	GS16-089	soil	4-Aug-16		2											X	X							

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Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:	Page 1 of 5
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:	
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:	

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Document ID: DIV-50-1507.003

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Chain of Custody Record

Emergency Support Services Hotline 1-855-AGAT 245 (1-855-242-8245)

Report to:

Company: IEG Same as COC#:

LABORATORY USE (LAB ID#)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/ TIME SAMPLED	COMMENTS- SITE SAMPLE INFO, SAMPLE CONTAINMENT	# of CONTAINERS	Detailed Soil Salinity (Saturated Paste)	CCME BTEX/ F1-F4	Soil Metals: ☐ HWS-B ☐ Cr6+ ☐ Hg	Water Metals: ☐ Dissolved ☐ Total ☐ Hg ☐ Cr6+	Routine Water Potability	AB Class 2 Landfill	BC Landfill	D50 Detailed Salinity (As Received)	Microtox	☐ BTEXS/VPH/EPH ☐ LEPH/HEPH	F3	Toulene	F2	Xylenes			HOLD FOR 60 DAYS	PRESERVED	CONTAMINATED/ HAZARDOUS
7756719	GS16-090	Soil	4-Aug-16		2											X	X							
720	GS16-091	Soil	4-Aug-16		2											X	X							
721	GS16-092	Soil	4-Aug-16		2											X	X							
722	GS16-093	Soil	4-Aug-16		2											X	X							
723	GS16-094	Soil	4-Aug-16		2											X	X							
724	GS16-095	Soil	4-Aug-16		2											X	X	X	X					
725	GS16-096	Soil	4-Aug-16		2											X	X	X	X					
726	GS16-097	Soil	4-Aug-16		2											X	X	X	X					
727	GS16-098	Soil	4-Aug-16		2											X	X	X	X					
728	GS16-099	Soil	4-Aug-16		2											X	X	X	X					
729	GS16-100	Soil	4-Aug-16		2											X	X	X	X					
730	GS16-101	Soil	4-Aug-16		2											X	X	X	X					
731	GS16-102	Soil	4-Aug-16		2											X	X	X	X					
732	GS16-103	Soil	4-Aug-16		2											X	X	X	X					
733	GS16-104	Soil	4-Aug-16		2											X	X	X	X					
734	GS16-105	Soil	4-Aug-16		2											X	X	X	X					
735	GS16-106	Soil	4-Aug-16		2											X	X	X	X					
736	GS16-107	Soil	4-Aug-16		2		X																	
737	GS16-108	Soil	4-Aug-16		2		X																	
738	GS16-109	Soil	4-Aug-16		2		X																	
739	GS16-110	Soil	4-Aug-16		2		X										16 AUG 07 12:36							
740	GS16-111	Soil	4-Aug-16		2		X																	
741	GS16-112	Soil	4-Aug-16		2		X																	
742	GS16-113	Soil	4-Aug-16		2		X																	
743	GS16-114	Soil	4-Aug-16		2		X																	

Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:	Page 2 of 5
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:	
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:	

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Calgary, Alberta T2E 7P7
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Chain of Custody Record

Emergency Support Services Hotline 1-855-AGAT 245 (1-855-242-8245)

Report to:

Company: IEG Same as COC#:

LABORATORY USE (LAB ID#)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/ TIME SAMPLED	COMMENTS- SITE SAMPLE INFO, SAMPLE CONTAINMENT	# of CONTAINERS	Detailed Soil Salinity (Saturated Paste)	CCME BTEX/ F1-F4	Soil Metals: HWS-B Cr6+ Hg	Water Metals: Dissolved Total Hg Cr6+	Routine Water Potability	AB Class 2 Landfill	BC Landfill	D50 Detailed Salinity (As Received)	Microtox	BTEXS/VPH/EPH LEPH/HEPH	F3	Toulene	F2	Xylenes			HOLD FOR 60 DAYS	PRESERVED	CONTAMINATED/ HAZARDOUS
7756744	GS16-115	Soil	4-Aug-16		2		X																	
745	GS16-116	Soil	4-Aug-16		2		X																	
746	GS16-117	Soil	4-Aug-16		2		X																	
747	GS16-118	Soil	4-Aug-16		2		X																	
748	GS16-119	Soil	4-Aug-16		2		X																	
749	GS16-120	Soil	4-Aug-16		2		X																	
750	GS16-121	Soil	4-Aug-16		2		X																	
751	GS16-122	Soil	4-Aug-16		2		X																	
752	GS16-123	Soil	4-Aug-16		2		X																	
753	GS16-124	Soil	4-Aug-16		2		X																	
754	GS16-125	Soil	4-Aug-16		2		X																	
755	GS16-126	Soil	4-Aug-16		2		X																	
756	GS16-127	Soil	4-Aug-16		2		X																	
757	GS16-128	Soil	4-Aug-16		2		X																	
758	GS16-129	Soil	4-Aug-16		2		X																	
759	GS16-130	Soil	4-Aug-16		2		X																	
760	GS16-131	Soil	4-Aug-16		2		X																	
761	GS16-132	Soil	4-Aug-16		2		X																	
762	GS16-133	Soil	4-Aug-16		2		X																	
763	GS16-134	Soil	4-Aug-16		2		X																	
764	GS16-135	Soil	4-Aug-16		2		X																	
765	GS16-136	Soil	4-Aug-16		2		X																	
766	GS16-137	Soil	4-Aug-16		2		X																	
767	GS16-138	Soil	4-Aug-16		2		X																	
768	GS16-139	Soil	4-Aug-16		2		X																	

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Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:
		Ry bl	4/8/2016
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:

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AGAT Laboratories
2910 12 Street NE
Calgary, Alberta T2E 7P7
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Chain of Custody Record

Emergency Support Services Hotline 1-855-AGAT 245 (1-855-242-8245)

Report to:

Company: IEG Same as COC#:

LABORATORY USE (LAB ID#)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/ TIME SAMPLED	COMMENTS- SITE SAMPLE INFO, SAMPLE CONTAINMENT	# of CONTAINERS	Detailed Soil Salinity (Saturated Paste)	CCME BTEX/ F1-F4	Soil Metals: ☐ HWS-B ☐ Cr6+ ☐ Hg	Water Metals: ☐ Dissolved ☐ Total ☐ Hg ☐ Cr6+	Routine Water Potability	AB Class 2 Landfill	BC Landfill	D50 Detailed Salinity (As Received)	Microtox	☐ BTEXS/VPH/EPH ☐ LEPH/HEPH	F3	Toulene	F2	Xylenes	PCB (Aroclor mixtures)	Organo-chlorine pesticide (DDT, DDE, DDD)	HOLD FOR 60 DAYS	PRESERVED	CONTAMINATED/ HAZARDOUS
7756769	GS16-140	Soil	4-Aug-16		2		X																	
770	GS16-141	Soil	4-Aug-16		2		X																	
771	GS16-142	Soil	4-Aug-16		2		X																	
772	GS16-143	Soil	4-Aug-16		2		X																	
773	GS16-144	Soil	4-Aug-16		2		X																	
774	GS16-145	Soil	4-Aug-16		2		X																	
775	GS16-146	Soil	4-Aug-16		2		X																	
776	GS16-147	Soil	4-Aug-16		2		X																	
777	GS16-148	Soil	4-Aug-16		2		X																	
778	GS16-149	Soil	4-Aug-16		2		X																	
779	GS16-150	Soil	4-Aug-16		2		X																	
780	GS16-151	Soil	5-Aug-16		2																X			
781	GS16-152	Soil	5-Aug-16		2																X			
782	GS16-153	Soil	5-Aug-16		2																X			
783	GS16-154	Soil	5-Aug-16		2																X			
784	GS16-155	Soil	5-Aug-16		3																	X		
785	GS16-156	Soil	5-Aug-16		3																	X		
786	GS16-157	Soil	5-Aug-16		3																	X		
787	GS16-158	Soil	5-Aug-16		3																	X		
788	GS16-159	Soil	5-Aug-16		3																	X		
789	GS16-160	Soil	5-Aug-16		2																		X	
790	GS16-161	Soil	5-Aug-16		2																		X	
791	DUP -8	soil	4-Aug-16		2												X	X						
792	Dup - 9	Soil	4-Aug-16		2												X	X	X	X				
793	Dup -10	Soil	4-Aug-16		2		X																	

Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:

Page 4 of 5

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E 08833

2910 12 Street NE
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AGAT Laboratories

Chain of Custody Record

Emergency Support Services Hotline 1-855-AGAT 245 (1-855-242-8245)

Report to:

Company: IEG   Same as COC#:

LABORATORY USE (LAB ID#)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/ TIME SAMPLED	COMMENTS- SITE SAMPLE INFO, SAMPLE CONTAINMENT	# of CONTAINERS	Detailed Soil Salinity (Saturated Paste)	CCME BTEX/ F1-F4	Soil Metals: ☐ HWS-B ☐ Cr6+ ☐ Hg	Water Metals: ☐ Dissolved ☐ Total ☐ Hg ☐ Cr6+	Routine Water Potability	AB Class 2 Landfill	BC Landfill	D50 Detailed Salinity (As Received)	Microtox	☐ BTEXS/VPH/EPH ☐ LEPH/HEPH	F3	Toulene	F2	Xylenes	PCB (Aroclor mixtures)	Organo-chlorine pesticide (DDT, DDE, DDD)	HOLD FOR 60 DAYS	PRESERVED	CONTAMINATED/ HAZARDOUS
7756795	Dup 11				2		X																	
802	Dup 12				2		X																	
803	Dup 13				2		X																	

16AUG07 12:36

Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign): Rry ol. [signature]	Date/ Time: 8/7/2016	Page 4 of 55	
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:		
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:	E 08834	

Document ID: DIV-50-1507.002

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM

RECEIVING BASICS - Shipping

Company/Consultant: EEG

Courier: Canadian North Prepaid Collect

Waybill# 818-YEN-7879-0666

Branch: (EDM) GP FN FM RD VAN LYD FSJ EST Other:____

If multiple sites were submitted at once: Yes No

Custody Seal Intact: Yes No NA

TAT: (<24hr) 24-48hr 48-72hr Reg Other_____

Cooler Quantity: 4

TIME SENSITIVE ISSUES - Shipping

ALREADY EXCEEDED HOLD TIME? Yes ~~No~~

Inorganic Tests (Please Circle): Mibi , BOD , Nitrate/Nitrite , Turbidity , Microtox , Ortho PO4 , Tedlar Bag , Residual Chlorine , Chlorophyll* , Chloroamines*

Earliest Expiry:_____

Hydrocarbons: Earliest Expiry 4/11/2016

SAMPLE INTEGRITY - Shipping

Hazardous Samples: YES (~~NO~~) Precaution Taken:_____

Legal Samples: Yes (~~No~~)

International Samples: Yes ~~No~~

Tape Sealed: Yes (No)

Coolant Used: Icepack Bagged Ice Free Ice Free Water (~~None~~)

Temperature (Bottles/Jars only) N/A if only Soil Bags Received

FROZEN (Please Circle if samples received Frozen) 19.5°C

1 (Bottle/Jar) 19.7+20.1+20.1=19.7 °C 2(Bottle/Jar) 19.5+19.5+19.5=19.5 °C

3 (Bottle/Jar) 20.2+20.1+20.1=20.2 °C 4 (Bottle/Jar) 18.8+17.6+19.0=18.4 °C

5 (Bottle/Jar)___+___+___=____ °C 6 (Bottle/Jar)___+___+___=____ °C

7 (Bottle/Jar)___+___+___=____ °C 8 (Bottle/Jar)___+___+___=____ °C

9 (Bottle/Jar)___+___+___=____ °C 10 (Bottle/Jar)___+___+___=____ °C

(If more than 10 coolers are received use another sheet of paper and attach)

LOGISTICS USE ONLY

Workorder No: 16E123918

Samples Damaged: Yes (No) If YES why?

No Bubble Wrap Frozen Courier

Other:_____

Account Project Manager:_____ have they been notified of the above issues: Yes No

Whom spoken to:_____ Date/Time:_____

CPM Initial_____

General Comments:_____

* Subcontracted Analysis (See CPM)

Date issued: October 05, 2015
Document ID: SR-9505.003

518-YEV-7879-0666

SHIPPER'S NAME AND ADDRESS

Northwind Industries Inc.
146 Navy Rd.
PO Box 1130
Inuvik, NT X0E 0T0
Canada
Fred Bailey 867-777-2426

SHIPPER'S ACCOUNT NUMBER: NOR178CW

CONSIGNEE'S NAME AND ADDRESS

AGAT Laboratories Ltd
6310 Roper Road
Edmonton, AB T6B 3P9
Canada
Conrad Ross 403-542-9356

CONSIGNEE'S ACCOUNT NUMBER: AGA100CW

NOT NEGOTIABLE

AIR WAYBILL

(AIR CONSIGNMENT NOTE)

Canadian North
101 3731 52 Ave E
Edmonton Int Arpt, AB T9E 0V4
Canada

GST #: R 892440629

Copies 1, 2 and 3 of this Air Waybill are originals and have the same validity.

It is agreed that the goods described herein are accepted in apparent good order and condition (except as noted) for carriage SUBJECT TO THE CONDITIONS OF CONTRACT ON THE REVERSE HEREOF. ALL GOODS MAY BE CARRIED BY ANY OTHER MEANS INCLUDING ROAD OR ANY OTHER CARRIER UNLESS SPECIFIC CONTRARY INSTRUCTIONS ARE GIVEN HEREON BY THE SHIPPER, AND THE SHIPPER AGREES THAT THE SHIPMENTS MAY BE CARRIED VIA INTERMEDIATE STOPPING PLACES WHICH THE CARRIER DEEMS APPROPRIATE. THE SHIPPER'S ATTENTION IS DRAWN TO THE NOTICE CONCERNING CARRIER'S LIMITATION OF LIABILITY. Shipper may increase such limitation of liability by declaring a higher value for carriage and paying a supplemental charge if required.

SIGNATURE	RECEIVED IN GOOD ORDER	PLACE	DATE/TIME

PRINTED NAME

ISSUING CARRIER'S AGENT NAME AND CITY

ALSO NOTIFY: NAME AND ADDRESS *(OPTIONAL ACCOUNTING INFORMATION)*

AGENT'S IATA CODE

ACCOUNT NO.

TO EXPEDITE MOVEMENT, SHIPMENT MAY BE DIVERTED TO MOTOR OR OTHER CARRIER UNLESS SHIPPER GIVES OTHER INSTRUCTIONS HEREON.

DOMESTIC LIABILITY:

AIRPORT OF DEPARTURE (ADDR OF FIRST CARRIER) AND REQUESTED ROUTING

Inuvik

ROUTING AND DESTINATION

TO	BY FIRST CARRIER	TO	BY	TO	BY
YEG	Canadian North				

CURRENCY	CHGS Code	WT/VAL PPD	WT/VAL COLL	OTHER PPD	OTHER COLL	DECLARED VALUE FOR CARRIAGE	DECLARED VALUE FOR CUSTOMS
CAD	CX		X		X	0.00	NCV

AIRPORT OF DESTINATION: Edmonton

FOR CARRIER USE ONLY — FLIGHT/DATE | FLIGHT/DATE

AMOUNT OF INSURANCE: 0.00

INSURANCE - If carrier offers insurance, and such insurance is requested in accordance with the conditions thereof, indicate amount to be insured in figures in box marked "Amount of Insurance".

INSURANCE DECLINED — INITIALS

HANDLING INFORMATION These commodities licensed by US for ultimate destination

HFPU

DUPLICATE COPY

NO. OF PIECES RCP	GROSS WEIGHT	kg / lb	RATE CLASS / COMMODITY ITEM NO.	CHARGEABLE WEIGHT	RATE / CHARGE	TOTAL	NATURE AND QUANTITY OF GOODS (INCL. DIMENSIONS OR VOLUME)
4	82	K	GAD 00	82	$7.42	608.44	Soil Samples DIMS 24x27x28IN (bulk)
4	82					608.44	

PREPAID	WEIGHT CHARGE	COLLECT
	0.00	608.44

VALUATION CHARGE	
0.00	0.00

TAX	
0.00	40.16

TOTAL OTHER CHARGES DUE AGENT	
0.00	0.00

TOTAL OTHER CHARGES DUE CARRIER	
0.00	194.83

COD	CURRENCY	
	CAD	0.00

TOTAL PREPAID	TOTAL COLLECT
0.00	843.43

CURRENCY CONVERSION RATES	TOTAL COLLECT IN DESTINATION CURRENCY

FOR CARRIERS USE ONLY AT DESTINATION (ALL COLLECT CHARGES IN DESTINATION CURRENCY)

CHARGES AT DESTINATION

TOTAL COLLECT CHARGES

P-UP ZONE	PICKUP CHARGES	ORIGIN ADVANCE CHARGES	DESCRIPTION OF ORIGIN ADVANCE
	0.00	0.00	

DEL ZONE	DELIVERY CHARGES	DEST. ADVANCE CHARGES	DESCRIPTION OF DEST. ADVANCE
	0.00	0.00	

OTHER CHARGES AND DESCRIPTION: 194.83 Nav Canada Charge, Fuel S

ITEMS PREPAID | ITEMS COLLECT

Shipper certifies that the particulars on the face hereof are correct and that insofar as any part of the consignment contains dangerous goods, such part is properly described by name and is in proper condition for carriage by air according to the applicable Dangerous Goods Regulations.

RE-WEIGH/DIMENSIONAL WEIGHT AND SHIPPER GUARANTEES ALL CHARGES SUBJECT TO RATE AUDIT

PRINTED NAME _____ SIGNATURE _____

SIGNATURE OF SHIPPER ABOVE AND INITIAL APPLICABLE BOX BELOW

[X] THIS SHIPMENT DOES NOT CONTAIN DANGEROUS GOODS REGULATED IN AIR TRANSPORT

[ ] THIS SHIPMENT DOES CONTAIN DANGEROUS GOODS REGULATED IN AIR TRANSPORT

EXECUTED ON 8/6/2016 10:12 (Date) (Time) at (Place) 992010 SIGNATURE OF ISSUING CARRIER OR ITS AGENT

518-YEV-7879-0666

AGAT Laboratories

6310 ROPER ROAD
EDMONTON, ALBERTA
CANADA T6B 3P9
TEL (780)395-2525
FAX (780)462-2490
http://www.agatlabs.com

CLIENT NAME: IEG CONSULTANTS LTD
500-2618 HOPEWELL PLACE NE
CALGARY, AB T1Y7J7
(403) 262-5505

ATTENTION TO: Konrad Ross

PROJECT: A04012A08

AGAT WORK ORDER: 16E126254

TRACE ORGANICS REVIEWED BY: Laarni Hafso, Laboratory Manager

DATE REPORTED: Aug 17, 2016

PAGES (INCLUDING COVER): 21

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (780) 395-2525

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

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Certificate of Analysis

AGAT WORK ORDER: 16E126254

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-08-14

DATE REPORTED: 2016-08-17

SAMPLE DESCRIPTION:				GS16-162	GS16-163	GS16-164	GS16-165	GS16-166	GS16-167	GS16-168	GS16-169
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				8/9/2016	8/9/2016	8/9/2016	8/9/2016	8/9/2016	8/9/2016	8/9/2016	8/9/2016
Parameter	Unit	G / S	RDL	7771425	7771426	7771427	7771428	7771429	7771430	7771431	7771432
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.36
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	10	15	<10	919	548	3040
C16 - C34 (F3)	mg/kg		10	81	65	144	97	93	718	916	1260
C34 - C50 (F4)	mg/kg		10	37	38	72	59	44	35	42	48
Gravimetric Heavy Hydrocarbons	mg/kg		1000	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%		1	5	6	8	7	6	7	6	6
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		99	96	95	96	97	99	108	107
Ethylbenzene-d10 (BTEX)	%	50-150		121	113	125	113	121	125	82	76
o-Terphenyl (F2-F4)	%	50-150		80	84	94	81	78	79	96	72

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CLIENT NAME: IEG CONSULTANTS LTD

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SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-08-14

DATE REPORTED: 2016-08-17

SAMPLE DESCRIPTION:				GS16-170	GS16-171	GS16-172	GS16-173	GS16-174	GS16-175	GS16-176	GS16-177
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				8/9/2016	8/9/2016	8/9/2016	8/9/2016	8/9/2016	8/9/2016	8/9/2016	8/9/2016
Parameter	Unit	G / S	RDL	7771433	7771434	7771435	7771436	7771437	7771438	7771439	7771440
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	0.38	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	2970	2080	487	226	35	173	656	45
C16 - C34 (F3)	mg/kg		10	1260	1160	606	304	376	608	703	279
C34 - C50 (F4)	mg/kg		10	37	47	41	25	208	225	66	137
Gravimetric Heavy Hydrocarbons	mg/kg		1000	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%		1	7	7	6	7	20	20	7	16
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		105	95	96	97	96	95	96	96
Ethylbenzene-d10 (BTEX)	%	50-150		86	95	107	110	115	105	110	110
o-Terphenyl (F2-F4)	%	50-150		74	76	89	92	82	89	82	81

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PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

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SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-08-14

DATE REPORTED: 2016-08-17

SAMPLE DESCRIPTION:				GS16-178	GS16-179	GS16-180	GS16-181	GS16-182	GS16-183	GS16-184	GS16-185
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				8/9/2016	8/9/2016	8/9/2016	8/9/2016	8/9/2016	8/9/2016	8/9/2016	8/9/2016
Parameter	Unit	G / S	RDL	7771441	7771443	7771444	7771445	7771446	7771447	7771448	7771449
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	35	126	22	19	17	16	13	242
C16 - C34 (F3)	mg/kg		10	495	470	438	304	272	245	187	526
C34 - C50 (F4)	mg/kg		10	240	185	240	146	132	119	88	140
Gravimetric Heavy Hydrocarbons	mg/kg		1000	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%		1	22	19	24	23	20	20	17	20
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		95	93	125	126	125	125	123	123
Ethylbenzene-d10 (BTEX)	%	50-150		112	101	112	116	109	110	116	104
o-Terphenyl (F2-F4)	%	50-150		102	88	83	108	80	77	76	79

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Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-08-14

DATE REPORTED: 2016-08-17

SAMPLE DESCRIPTION:				GS16-186	GS16-187	GS16-188	GS16-189	GS16-190	GS16-191	GS16-192	GS16-193
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				8/9/2016	8/9/2016	8/9/2016	8/9/2016	8/9/2016	8/9/2016	8/9/2016	8/9/2016
Parameter	Unit	G / S	RDL	7771450	7771451	7771452	7771453	7771454	7771458	7771462	7771466
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	0.042	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	0.17	0.24	<0.05	<0.05	1.05	0.30	<0.05	0.25
Ethylbenzene	mg/kg		0.01	0.02	<0.01	<0.01	<0.01	0.09	0.07	<0.01	0.06
Xylenes	mg/kg		0.05	0.06	<0.05	<0.05	<0.05	0.47	0.30	<0.05	0.29
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	330	262	61	<10	463	221	252	102
C16 - C34 (F3)	mg/kg		10	180	280	140	38	300	111	137	130
C34 - C50 (F4)	mg/kg		10	67	108	71	33	96	45	28	54
Gravimetric Heavy Hydrocarbons	mg/kg		1000	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%		1	10	16	9	6	19	8	8	11
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		124	124	127	127	123	121	127	126
Ethylbenzene-d10 (BTEX)	%	50-150		109	111	112	111	112	95	114	111
o-Terphenyl (F2-F4)	%	50-150		74	81	92	65	88	74	81	73

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DATE RECEIVED: 2016-08-14

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SAMPLE DESCRIPTION:				GS16-194	GS16-195	GS16-196	GS16-197	GS16-198	GS16-199	GS16-200	GS16-201
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				8/9/2016	8/9/2016	8/9/2016	8/9/2016	8/10/2016	8/10/2016	8/10/2016	8/10/2016
Parameter	Unit	G / S	RDL	7771468	7771469	7771474	7771475	7771476	7771477	7771478	7771479
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	0.33	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.20
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.06	<0.01	0.13
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.57	0.18	0.83
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	19	12	16	<10	64	199	221	1660
C16 - C34 (F3)	mg/kg		10	147	107	67	45	93	125	119	212
C34 - C50 (F4)	mg/kg		10	52	131	41	36	41	26	32	33
Gravimetric Heavy Hydrocarbons	mg/kg		1000	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%		1	12	6	7	5	8	6	6	7
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		126	127	127	127	127	128	127	89
Ethylbenzene-d10 (BTEX)	%	50-150		111	107	109	109	114	126	124	87
o-Terphenyl (F2-F4)	%	50-150		75	95	81	90	77	75	79	69

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CLIENT NAME: IEG CONSULTANTS LTD

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Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-08-14

DATE REPORTED: 2016-08-17

SAMPLE DESCRIPTION:				GS16-202	GS16-203	GS16-204	GS16-205	GS16-206	GS16-207	GS16-208	GS16-209
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				8/10/2016	8/10/2016	8/10/2016	8/10/2016	8/10/2016	8/10/2016	8/10/2016	8/10/2016
Parameter	Unit	G / S	RDL	7771480	7771481	7771482	7771483	7771484	7771485	7771486	7771487
Benzene	mg/kg		0.005	0.042	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	0.56	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	0.13	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	0.85	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	984	738	118	<10	875	2120	2880	507
C16 - C34 (F3)	mg/kg		10	138	232	163	37	490	1060	1020	129
C34 - C50 (F4)	mg/kg		10	33	44	34	18	32	60	49	35
Gravimetric Heavy Hydrocarbons	mg/kg		1000	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%		1	6	11	10	5	9	11	14	12
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		85	80	81	82	81	80	76	76
Ethylbenzene-d10 (BTEX)	%	50-150		108	104	99	96	108	108	122	117
o-Terphenyl (F2-F4)	%	50-150		73	79	74	74	93	92	86	78

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Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-08-14

DATE REPORTED: 2016-08-17

SAMPLE DESCRIPTION:				GS16-210	GS16-211	GS16-212	GS16-213	GS16-214	GS16-215	GS16-216	GS16-217
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				8/11/2016	8/11/2016	8/11/2016	8/11/2016	8/11/2016	8/11/2016	8/11/2016	8/11/2016
Parameter	Unit	G / S	RDL	7771488	7771489	7771490	7771491	7771492	7771493	7771494	7771495
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	11	<10	14	<10	<10	12
C16 - C34 (F3)	mg/kg		10	40	24	58	32	33	21	50	40
C34 - C50 (F4)	mg/kg		10	22	<10	20	13	10	<10	16	15
Gravimetric Heavy Hydrocarbons	mg/kg		1000	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%		1	9	12	5	8	5	5	7	8
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		102	80	81	96	77	82	79	81
Ethylbenzene-d10 (BTEX)	%	50-150		107	93	99	104	109	113	106	89
o-Terphenyl (F2-F4)	%	50-150		90	79	84	82	88	84	110	96

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Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-08-14

DATE REPORTED: 2016-08-17

SAMPLE DESCRIPTION:				GS16-218	GS16-219	GS16-220	GS16-221	GS16-222	GS16-223	GS16-224	GS16-225
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				8/11/2016	8/11/2016	8/11/2016	8/11/2016	8/11/2016	8/11/2016	8/11/2016	8/11/2016
Parameter	Unit	G / S	RDL	7771496	7771497	7771498	7771499	7771500	7771501	7771502	7771503
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	1070	<10	43	12	<10	<10
C16 - C34 (F3)	mg/kg		10	25	43	426	24	111	69	43	46
C34 - C50 (F4)	mg/kg		10	<10	15	28	<10	42	54	32	43
Gravimetric Heavy Hydrocarbons	mg/kg		1000	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%		1	6	6	4	3	3	5	5	5
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		96	81	80	79	94	90	95	90
Ethylbenzene-d10 (BTEX)	%	50-150		103	99	98	109	103	117	97	112
o-Terphenyl (F2-F4)	%	50-150		95	97	92	98	63	79	69	77

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CLIENT NAME: IEG CONSULTANTS LTD

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SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-08-14

DATE REPORTED: 2016-08-17

SAMPLE DESCRIPTION:				GS16-226	GS16-227	GS16-228	GS16-229	GS16-230	GS16-109 1.0m	GS16-110 1.0m	GS16-111 1.0m
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				8/11/2016	8/11/2016	8/11/2016	8/11/2016	8/11/2016	8/4/2016	8/9/2016	8/9/2016
Parameter	Unit	G / S	RDL	7771504	7771505	7771506	7771507	7771508	7771509	7771510	7771511
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	0.28	0.08	0.16	0.66	6.82	2.51
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.96
Xylenes	mg/kg		0.05	<0.05	<0.05	0.05	<0.05	<0.05	<0.05	0.15	4.15
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	22
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	14
C10 - C16 (F2)	mg/kg		10	20	<10	381	37	28	103	112	2400
C16 - C34 (F3)	mg/kg		10	87	102	828	616	499	929	2710	3000
C34 - C50 (F4)	mg/kg		10	40	31	239	312	272	452	1310	580
Gravimetric Heavy Hydrocarbons	mg/kg		1000	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%		1	4	4	30	31	27	46	52	37
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		92	91	91	92	88	92	95	89
Ethylbenzene-d10 (BTEX)	%	50-150		103	108	114	114	115	114	105	117
o-Terphenyl (F2-F4)	%	50-150		66	69	66	72	79	86	83	30

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 16E126254

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-08-14

DATE REPORTED: 2016-08-17

SAMPLE DESCRIPTION:				GS16-112 1.0m	GS16-113 1.0m	GS16-114 1.0m	GS16-115 1.0m	GS16-116 1.0m	GS16-117 1.0m	GS16-118 1.0m	GS16-119 1.0m
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				8/9/2016	8/9/2016	8/9/2016	8/9/2016	8/9/2016	8/9/2016	8/9/2016	8/9/2016
Parameter	Unit	G / S	RDL	7771512	7771513	7771514	7771515	7771516	7771517	7771518	7771519
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	0.444	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	0.12	<0.05	0.06	1.04	5.26	0.18	1.49	2.02
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	0.15	1.11	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	0.69	6.22	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	21	73	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	19	60	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	55	<10	32	881	621	108	155	226
C16 - C34 (F3)	mg/kg		10	492	<10	59	1350	1190	2350	783	1260
C34 - C50 (F4)	mg/kg		10	280	40	70	469	538	<10	401	664
Gravimetric Heavy Hydrocarbons	mg/kg		1000	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%		1	28	17	14	31	40	48	45	73
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		86	97	95	105	104	88	83	96
Ethylbenzene-d10 (BTEX)	%	50-150		125	102	102	88	101	119	120	114
o-Terphenyl (F2-F4)	%	50-150		87	71	78	82	86	84	92	87

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 16E126254

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-08-14

DATE REPORTED: 2016-08-17

		SAMPLE DESCRIPTION:		GS16-120 1.0m	Dup - 14	Dup - 15	Dup - 16	Dup - 17	Dup - 18	Dup - 20	Dup - 21
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		8/9/2016	8/9/2016	8/9/2016	8/9/2016	8/10/2016	8/11/2016	8/11/2016	8/10/2016
Parameter	Unit	G / S	RDL	7771520	7771521	7771522	7771523	7771524	7771525	7771526	7771527
Benzene	mg/kg		0.005	0.471	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	2.36	<0.05	<0.05	0.10	<0.05	<0.05	<0.05	0.07
Ethylbenzene	mg/kg		0.01	0.56	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	2.51	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	11	<10	<10	17	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	17	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	242	<10	18	348	20	<10	48	711
C16 - C34 (F3)	mg/kg		10	550	70	261	185	65	64	143	1210
C34 - C50 (F4)	mg/kg		10	176	12	128	60	10	33	28	275
Gravimetric Heavy Hydrocarbons	mg/kg		1000	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%		1	52	6	25	10	7	8	5	31
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		94	91	92	94	93	93	92	93
Ethylbenzene-d10 (BTEX)	%	50-150		100	75	89	98	86	78	75	96
o-Terphenyl (F2-F4)	%	50-150		97	101	83	88	88	109	88	110

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

7771425-7771527 Results are based on the dry weight of the sample.
The C6-C10 (F1) fraction is calculated using toluene response factor.
The C10 - C16 (F2), C16 - C34 (F3), and C34 - C50 (F4) fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons (F4g) are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
Total C6 - C50 results are corrected for BTEX and PAH contributions (if requested).
Quality control data is available upon request.
Assistance in the interpretation of data is available upon request.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
The chromatogram returned to baseline by the retention time of nC50.
Extraction and holding times were met for this sample.
C6 –C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX.
Xylenes is a calculated parameter. The calculated value is the sum of m&p-Xylenes + o-Xylene.

Certified By:

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Quality Assurance

CLIENT NAME: IEG CONSULTANTS LTD

AGAT WORK ORDER: 16E126254

PROJECT: A04012A08

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: Aug 17, 2016			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)															
Benzene	1389	7771275	< 0.005	< 0.005	NA	< 0.005	115%	80%	120%	84%	80%	120%	100%	60%	140%
Toluene	1389	7771275	< 0.05	< 0.05	NA	< 0.05	108%	80%	120%	80%	80%	120%	98%	60%	140%
Ethylbenzene	1389	7771275	< 0.01	< 0.01	NA	< 0.01	98%	80%	120%	80%	80%	120%	93%	60%	140%
Xylenes	1389	7771275	< 0.05	< 0.05	NA	< 0.05	107%	80%	120%	81%	80%	120%	100%	60%	140%
C6 - C10 (F1)	1389	7771275	< 10	< 10	NA	< 10	103%	80%	120%	119%	80%	120%	134%	60%	140%
C10 - C16 (F2)	861	7771441	35	49	NA	< 10	106%	80%	120%	99%	80%	120%	86%	60%	140%
C16 - C34 (F3)	861	7771441	467	405	14.2%	< 10	111%	80%	120%	91%	80%	120%	86%	60%	140%
C34 - C50 (F4)	861	7771441	240	217	10.1%	< 10	118%	80%	120%	94%	80%	120%	87%	60%	140%
Moisture Content	861	7771441	22	22	0.0%	< 1									

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)															
Benzene	1390	7771491	< 0.005	< 0.005	NA	< 0.005	106%	80%	120%	117%	80%	120%	120%	60%	140%
Toluene	1390	7771491	< 0.05	< 0.05	NA	< 0.05	99%	80%	120%	95%	80%	120%	122%	60%	140%
Ethylbenzene	1390	7771491	< 0.01	< 0.01	NA	< 0.01	89%	80%	120%	92%	80%	120%	117%	60%	140%
Xylenes	1390	7771491	< 0.05	< 0.05	NA	< 0.05	99%	80%	120%	95%	80%	120%	124%	60%	140%
C6 - C10 (F1)	1390	7771491	< 10	< 10	NA	< 10	111%	80%	120%	85%	80%	120%	91%	60%	140%
C10 - C16 (F2)	835	7771491	<10	<10	NA	< 10	93%	80%	120%	112%	80%	120%	113%	60%	140%
C16 - C34 (F3)	835	7771491	32	37	14.0%	< 10	97%	80%	120%	99%	80%	120%	101%	60%	140%
C34 - C50 (F4)	835	7771491	13	14	7.0%	< 10	95%	80%	120%	103%	80%	120%	106%	60%	140%
Moisture Content	835	7771491	8	7	13.3%	< 1									

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

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Method Summary

CLIENT NAME: IEG CONSULTANTS LTD

AGAT WORK ORDER: 16E126254

PROJECT: A04012A08

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	ORG-170-5110/5140/5430/5440	EPA SW-846 8260-S	GC/MS
Toluene	ORG-170-5110/5140/5430/5440	EPA SW-846 8260-S	GC/MS
Ethylbenzene	ORG-170-5110/5140/5430/5440	EPA SW-846 8260-S	GC/MS
Xylenes	ORG-170-5110/5140/5430/5440	EPA SW-846 8260-S	GC/MS
C6 - C10 (F1)	ORG-170-5110/5140/5430/5440	CCME Tier 1 Method-S L	GC/FID
C6 - C10 (F1 minus BTEX)	ORG-170-5110/5140/5430/5440	CCME Tier 1 Method-S L	GC/FID
C10 - C16 (F2)	ORG-170-5120/5300	CCME Tier 1 Method-S H	GC/FID
C16 - C34 (F3)	ORG-170-5120/5300	CCME Tier 1 Method-S H	GC/FID
C34 - C50 (F4)	ORG-170-5120/5300	CCME Tier 1 Method-S H	GC/FID
Gravimetric Heavy Hydrocarbons	ORG-170-5120/5300	CCME Tier 1 Method-S H	GC/FID
Moisture Content	LAB-175-4002	CCME Tier 1 Method-S %	GRAVIMETRIC
Toluene-d8 (BTEX)	ORG-170-5110/5140/5430/5440	EPA SW-846 8260-S	GC/MS
Ethylbenzene-d10 (BTEX)	ORG-170-5110/5140/5430/5440	EPA SW-846 8260-S	GC/MS
o-Terphenyl (F2-F4)	ORG-170-5120/5300	CCME Tier 1 Method-S H	GC/FID

AGAT Laboratories
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Laboratory Use Only
Arrival Temperature: 16.6°C
AGAT Job Number: 16E126254
Date and Time:

Chain of Custody Record

Emergency Support Services Hotline 1-855-AGAT 245 (1-855-242-8245)

Report Information

Company: IEG
Contact: Konrad Ross
Address: 2618 Hopewell Place NE
Calgary
Phone: 403-464-7677 Fax:
LSD:
Client Project #: A04012A08

Invoice To

Same ☑ Yes ☐ No

Company:
Contact:
Address:
Phone: Fax:
PO/AFE#

Report Information

1. Name: Konrad Ross
Email: Kross@klohn.com
2. Name: Nicole Wills
Email: nwills@klohn.com
3. Name:
Email:

Report Format

☐ Single Sample per Page
☐ Multiple Samples per Page

Turnaround Time Required (TAT)

Regular TAT ☐ 5-7 Business Days
Rush TAT (Surcharge) ☑ Less than 24 Hours (200%) ☐ Less than 48 Hours (100%) ☐ Less than 72 Hours (50%)
Date Required:

Requirements (Selection may impact detection limits)

☐ CCME ☑ AB Tier 1 ☐ BC CSR
☐ Agricultural ☐ Agricultural ☐ AW
☐ Industrial ☐ Industrial ☐ IW
☐ Residential/ Park ☐ Residential/ Park ☐ LW
☐ Commercial ☐ Commercial ☐ DW
☐ Drinking Water ☐ Natural Area
☐ FWAL ☐ AB Surface Water
☐ Other:
☐ D50 (Drilling) ☐ SPIGEC ☐

LABORATORY USE (LAB ID#)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/ TIME SAMPLED	COMMENTS- SITE SAMPLE INFO, SAMPLE CONTAINMENT	# of CONTAINERS	Detailed Soil Salinity (Saturated Paste)	CCME BTEX/ F1-F4	Soil Metals: ☐ HWS-B ☐ Cr^{6+} ☐ Hg	Water Metals: ☐ Dissolved ☐ Total ☐ Hg ☐ Cr^{6+}	Routine Water Potability	AB Class 2 Landfill	BC Landfill	D50 Detailed Salinity (As Received)	Microtox	☐ BTEXS/VPH/EPH ☐ LEPH/HEPH							HOLD FOR 60 DAYS	PRESERVED	CONTAMINATED/ HAZARDOUS
7771425	GS16-162	soil	9-Aug-16		2		X																
426	GS16-163	soil	9-Aug-16		2		X																
427	GS16-164	soil	9-Aug-16		2		X																
428	GS16-165	soil	9-Aug-16		2		X																
429	GS16-166	soil	9-Aug-16		2		X																
430	GS16-167	soil	9-Aug-16		2		X																
431	GS16-168	soil	9-Aug-16		2		X																
432	GS16-169	soil	9-Aug-16		2		X																
433	GS16-170	soil	9-Aug-16		2		X																
434	GS16-171	soil	9-Aug-16		2		X																
435	GS16-172	soil	9-Aug-16		2		X																
436	GS16-173	soil	9-Aug-16		2		X																

Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:
		[illegible]	9/19/2016

Page 1 of 5

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Document ID: DIV-50-1507.003

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Chain of Custody Record

Emergency Support Services Hotline 1-855-AGAT 245 (1-855-242-8245)

Report to:

Company: IEG Same as COC#:

LABORATORY USE (LAB ID#)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/ TIME SAMPLED	COMMENTS- SITE SAMPLE INFO, SAMPLE CONTAINMENT	# of CONTAINERS	Detailed Soil Salinity (Saturated Paste)	CCME BTEX/ F1-F4	Soil Metals: ☐ HWS-B ☐ Cr6+ ☐ Hg	Water Metals: ☐ Dissolved ☐ Total ☐ Hg ☐ Cr6+	Routine Water Potability	AB Class 2 Landfill	BC Landfill	D50 Detailed Salinity (As Received)	Microtox	☐ BTEXS/VPH/EPH ☐ LEPH/HEPH							HOLD FOR 60 DAYS	PRESERVED	CONTAMINATED/ HAZARDOUS
7771437	GS16-174	Soil	9-Aug-16		2		X																
438	GS16-175	Soil	9-Aug-16		2		X																
439	GS16-176	Soil	9-Aug-16		2		X																
440	GS16-177	Soil	9-Aug-16		2		X																
441	GS16-178	Soil	9-Aug-16		2		X																
443	GS16-179	Soil	9-Aug-16		2		X																
444	GS16-180	Soil	9-Aug-16		2		X																
445	GS16-181	Soil	9-Aug-16		2		X																
446	GS16-182	Soil	9-Aug-16		2		X																
447	GS16-183	Soil	9-Aug-16		2		X																
448	GS16-184	Soil	9-Aug-16		2		X																
449	GS16-185	Soil	9-Aug-16		2		X																
450	GS16-186	Soil	9-Aug-16		2		X																
451	GS16-187	Soil	9-Aug-16		2		X																
452	GS16-188	Soil	9-Aug-16		2		X																
453	GS16-189	Soil	9-Aug-16		2		X																
454	GS16-190	Soil	9-Aug-16		2		X																
458	GS16-191	Soil	9-Aug-16		2		X																
462	GS16-192	Soil	9-Aug-16		2		X																
466	GS16-193	Soil	9-Aug-16		2		X																
468	GS16-194	Soil	9-Aug-16		2		X																
469	GS16-195	Soil	9-Aug-16		2		X																
474	GS16-196	Soil	9-Aug-16		2		X																
475	GS16-197	Soil	9-Aug-16		2		X																
476	GS16-198	Soil	10-Aug-16		2		X																

16 AUG 14 09:38

Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:

8/14/2016

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Document ID: DIV-50-1507.002

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Chain of Custody Record

Emergency Support Services Hotline 1-855-AGAT 245 (1-855-242-8245)

Report to:

Company: IEG Same as COC#:

LABORATORY USE (LAB ID#)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/ TIME SAMPLED	COMMENTS- SITE SAMPLE INFO, SAMPLE CONTAINMENT	# of CONTAINERS	Detailed Soil Salinity (Saturated Paste)	CCME BTEX/ F1-F4	Soil Metals: ☐ HWS-B ☐ Cr6+ ☐ Hg	Water Metals: ☐ Dissolved ☐ Total ☐ Hg ☐ Cr6+	Routine Water Potability	AB Class 2 Landfill	BC Landfill	D50 Detailed Salinity (As Received)	Microtox	☐ BTEXS/VPH/EPH ☐ LEPH/HEPH	F3	Toulene	F2	Xylenes			HOLD FOR 60 DAYS	PRESERVED	CONTAMINATED/ HAZARDOUS
7771477	GS16-199	Soil	10-Aug-16		2		X																	
478	GS16-200	Soil	10-Aug-16		2		X																	
479	GS16-201	Soil	10-Aug-16		2		X																	
480	GS16-202	Soil	10-Aug-16		2		X																	
481	GS16-203	Soil	10-Aug-16		2		X																	
482	GS16-204	Soil	10-Aug-16		2		X																	
483	GS16-205	Soil	10-Aug-16		2		X																	
484	GS16-206	Soil	10-Aug-16		2		X																	
485	GS16-207	Soil	10-Aug-16		2		X																	
486	GS16-208	Soil	10-Aug-16		2		X																	
487	GS16-209	Soil	10-Aug-16		2		X																	
488	GS16-210	Soil	11-Aug-16		2		X																	
489	GS16-211	Soil	11-Aug-16		2		X																	
490	GS16-212	Soil	11-Aug-16		2		X																	
491	GS16-213	Soil	11-Aug-16		2		X																	
492	GS16-214	Soil	11-Aug-16		2		X																	
493	GS16-215	Soil	11-Aug-16		2		X																	
494	GS16-216	Soil	11-Aug-16		2		X																	
495	GS16-217	Soil	11-Aug-16		2		X																	
496	GS16-218	Soil	11-Aug-16		2		X																	
497	GS16-219	Soil	11-Aug-16		2		X																	
498	GS16-220	Soil	11-Aug-16		2		X																	
499	GS16-221	Soil	11-Aug-16		2		X																	
500	GS16-222	Soil	11-Aug-16		2		X																	
501	GS16-223	Soil	11-Aug-16		2		X																	

16 AUG 14 09:39

Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:
		Ray J.	8/14/2016
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:

Page 3 of 5

E 08860

Document ID: DIV-50-1507.002

AGAT Laboratories
2910 12 Street NE
Calgary, Alberta T2E 7P7
P: 403.735.2005 ▪ F: 403.735.2771
webearth.agatlabs.com

Chain of Custody Record

Emergency Support Services Hotline 1-855-AGAT 245 (1-855-242-8245)

Report to:

Company: IEG Same as COC#:

LABORATORY USE (LAB ID#)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/ TIME SAMPLED	COMMENTS- SITE SAMPLE INFO, SAMPLE CONTAINMENT	# of CONTAINERS	Detailed Soil Salinity (Saturated Paste)	CCME BTEX/ F1-F4	Soil Metals: ☐ HWS-B ☐ Cr6+ ☐ Hg	Water Metals: ☐ Dissolved ☐ Total ☐ Hg ☐ Cr6+	Routine Water Potability	AB Class 2 Landfill	BC Landfill	D50 Detailed Salinity (As Received)	Microtox	☐ BTEXS/VPH/EPH ☐ LEPH/HEPH	F3	Toulene	F2	Xylenes	PCB (Aroclor mixtures)	Organo-chlorine pesticide (DDT, DDE, DDD)	HOLD FOR 60 DAYS	PRESERVED	CONTAMINATED/ HAZARDOUS
7771502	GS16-224	Soil	11-Aug-16		2		X																	
503	GS16-225	Soil	11-Aug-16		2		X																	
504	GS16-226	Soil	11-Aug-16		2		X																	
505	GS16-227	Soil	11-Aug-16		2		X																	
506	GS16-228	Soil	11-Aug-16		2		X																	
507	GS16-229	Soil	11-Aug-16		2		X																	
508	GS16-230	Soil	11-Aug-16		2		X																	
509	GS16-109 1.0m	Soil	4-Aug-16		2		X																	
510	GS16-110 1.0m	Soil	9-Aug-16		2		X																	
511	GS16-111 1.0m	Soil	9-Aug-16		2		X																	
512	GS16-112 1.0m	Soil	9-Aug-16		2		X																	
513	GS16-113 1.0m	Soil	9-Aug-16		2		X																	
514	GS16-114 1.0m	Soil	9-Aug-16		2		X																	
515	GS16-115 1.0m	Soil	9-Aug-16		2		X																	
516	GS16-116 1.0m	Soil	9-Aug-16		2		X																	
517	GS16-117 1.0m	Soil	9-Aug-16		2		X																	
518	GS16-118 1.0m	Soil	9-Aug-16		2		X																	
519	GS16-119 1.0m	Soil	9-Aug-16		2		X																	
520	GS16-120 1.0m	Soil	9-Aug-16		2		X																	
521	Dup -14	Soil	9-Aug-16		2		X																	
522	Dup -15	Soil	9-Aug-16		2		X																	
523	Dup -16	Soil	9-Aug-16		2		X																	
524	Dup -17	Soil	10-Aug-16		2		X																	
525	Dup -18	Soil	11-Aug-16		2		X																	
526	Dup - 20	Soil	11-Aug-16		2		X																	

Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):		Date/ Time: 8/19/2016	Page 4 of 5
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):		Date/ Time:	
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):		Date/ Time:	

E 08861

Document ID: DIV-50-1507.002

AGAT Laboratories
2910 12 Street NE
Calgary, Alberta T2E 7P7
P: 403.735.2005 ▪ F: 403.735.2771
webearth.agatlabs.com

Chain of Custody Record

Emergency Support Services Hotline 1-855-AGAT 245 (1-855-242-8245)

Report to:

Company: IEG Same as COC#:

LABORATORY USE (LAB ID#)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/ TIME SAMPLED	COMMENTS- SITE SAMPLE INFO, SAMPLE CONTAINMENT	# of CONTAINERS	Detailed Soil Salinity (Saturated Paste)	CCME BTEX/ F1-F4	Soil Metals: ☐ HWS-B ☐ Cr6+ ☐ Hg	Water Metals: ☐ Dissolved ☐ Total ☐ Hg ☐ Cr6+	Routine Water Potability	AB Class 2 Landfill	BC Landfill	D50 Detailed Salinity (As Received)	Microtox	☐ BTEXS/VPH/EPH ☐ LEPH/HEPH	F3	Toulene	F2	Xylenes	PCB (Aroclor mixtures)	Organo-chlorine pesticide (DDT, DDE, DDD)	HOLD FOR 60 DAYS	PRESERVED	CONTAMINATED/ HAZARDOUS
7771527	Dup-21	10-Aug-16			2		X																	

16 AUG 14 09:59

Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:

Page 4 of 55

E 08862

Document ID: DIV-50-1507.002

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM

RECEIVING BASICS - Shipping

Company/Consultant: IEG

Courier: Canadian North Cargo Prepaid Collect

Waybill# 518 YEV 7061 7341

Branch: [EDM] GP FN FM RD VAN LYD FSJ EST Other: NT

If multiple sites were submitted at once: Yes (No)

Custody Seal Intact: Yes No (NA)

TAT: <24hr 24-48hr 48-72hr Reg Other_____

Cooler Quantity: 4

TIME SENSITIVE ISSUES - Shipping

ALREADY EXCEEDED HOLD TIME? Yes No

Inorganic Tests (Please Circle): Mibi , BOD , Nitrate/Nitrite , Turbidity , Microtox , Ortho PO4 , Tedlar Bag , Residual Chlorine , Chlorophyll* , Chloroamines*

Earliest Expiry:_____

Hydrocarbons: Earliest Expiry _____

SAMPLE INTEGRITY - Shipping

Hazardous Samples: YES (NO) Precaution Taken:_____

Legal Samples: Yes (No)

International Samples: Yes (No)

Tape Sealed: Yes (No)

Coolant Used: Icepack Bagged Ice Free Ice Free Water (None)

Temperature (Bottles/Jars only) N/A if only Soil Bags Received

FROZEN (Please Circle if samples received Frozen)

1 (Bottle/Jar) 16.0+16.6+16.7=16.4°C	2(Bottle/Jar) 17.1+16.5+16.7=16.8°C
3 (Bottle/Jar) 16.4+16.7+16.6=16.6°C	4 (Bottle/Jar) 16.6+16.8+16.7=16.7°C
5 (Bottle/Jar)___+___+___=___°C	6 (Bottle/Jar)___+___+___=___°C
7 (Bottle/Jar)___+___+___=___°C	8 (Bottle/Jar)___+___+___=___°C
9 (Bottle/Jar)___+___+___=___°C	10 (Bottle/Jar)___+___+___=___°C

(If more than 10 coolers are received use another sheet of paper and attach)

Ave. Temp = 16.6°C

LOGISTICS USE ONLY

Workorder No: 16E126254

Samples Damaged: Yes (No) If YES why?

'16 AUG 14 09:21

No Bubble Wrap Frozen Courier

Other: _____

Account Project Manager: Anthony Espinoza have they been notified of the above issues: (Yes) No

Whom spoken to: _____ Date/Time: _____

CPM Initial_____

General Comments: Sample "GS16-165" rec'd with 1x 120ml glass jar empty.

* Subcontracted Analysis (See CPM)

Date issued: October 05, 2015
Document ID: SR-9505.003

518 | YEV | 7061-7341 518-YEV-7061-7341

SHIPPER'S NAME AND ADDRESS

Northwind Industries Inc.
146 Navy Rd.
PO Box 1130
Inuvik, NT X0E 0T0
Canada
Fred Bailey 867-777-2426
Registered

SHIPPER'S ACCOUNT NUMBER: NOR178CW

CONSIGNEE'S NAME AND ADDRESS

AGAT Laboratories Ltd
6310 Roper Road
Edmonton, AB T6B 3P9
Canada
780-395-2525 403-735-2745

CONSIGNEE'S ACCOUNT NUMBER: AGA100CW

NOT NEGOTIABLE
AIR WAYBILL
(AIR CONSIGNMENT NOTE)

Canadian North
101 3731 52 Ave E
Edmonton Int Arpt, AB T9E 0V4
Canada

GST #: R 892440629

Copies 1, 2 and 3 of this Air Waybill are originals and have the same validity.

It is agreed that the goods described herein are accepted in apparent good order and condition (except as noted) for carriage SUBJECT TO THE CONDITIONS OF CONTRACT ON THE REVERSE HEREOF. ALL GOODS MAY BE CARRIED BY ANY OTHER MEANS INCLUDING ROAD OR ANY OTHER CARRIER UNLESS SPECIFIC CONTRARY INSTRUCTIONS ARE GIVEN HEREON BY THE SHIPPER, AND THE SHIPPER AGREES THAT THE SHIPMENTS MAY BE CARRIED VIA INTERMEDIATE STOPPING PLACES WHICH THE CARRIER DEEMS APPROPRIATE. THE SHIPPER'S ATTENTION IS DRAWN TO THE NOTICE CONCERNING CARRIER'S LIMITATION OF LIABILITY. Shipper may increase such limitation of liability by declaring a higher value for carriage and paying a supplemental charge if required.

SIGNATURE | RECEIVED IN GOOD ORDER | PLACE | DATE/TIME

PRINTED NAME

ISSUING CARRIER'S AGENT NAME AND CITY

ALSO NOTIFY: NAME AND ADDRESS *(OPTIONAL ACCOUNTING INFORMATION)*

AGENT'S IATA CODE | ACCOUNT NO.

TO EXPEDITE MOVEMENT, SHIPMENT MAY BE DIVERTED TO MOTOR OR OTHER CARRIER UNLESS SHIPPER GIVES OTHER INSTRUCTIONS HEREON.

DOMESTIC LIABILITY:

AIRPORT OF DEPARTURE (ADDR OF FIRST CARRIER) AND REQUESTED ROUTING

Inuvik

ROUTING AND DESTINATION

TO	BY FIRST CARRIER	TO	BY	TO	BY
YEG	Canadian North				

CURRENCY	CHGS Code	WT/VAL PPD	WT/VAL COLL	OTHER PPD	OTHER COLL	DECLARED VALUE FOR CARRIAGE	DECLARED VALUE FOR CUSTOMS
CAD	CX		X		X	NVD	NCV

AIRPORT OF DESTINATION: Edmonton

FOR CARRIER USE ONLY: FLIGHT/DATE | FLIGHT/DATE

AMOUNT OF INSURANCE: NIL

INSURANCE - If carrier offers insurance, and such insurance is requested in accordance with the conditions thereof, indicate amount to be insured in figures in box marked "Amount of Insurance".

INSURANCE DECLINED INITIALS

HANDLING INFORMATION These commodities licensed by US for ultimate destination

HFPU

DUPLICATE COPY

NO. OF PIECES RCP	GROSS WEIGHT	kg/lb	RATE CLASS / COMMODITY ITEM NO.	CHARGEABLE WEIGHT	RATE / CHARGE	TOTAL	NATURE AND QUANTITY OF GOODS (INCL. DIMENSIONS OR VOLUME)
4	79	K	GAD 00	79	$7.42	586.18	Soil samples DIMS 24x28x26IN (bulk)
4	79					586.18	

PREPAID	WEIGHT CHARGE	COLLECT	P-UP ZONE	PICKUP CHARGES	ORIGIN ADVANCE CHARGES	DESCRIPTION OF ORIGIN ADVANCE
0.00		586.18		0.00	0.00	

VALUATION CHARGE		DEL ZONE	DELIVERY CHARGES	DEST. ADVANCE CHARGES	DESCRIPTION OF DEST. ADVANCE
0.00	0.00		0.00	0.00	

TAX		OTHER CHARGES AND DESCRIPTION	ITEMS PREPAID	ITEMS COLLECT
0.00	38.69	187.71 Nav Canada Charge, Fuel S		

TOTAL OTHER CHARGES DUE AGENT		Shipper certifies that the particulars on the face hereof are correct and that insofar as any part of the consignment contains dangerous goods, such part is properly described by name and is in proper condition for carriage by air according to the applicable Dangerous Goods Regulations.
0.00	0.00	
TOTAL OTHER CHARGES DUE CARRIER		**RE-WEIGH/DIMENSIONAL WEIGHT AND SHIPPER GUARANTEES ALL CHARGES SUBJECT TO RATE AUDIT**
0.00	187.71	
COD → CURRENCY: CAD	0.00	
TOTAL PREPAID	TOTAL COLLECT	PRINTED NAME _____ SIGNATURE _____
0.00	812.58	SIGNATURE OF SHIPPER ABOVE AND INITIAL APPLICABLE BOX BELOW. [X] THIS SHIPMENT DOES NOT CONTAIN DANGEROUS GOODS REGULATED IN AIR TRANSPORT. [ ] THIS SHIPMENT DOES CONTAIN DANGEROUS GOODS REGULATED IN AIR TRANSPORT.
CURRENCY CONVERSION RATES	TOTAL COLLECT IN DESTINATION CURRENCY	EXECUTED ON 8/12/2016 12:36 (Date) (Time) at (Place) 992091 SIGNATURE OF ISSUING CARRIER OR ITS AGENT
FOR CARRIERS USE ONLY AT DESTINATION (ALL COLLECT CHARGES IN DESTINATION CURRENCY)	CHARGES AT DESTINATION	TOTAL COLLECT CHARGES

518-YEV-7061-7341

AGAT Laboratories

6310 ROPER ROAD
EDMONTON, ALBERTA
CANADA T6B 3P9
TEL (780)395-2525
FAX (780)462-2490
http://www.agatlabs.com

CLIENT NAME: IEG CONSULTANTS LTD
500-2618 HOPEWELL PLACE NE
CALGARY, AB T1Y7J7
(403) 262-5505

ATTENTION TO: Konrad Ross

PROJECT: A04012A08

AGAT WORK ORDER: 16E128870

TRACE ORGANICS REVIEWED BY: Melinda Guay, Technical Reviewer

DATE REPORTED: Aug 22, 2016

PAGES (INCLUDING COVER): 15

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (780) 395-2525

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 16E128870

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-08-20

DATE REPORTED: 2016-08-22

SAMPLE DESCRIPTION:				GS16-231	GS16-234	GS16-235	GS16-236	GS16-237	GS16-238	GS16-239	GS16-240
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				8/18/2016	8/18/2016	8/18/2016	8/18/2016	8/18/2016	8/18/2016	8/18/2016	8/18/2016
Parameter	Unit	G / S	RDL	7789216	7789225	7789226	7789227	7789228	7789229	7789230	7789231
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	0.39	0.36	0.06	<0.05	<0.05	0.12
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	85	46	2150	3100	1890	340	<10	719
C16 - C34 (F3)	mg/kg		10	157	176	1070	1340	1100	399	33	442
C34 - C50 (F4)	mg/kg		10	27	41	25	28	30	19	<10	23
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	6	13	8	9	8	9	6	9
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		101	100	99	98	98	100	100	100
Ethylbenzene-d10 (BTEX)	%	50-150		119	101	136	98	81	96	115	118
o-Terphenyl (F2-F4)	%	50-150		88	89	101	101	99	94	91	90

Certified By:

AGAT Laboratories
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FAX (780)462-2490
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 16E128870

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-08-20

DATE REPORTED: 2016-08-22

SAMPLE DESCRIPTION:				GS16-241	GS16-242	GS16-243	GS16-244	GS16-245	GS16-246	GS16-247	GS16-248
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				8/18/2016	8/18/2016	8/18/2016	8/18/2016	8/18/2016	8/18/2016	8/18/2016	8/18/2016
Parameter	Unit	G / S	RDL	7789232	7789233	7789234	7789235	7789236	7789237	7789238	7789239
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	0.06	<0.05	<0.05	0.09	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.57	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	668	322	81	16	54	10	113	273
C16 - C34 (F3)	mg/kg		10	649	531	350	164	190	44	96	126
C34 - C50 (F4)	mg/kg		10	35	78	116	68	67	25	25	26
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	9	19	21	13	20	10	10	10
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		99	99	99	99	99	100	100	100
Ethylbenzene-d10 (BTEX)	%	50-150		91	93	89	93	97	95	109	130
o-Terphenyl (F2-F4)	%	50-150		89	92	99	85	88	89	105	85

Certified By:

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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 16E128870

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-08-20

DATE REPORTED: 2016-08-22

SAMPLE DESCRIPTION:				GS16-249	GS16-250	GS16-251	GS16-252	GS16-253	GS16-254	GS16-255	GS16-256
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				8/18/2016	8/18/2016	8/18/2016	8/18/2016	8/18/2016	8/18/2016	8/18/2016	8/18/2016
Parameter	Unit	G / S	RDL	7789240	7789241	7789242	7789243	7789245	7789246	7789247	7789252
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.009	<0.005	<0.005
Toluene	mg/kg		0.05	0.18	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	0.06	0.04	<0.01	<0.01	0.03	0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	0.41	0.50	0.11	0.06	0.21	0.23	<0.05	0.17
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	748	684	709	611	641	2180	502	428
C16 - C34 (F3)	mg/kg		10	170	140	141	209	259	1120	203	352
C34 - C50 (F4)	mg/kg		10	38	29	30	50	14	37	<10	25
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	15	15	10	10	10	15	9	8
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		99	99	99	100	85	86	82	78
Ethylbenzene-d10 (BTEX)	%	50-150		78	76	87	108	138	127	112	105
o-Terphenyl (F2-F4)	%	50-150		83	81	88	88	104	107	102	127

Certified By:

AGAT Laboratories
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Certificate of Analysis

AGAT WORK ORDER: 16E128870

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-08-20

DATE REPORTED: 2016-08-22

SAMPLE DESCRIPTION:				GS16-257	Dup-22	Dup-23	GS16-232	GS16-233	GS16-258	GS16-259	GS16-260
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				8/18/2016	8/18/2016	8/18/2016	8/18/2016	8/18/2016	8/18/2016	8/18/2016	8/18/2016
Parameter	Unit	G / S	RDL	7789253	7789254	7789255	7789276	7789283	7789284	7789285	7789286
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	0.05	0.05	<0.05	<0.05	0.15	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	0.08	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	41	45	262	213	13	184	150	11
C16 - C34 (F3)	mg/kg		10	69	67	427	373	297	77	99	31
C34 - C50 (F4)	mg/kg		10	11	<10	73	97	145	19	19	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	13	16	28	22	24	10	12	9
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		86	78	84	80	81	82	82	82
Ethylbenzene-d10 (BTEX)	%	50-150		131	106	125	116	122	124	109	117
o-Terphenyl (F2-F4)	%	50-150		99	98	101	106	99	101	119	104

Certified By:

AGAT Laboratories
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CANADA T6B 3P9
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FAX (780)462-2490
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 16E128870

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-08-20

DATE REPORTED: 2016-08-22

SAMPLE DESCRIPTION:				GS16-261	GS16-262	GS16-263	GS16-264	GS16-265	GS16-266	GS16-267	GS16-268
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				8/18/2016	8/18/2016	8/18/2016	8/18/2016	8/18/2016	8/18/2016	8/18/2016	8/18/2016
Parameter	Unit	G / S	RDL	7789288	7789289	7789290	7789291	7789294	7789295	7789296	7789297
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	0.10	0.11	0.06	<0.05	<0.05	0.10	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	0.04	<0.01	0.11	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	0.16	0.11	1.45	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	129	172	168	2080	<10	441	43	<10
C16 - C34 (F3)	mg/kg		10	112	168	150	615	39	795	246	176
C34 - C50 (F4)	mg/kg		10	26	44	41	15	16	161	79	68
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	13	15	12	10	14	34	31	28
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		81	82	79	82	79	79	80	80
Ethylbenzene-d10 (BTEX)	%	50-150		114	106	124	118	107	130	138	126
o-Terphenyl (F2-F4)	%	50-150		106	104	100	98	103	104	116	96

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Certificate of Analysis

AGAT WORK ORDER: 16E128870

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-08-20

DATE REPORTED: 2016-08-22

SAMPLE DESCRIPTION:				GS16-269	GS16-270	GS16-271	GS16-272	GS16-273	GS16-274	GS16-275	GS16-276
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				8/18/2016	8/18/2016	8/18/2016	8/18/2016	8/18/2016	8/18/2016	8/18/2016	8/18/2016
Parameter	Unit	G / S	RDL	7789299	7789300	7789301	7789302	7789303	7789304	7789305	7789306
Benzene	mg/kg		0.005	<0.005	0.010	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	0.09	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	0.02	<0.01	<0.01	0.03	0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	0.22	0.05	0.10	0.40	0.76	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	26	<10	<10	<10	10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	26	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	29	2470	1380	1230	2350	2080	95	286
C16 - C34 (F3)	mg/kg		10	408	1290	1360	1010	1700	1340	130	326
C34 - C50 (F4)	mg/kg		10	213	52	69	57	94	72	35	72
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	29	9	11	13	17	15	8	9
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		98	93	95	95	94	95	98	98
Ethylbenzene-d10 (BTEX)	%	50-150		79	97	66	67	67	71	75	76
o-Terphenyl (F2-F4)	%	50-150		105	88	84	86	99	89	100	107

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 16E128870

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-08-20

DATE REPORTED: 2016-08-22

		SAMPLE DESCRIPTION:		Dup-24
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		8/18/2016
Parameter	Unit	G / S	RDL	7789307
Benzene	mg/kg		0.005	<0.005
Toluene	mg/kg		0.05	<0.05
Ethylbenzene	mg/kg		0.01	0.02
Xylenes	mg/kg		0.05	0.88
C6 - C10 (F1)	mg/kg		10	21
C6 - C10 (F1 minus BTEX)	mg/kg		10	20
C10 - C16 (F2)	mg/kg		10	2540
C16 - C34 (F3)	mg/kg		10	1460
C34 - C50 (F4)	mg/kg		10	63
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A
Moisture Content	%		1	8
Surrogate	Unit	Acceptable Limits		
Toluene-d8 (BTEX)	%	50-150		96
Ethylbenzene-d10 (BTEX)	%	50-150		68
o-Terphenyl (F2-F4)	%	50-150		99

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

7789216-7789307 Results are based on the dry weight of the sample.
The C6-C10 (F1) fraction is calculated using toluene response factor.
The C10 - C16 (F2), C16 - C34 (F3), and C34 - C50 (F4) fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons (F4g) are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
Total C6 - C50 results are corrected for BTEX and PAH contributions (if requested).
Quality control data is available upon request.
Assistance in the interpretation of data is available upon request.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
The chromatogram returned to baseline by the retention time of nC50.
Extraction and holding times were met for this sample.
C6 –C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX.
Xylenes is a calculated parameter. The calculated value is the sum of m&p-Xylenes + o-Xylene.

Certified By:

AGAT Laboratories

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Quality Assurance

CLIENT NAME: IEG CONSULTANTS LTD

AGAT WORK ORDER: 16E128870

PROJECT: A04012A08

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: Aug 22, 2016			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)															
Benzene	1019	7789216	< 0.005	< 0.005	NA	< 0.005	107%	80%	120%	100%	80%	120%	99%	60%	140%
Toluene	1019	7789216	< 0.05	< 0.05	NA	< 0.05	114%	80%	120%	97%	80%	120%	99%	60%	140%
Ethylbenzene	1019	7789216	< 0.01	< 0.01	NA	< 0.01	119%	80%	120%	89%	80%	120%	90%	60%	140%
Xylenes	1019	7789216	< 0.05	< 0.05	NA	< 0.05	117%	80%	120%	85%	80%	120%	89%	60%	140%
C6 - C10 (F1)	1019	7789216	< 10	< 10	NA	< 10	93%	80%	120%	113%	80%	120%	135%	60%	140%
C10 - C16 (F2)	1028	7789216	85	72	16.6%	< 10	84%	80%	120%	86%	80%	120%	83%	60%	140%
C16 - C34 (F3)	1028	7789216	157	131	18.1%	< 10	87%	80%	120%	82%	80%	120%	74%	60%	140%
C34 - C50 (F4)	1028	7789216	27	20	NA	< 10	87%	80%	120%	83%	80%	120%	74%	60%	140%
Moisture Content	1028	7789216	6	7	15.4%	< 1									

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

Certified By:

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Method Summary

CLIENT NAME: IEG CONSULTANTS LTD

AGAT WORK ORDER: 16E128870

PROJECT: A04012A08

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	ORG-170-5110/5140/5430/5440	EPA SW-846 8260-S	GC/MS
Toluene	ORG-170-5110/5140/5430/5440	EPA SW-846 8260-S	GC/MS
Ethylbenzene	ORG-170-5110/5140/5430/5440	EPA SW-846 8260-S	GC/MS
Xylenes	ORG-170-5110/5140/5430/5440	EPA SW-846 8260-S	GC/MS
C6 - C10 (F1)	ORG-170-5110/5140/5430/5440	CCME Tier 1 Method-S L	GC/FID
C6 - C10 (F1 minus BTEX)	ORG-170-5110/5140/5430/5440	CCME Tier 1 Method-S L	GC/FID
C10 - C16 (F2)	ORG-170-5120/5300	CCME Tier 1 Method-S H	GC/FID
C16 - C34 (F3)	ORG-170-5120/5300	CCME Tier 1 Method-S H	GC/FID
C34 - C50 (F4)	ORG-170-5120/5300	CCME Tier 1 Method-S H	GC/FID
Gravimetric Heavy Hydrocarbons	ORG-170-5120/5300	CCME Tier 1 Method-S H	GC/FID
Moisture Content	LAB-175-4002	CCME Tier 1 Method-S %	GRAVIMETRIC
Toluene-d8 (BTEX)	ORG-170-5110/5140/5430/5440	EPA SW-846 8260-S	GC/MS
Ethylbenzene-d10 (BTEX)	ORG-170-5110/5140/5430/5440	EPA SW-846 8260-S	GC/MS
o-Terphenyl (F2-F4)	ORG-170-5120/5300	CCME Tier 1 Method-S H	GC/FID

AGAT Laboratories
2910 12 Street NE
Calgary, Alberta T2E 7P7
P: 403.735.2005 • F: 403.735.2771
webearth.agatlabs.com

Laboratory Use Only
Arrival Temperature: 1.5°C
AGAT Job Number: 16E128870
Date and Time:

Chain of Custody Record

Emergency Support Services Hotline 1-855-AGAT 245 (1-855-242-8245)

Report Information

Company: IEG
Contact: Konrad Ross
Address:
Phone: 403-542-9356 Fax:
LSD:
Client Project #: A04012A08

Invoice To

Same ☑ Yes ☐ No

Company:
Contact:
Address:
Phone: Fax:
PO/AFE#

Report Information

1. Name: Konrad Ross
Email: Kross@klohn.com
2. Name: Nicole Wills
Email: nwills@klohn.com
3. Name:
Email:

Report Format

☐ Single Sample per Page
☐ Multiple Samples per Page

Turnaround Time Required (TAT)

Regular TAT ☐ 5-7 Business Days
Rush TAT (Surcharge) ☑ Less than 24 Hours (200%) ☐ Less than 48 Hours (100%) ☐ Less than 72 Hours (50%)
Date Required:

Requirements (Selection may impact detection limits)

☐ CCME ☑ AB Tier 1 ☐ BC CSR
☐ Agricultural ☐ Agricultural ☐ AW
☐ Industrial ☐ Industrial ☐ IW
☐ Residential/ Park ☐ Residential/ Park ☐ LW
☐ Commercial ☐ Commercial ☐ DW
☐ Drinking Water ☐ Natural Area
☐ FWAL ☐ AB Surface Water
☐ Other:
☐ D50 (Drilling) ☐ SPIGEC ☐

LABORATORY USE (LAB ID#)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/ TIME SAMPLED	COMMENTS- SITE SAMPLE INFO, SAMPLE CONTAINMENT	# of CONTAINERS	Detailed Soil Salinity (Saturated Paste)	CCME BTEX/ F1-F4	Soil Metals: ☐ HWS-B ☐ Cr^{6+} ☐ Hg	Water Metals: ☐ Dissolved ☐ Total ☐ Hg ☐ Cr^{6+}	Routine Water Potability	AB Class 2 Landfill	BC Landfill	D50 Detailed Salinity (As Received)	Microtox	☐ BTEXS/VPH/EPH ☐ LEPH/HEPH	HOLD FOR 60 DAYS	PRESERVED	CONTAMINATED/ HAZARDOUS
7789216	GS16-231	Soil	August 18, 2016	Jars labled as KCB,	2		X											
225	GS16-234	Soil	August 18, 2016	please report as IEG	2		X											
226	GS16-235	Soil	August 18, 2016		2		X											
227	GS16-236	Soil	August 18, 2016		2		X											
228	GS16-237	Soil	August 18, 2016		2		X											
229	GS16-238	Soil	August 18, 2016		2		X											
230	GS16-239	Soil	August 18, 2016		2		X											
231	GS16-240	Soil	August 18, 2016		2		X											
232	GS16-241	Soil	August 18, 2016		2		X											
233	GS16-242	Soil	August 18, 2016		2		X											
234	GS16-243	Soil	August 18, 2016		2		X											
235	GS16-244	Soil	August 18, 2016		2		X											

16 AUG 20 1102

Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:
		Jason Trasmonte	20 Aug. 16 1102h
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:

Page 1 of 2
N°: AB

Document ID: DIV-50-1507.003

E 08910

16E128870

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Chain of Custody Record

Emergency Support Services Hotline 1-855-AGAT 245 (1-855-242-8245)

Report to:

Company: IEG

Same as COC#: 08910

LABORATORY USE (LAB ID#)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/ TIME SAMPLED	COMMENTS- SITE SAMPLE INFO, SAMPLE CONTAINMENT	# of CONTAINERS	Detailed Soil Salinity (Saturated Paste)	CCME BTEX/ F1-F4	Soil Metals: ☐ HWS-B ☐ Cr6+ ☐ Hg	Water Metals: ☐ Dissolved ☐ Total ☐ Hg ☐ Cr6+	Routine Water Potability	AB Class 2 Landfill	BC Landfill	D50 Detailed Salinity (As Received)	Microtox	☐ BTEXS/VPH/EPH ☐ LEPH/HEPH							HOLD FOR 60 DAYS	PRESERVED	CONTAMINATED/ HAZARDOUS
7789236	GS16-245	Soil	18-Aug-16		2		X																
237	GS16-246	Soil	18-Aug-16		2		X													IE ALG 20 11 02			
238	GS16-247	Soil	18-Aug-16		2		X																
239	GS16-248	Soil	18-Aug-16		2		X																
240	GS16-249	Soil	18-Aug-16		2		X																
241	GS16-250	Soil	18-Aug-16		2		X																
242	GS16-251	Soil	18-Aug-16		2		X																
243	GS16-252	Soil	18-Aug-16		2		X																
245	GS16-253	Soil	18-Aug-16		2		X																
246	GS16-254	Soil	18-Aug-16		2		X																
247	GS16-255	Soil	18-Aug-16		2		X																
252	GS16-256	Soil	18-Aug-16		2		X																
253	GS16-257	Soil	18-Aug-16		2		X																
254	Dup-22	Soil	18-Aug-16		2		X																
255	Dup-23	Soil	18-Aug-16		2		X																

Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:
		J. Tremonte	20 Aug. 2016 1102

Page 2 of 2

N°: AB

Document ID: DIV-50-1507.002

E 08911

16E128870

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Chain of Custody Record

Emergency Support Services Hotline 1-855-AGAT 245 (1-855-242-8245)

Report to:

Company: IEG Same as COC#: 08910

LABORATORY USE (LAB ID#)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/ TIME SAMPLED	COMMENTS- SITE SAMPLE INFO, SAMPLE CONTAINMENT	# of CONTAINERS	Detailed Soil Salinity (Saturated Paste)	CCME BTEX/ F1-F4	Soil Metals: ☐HWS-B ☐Cr6+ ☐Hg	Water Metals: ☐Dissolved ☐Total ☐Hg ☐Cr6+	Routine Water Potability	AB Class 2 Landfill	BC Landfill	D50 Detailed Salinity (As Received)	Microtox	☐BTEXS/VPH/EPH ☐LEPH/HEPH	HOLD FOR 60 DAYS	PRESERVED	CONTAMINATED/ HAZARDOUS
9276	GS16-232	Soil	18-Aug-16		2		X											
283	GS16-233	Soil	18-Aug-16		2		X											
284	GS16-258	Soil	18-Aug-16		2		X											
285	GS16-259	Soil	18-Aug-16		2		X											
286	GS16-260	Soil	18-Aug-16		2		X											
288	GS16-261	Soil	18-Aug-16		2		X											
289	GS16-262	Soil	18-Aug-16		2		X											
290	GS16-263	Soil	18-Aug-16		2		X											
291	GS16-264	Soil	18-Aug-16		2		X											
294	GS16-265	Soil	18-Aug-16		2		X											
295	GS16-266	Soil	18-Aug-16		2		X											
296	GS16-267	Soil	18-Aug-16		2		X											
297	GS16-268	Soil	18-Aug-16		2		X											
299	GS16-269	Soil	18-Aug-16		2		X											
300	GS16-270	Soil	18-Aug-16		2		X											
301	GS16-271	Soil	18-Aug-16		2		X											
302	GS16-272	Soil	18-Aug-16		2		X											
303	GS16-273	Soil	18-Aug-16		2		X											
304	GS16-274	Soil	18-Aug-16		2		X											
305	GS16-275	Soil	18-Aug-16		4		X											
306	GS16-276	Soil	18-Aug-16		2		X											
307	Dup-24	Soil	18-Aug-16		2		X											

18 AUG 20 1356

Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:

Sandra L [signature] 20 Aug 16

Page 2 of 2

Document ID: DIV-50-1507.002

E 08912

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM

RECEIVING BASICS - Shipping

Company/Consultant: IEG

Courier: Canadian North Cargo Prepaid Collect

Waybill# N/A

Branch [EDM] GP FN FM RD VAN LYD FSJ EST Other:____

If multiple sites were submitted at once: Yes (No)

Custody Seal Intact: Yes No (NA)

TAT: (<24hr) 24-48hr 48-72hr Reg Other_____

Cooler Quantity: 2

TIME SENSITIVE ISSUES - Shipping

ALREADY EXCEEDED HOLD TIME? Yes (No)

Inorganic Tests (Please Circle): Mibi , BOD , Nitrate/Nitrite , Turbidity , Microtox , Ortho PO4 , Tedlar Bag , Residual Chlorine , Chlorophyll* , Chloroamines*

Earliest Expiry: Aug. 25, 2016

Hydrocarbons: Earliest Expiry N/A

SAMPLE INTEGRITY - Shipping

Hazardous Samples: YES (NO) Precaution Taken:_____

Legal Samples: Yes (No)

International Samples: Yes (No)

Tape Sealed: Yes (No)

Coolant Used: Icepack Bagged Ice (Free Ice) Free Water None

Temperature (Bottles/Jars only) N/A if only Soil Bags Received

FROZEN (Please Circle if samples received Frozen)

1 (Bottle/(Jar)) -0.4 + -0.3 + -0.1 = -0.3 °C 2(Bottle/(Jar)) 5.0 + 3.8 + 1.0 = 3.3 °C

3 (Bottle/Jar)___+___+___=____°C 4 (Bottle/Jar)___+___+___=____°C

5 (Bottle/Jar)___+___+___=____°C 6 (Bottle/Jar)___+___+___=____°C

7 (Bottle/Jar)___+___+___=____°C 8 (Bottle/Jar)___+___+___=____°C

9 (Bottle/Jar)___+___+___=____°C 10 (Bottle/Jar)___+___+___=____°C

(If more than 10 coolers are received use another sheet of paper and attach) 1.5 °C

LOGISTICS USE ONLY

Workorder No: 16E128870

Samples Damaged: Yes (No) If YES why?

No Bubble Wrap Frozen Courier

Other: _____

Account Project Manager: _____ have they been notified of the above issues: Yes No

Whom spoken to: _____ Date/Time: _____

CPM Initial_____

General Comments: COC count incorrect for samples

GS16-275 → states 4 but received 2.

CS16-276 COC states 2 but received 4.

Noted in SIR.

* Subcontracted Analysis (See CPM)

Date issued: October 05, 2015
Document ID: SR-9505.003

CANADIAN NORTH CARGO

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ENVELOPE | GENERAL

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Consignee: AGAT LABORATORIES

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EDMONTON AB T6B3P9

403 542 9356

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NUMBER OF PIECES / NO. DE COLIS	WEIGHT / POIDS	REQUIRED DESCRIPTION OF CONTENTS / DESCRIPTION DU CONTENU REQUIS
2	56.9 KG	SOIL SAMPLES

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AGAT Laboratories

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CANADA T6B 3P9
TEL (780)395-2525
FAX (780)462-2490
http://www.agatlabs.com

CLIENT NAME: **IEG CONSULTANTS LTD**
500-2618 HOPEWELL PLACE NE
CALGARY, AB T1Y7J7
(403) 262-5505

ATTENTION TO: **Konrad Ross**

PROJECT: **A04012A08**

AGAT WORK ORDER: **16E131607**

SOIL ANALYSIS REVIEWED BY: **Shanna Mills, Inorganics Manager**

TRACE ORGANICS REVIEWED BY: **Ngoc (Ruby) Vu, Lab Technician**

DATE REPORTED: **Sep 03, 2016**

PAGES (INCLUDING COVER): **14**

VERSION*: **1**

Should you require any information regarding this analysis please contact your client services representative at (780) 395-2525

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

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Certificate of Analysis

AGAT WORK ORDER: 16E131607

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Landfill - Inorganics - Class II

DATE RECEIVED: 2016-08-27

DATE REPORTED: 2016-09-03

		SAMPLE DESCRIPTION:		GS16-295
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		8/22/2016
Parameter	Unit	G / S	RDL	7808878
pH (1:1 Water:Soil extraction)	pH Units	2.0-12.5		7.55
Free Liquid	Pos/Neg	Neg	N/A	Neg
Antimony - Leachate	mg/L	500	0.5	<0.5
Arsenic - Leachate	mg/L	5.00	0.5	<0.5
Barium - Leachate	mg/L	100	0.5	<0.5
Beryllium - Leachate	mg/L	5.0	0.5	<0.5
Boron - Leachate	mg/L	500	0.5	0.6
Cadmium - Leachate	mg/L	1.00	0.5	<0.5
Chromium - Leachate	mg/L	5.00	0.5	<0.5
Cobalt - Leachate	mg/L	100	0.5	<0.5
Copper - Leachate	mg/L	100	0.5	<0.5
Iron - Leachate	mg/L	1000	0.5	2.2
Lead - Leachate	mg/L	5.00	0.5	<0.5
Mercury - Leachate	mg/L	0.200	0.1	<0.1
Nickel - Leachate	mg/L	5.00	0.5	<0.5
Selenium - Leachate	mg/L	1.00	0.5	<0.5
Silver - Leachate	mg/L	5.00	0.5	<0.5
Thallium - Leachate	mg/L	5.00	0.5	<0.5
Uranium - Leachate	mg/L	2.00	0.5	<0.5
Vanadium - Leachate	mg/L	100	0.5	<0.5
Zinc - Leachate	mg/L	500	1	<1
Zirconium - Leachate	mg/L	500	0.5	<0.5

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Class 2 Landfill

7808878 Analysis based on "as received"

Certified By: gmills

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Certificate of Analysis

AGAT WORK ORDER: 16E131607

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Landfill - Organics - Class II

DATE RECEIVED: 2016-08-27

DATE REPORTED: 2016-09-03

		SAMPLE DESCRIPTION:		GS16-295
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		8/22/2016
Parameter	**Unit**	**G / S**	**RDL**	**7808878**
Flash point (Closed Cup)	Deg C	61.0 -		>100
Benzene - Leachable	mg/L	0.5	0.005	<0.005
Toluene - Leachable	mg/L	0.5	0.005	<0.005
Ethylbenzene - Leachable	mg/L	0.5	0.005	<0.005
Xylenes - Leachable	mg/L	0.5	0.005	<0.005
Surrogate	**Unit**	**Acceptable Limits**		
Toluene-d8 (BTEX)	%	50-150		96

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Class 2 Landfill

7808878 Flashpoint corrected to Sea Level.
Zero Headspace Extraction for Leachable BTEX.
Xylenes – Leachable is a calculated parameter. The calculated value is the sum of m&p-Xylenes - Leachable + o-Xylene – Leachable.

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 16E131607

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-08-27

DATE REPORTED: 2016-09-03

		SAMPLE DESCRIPTION:		GS16-277	GS16-278	GS16-279	GS16-280	GS16-281	GS16-282	GS16-283	GS16-284
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		8/22/2016	8/22/2016	8/22/2016	8/22/2016	8/22/2016	8/22/2016	8/22/2016	8/22/2016
Parameter	**Unit**	**G / S**	**RDL**	**7808860**	**7808861**	**7808862**	**7808863**	**7808864**	**7808865**	**7808866**	**7808867**
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	<0.05
Ethylbenzene	mg/kg		0.01	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	0.25	0.21	0.30	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	1320	3240	5140	1000	604	146	103	<10
C16 - C34 (F3)	mg/kg		10	890	1250	2410	731	544	192	65	46
C34 - C50 (F4)	mg/kg		10	15	33	34	21	23	19	18	14
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	12	7	11	10	10	8	8	7
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8 (BTEX)	%	50-150		98	99	98	104	100	99	99	100
Ethylbenzene-d10 (BTEX)	%	50-150		78	125	115	132	136	145	107	84
o-Terphenyl (F2-F4)	%	50-150		75	80	86	74	90	84	90	85

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 16E131607

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-08-27

DATE REPORTED: 2016-09-03

SAMPLE DESCRIPTION:				GS16-285	GS16-286	GS16-287	GS16-288	GS16-289	GS16-290	GS16-291	GS16-292
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				8/22/2016	8/22/2016	8/22/2016	8/22/2016	8/22/2016	8/22/2016	8/22/2016	8/22/2016
Parameter	**Unit**	**G / S**	**RDL**	**7808868**	**7808869**	**7808870**	**7808871**	**7808872**	**7808873**	**7808874**	**7808875**
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	0.11	<0.05	0.30	0.14	<0.05	<0.05	0.15	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	0.11	<0.05	<0.05	0.17	0.11
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	21	34	163	121	354	314	620	467
C16 - C34 (F3)	mg/kg		10	77	67	186	128	126	115	180	141
C34 - C50 (F4)	mg/kg		10	28	21	63	38	20	21	16	23
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	8	7	13	9	6	5	9	7
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8 (BTEX)	%	50-150		101	100	100	99	101	100	100	102
Ethylbenzene-d10 (BTEX)	%	50-150		139	122	132	131	137	149	145	120
o-Terphenyl (F2-F4)	%	50-150		90	91	81	79	82	78	77	81

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 16E131607

PROJECT: A04012A08

CLIENT NAME: IEG CONSULTANTS LTD

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2016-08-27

DATE REPORTED: 2016-09-03

		SAMPLE DESCRIPTION:		GS16-293	GS16-294
		SAMPLE TYPE:		Soil	Soil
		DATE SAMPLED:		8/22/2016	8/22/2016
Parameter	Unit	G / S	RDL	7808876	7808877
Benzene	mg/kg		0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10
C10 - C16 (F2)	mg/kg		10	63	78
C16 - C34 (F3)	mg/kg		10	70	58
C34 - C50 (F4)	mg/kg		10	22	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A
Moisture Content	%		1	6	6
Surrogate	**Unit**	**Acceptable Limits**			
Toluene-d8 (BTEX)	%	50-150		101	100
Ethylbenzene-d10 (BTEX)	%	50-150		133	89
o-Terphenyl (F2-F4)	%	50-150		89	83

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

7808860-7808877 Results are based on the dry weight of the sample.
The C6-C10 (F1) fraction is calculated using toluene response factor.
The C10 - C16 (F2), C16 - C34 (F3), and C34 - C50 (F4) fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons (F4g) are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
Total C6 - C50 results are corrected for BTEX and PAH contributions (if requested).
Quality control data is available upon request.
Assistance in the interpretation of data is available upon request.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
The chromatogram returned to baseline by the retention time of nC50.
Extraction and holding times were met for this sample.
C6 –C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX.
Xylenes is a calculated parameter. The calculated value is the sum of m&p-Xylenes + o-Xylene.

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Quality Assurance

CLIENT NAME: IEG CONSULTANTS LTD

AGAT WORK ORDER: 16E131607

PROJECT: A04012A08

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Soil Analysis

RPT Date: Sep 03, 2016			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Landfill - Inorganics - Class II															
pH (1:1 Water:Soil extraction)	242	7809564	10.31	10.39	0.8%	<	100%	90%	110%						
Free Liquid	242	7809564	Neg	Neg	0.0%	N/A									
Antimony - Leachate	243	7809564	<0.5	<0.5	NA	< 0.5	96%	80%	120%				98%	80%	120%
Arsenic - Leachate	243	7809564	<0.5	<0.5	NA	< 0.5	109%	80%	120%				102%	80%	120%
Barium - Leachate	243	7809564	2.7	2.9	5.7%	< 0.5	93%	80%	120%				104%	80%	120%
Beryllium - Leachate	243	7809564	<0.5	<0.5	NA	< 0.5	95%	80%	120%				107%	80%	120%
Boron - Leachate	243	7809564	0.7	1.1	NA	< 0.5	99%	80%	120%				103%	80%	120%
Cadmium - Leachate	243	7809564	<0.5	<0.5	NA	< 0.5	102%	80%	120%				104%	80%	120%
Chromium - Leachate	243	7809564	<0.5	<0.5	NA	< 0.5	97%	80%	120%				105%	80%	120%
Cobalt - Leachate	243	7809564	<0.5	<0.5	NA	< 0.5	97%	80%	120%				95%	80%	120%
Copper - Leachate	243	7809564	<0.5	<0.5	NA	< 0.5	94%	80%	120%				104%	80%	120%
Iron - Leachate	243	7809564	5.6	5.5	1.6%	< 0.5	104%	80%	120%				106%	80%	120%
Lead - Leachate	243	7809564	<0.5	<0.5	NA	< 0.5	102%	80%	120%				100%	80%	120%
Mercury - Leachate	243	7809564	<0.1	<0.1	NA	< 0.1	111%	80%	120%				106%	80%	120%
Nickel - Leachate	243	7809564	<0.5	<0.5	NA	< 0.5	102%	80%	120%				104%	80%	120%
Selenium - Leachate	243	7809564	<0.5	<0.5	NA	< 0.5	106%	80%	120%				107%	80%	120%
Silver - Leachate	243	7809564	<0.5	<0.5	NA	< 0.5	93%	80%	120%				91%	80%	120%
Thallium - Leachate	243	7809564	<0.5	<0.5	NA	< 0.5	99%	80%	120%				107%	80%	120%
Uranium - Leachate	243	7809564	<0.5	<0.5	NA	< 0.5	98%	80%	120%				96%	80%	120%
Vanadium - Leachate	243	7809564	<0.5	<0.5	NA	< 0.5	95%	80%	120%				105%	80%	120%
Zinc - Leachate	243	7809564	<1	<1	NA	< 1	105%	80%	120%				100%	80%	120%
Zirconium - Leachate	243	7809564	<0.5	<0.5	NA	< 0.5	107%	80%	120%				103%	80%	120%

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.
If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.

Certified By:

AGAT Laboratories

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Quality Assurance

CLIENT NAME: IEG CONSULTANTS LTD

AGAT WORK ORDER: 16E131607

PROJECT: A04012A08

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: Sep 03, 2016			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Landfill - Organics - Class II															
Flash point (Closed Cup)	1505	Butanol	39	40	2.5%	<	111%	80%	120%						
Benzene - Leachable	1402	7808859	< 0.005	< 0.005	NA	< 0.005	111%	80%	120%	118%	80%	120%	125%	70%	130%
Toluene - Leachable	1402	7808859	< 0.005	< 0.005	NA	< 0.005	96%	80%	120%	103%	80%	120%	103%	70%	130%
Ethylbenzene - Leachable	1402	7808859	< 0.005	< 0.005	NA	< 0.005	82%	80%	120%	82%	80%	120%	86%	70%	130%
Xylenes - Leachable	1402	7808859	< 0.005	< 0.005	NA	< 0.005	85%	80%	120%	90%	80%	120%	95%	60%	140%

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)															
Benzene	1030	7808862	< 0.005	< 0.005	NA	< 0.005	84%	80%	120%	116%	80%	120%	124%	60%	140%
Toluene	1030	7808862	< 0.05	< 0.05	NA	< 0.05	91%	80%	120%	114%	80%	120%	128%	60%	140%
Ethylbenzene	1030	7808862	< 0.01	< 0.01	NA	< 0.01	85%	80%	120%	120%	80%	120%	125%	60%	140%
Xylenes	1030	7808862	0.30	0.37	20.9%	< 0.05	88%	80%	120%	116%	80%	120%	127%	60%	140%
C6 - C10 (F1)	1030	7808862	< 10	< 10	NA	< 10	100%	80%	120%	93%	80%	120%	78%	60%	140%
C10 - C16 (F2)	932	7808862	5140	3950	26.2%	< 10	84%	80%	120%	105%	80%	120%	72%	60%	140%
C16 - C34 (F3)	932	7808862	2410	1850	26.3%	< 10	93%	80%	120%	90%	80%	120%	69%	60%	140%
C34 - C50 (F4)	932	7808862	34	28	NA	< 10	96%	80%	120%	98%	80%	120%	80%	60%	140%
Moisture Content	932	7808862	11	11	0.0%	< 1									

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

Certified By:

AGAT Laboratories

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Method Summary

CLIENT NAME: IEG CONSULTANTS LTD

AGAT WORK ORDER: 16E131607

PROJECT: A04012A08

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
pH (1:1 Water:Soil extraction)	INOR-171-6207	HENDERSHOT 2007	PH METER
Free Liquid	INOR-171-6012	EPA SW- 846-9095B	Paint Filter Test
Antimony - Leachate	INOR-171-6011, INOR-6201	In-House Leachate; EATON 2005	ICP/OES
Arsenic - Leachate	INOR-171-6011, INOR-6201	In-House Leachate; EATON 2005	ICP/OES
Barium - Leachate	INOR-171-6011, INOR-6201	In-House Leachate; EATON 2005	ICP/OES
Beryllium - Leachate	INOR-171-6011, INOR-6201	In-House Leachate; EATON 2005	ICP/OES
Boron - Leachate	INOR-171-6011, INOR-6201	In-House Leachate; EATON 2005	ICP/OES
Cadmium - Leachate	INOR-171-6011, INOR-6201	In-House Leachate; EATON 2005	ICP/OES
Chromium - Leachate	INOR-171-6011, INOR-6201	In-House Leachate; EATON 2005	ICP/OES
Cobalt - Leachate	INOR-171-6011, INOR-6201	In-House Leachate; EATON 2005	ICP/OES
Copper - Leachate	INOR-171-6011, INOR-6201	In-House Leachate; EATON 2005	ICP/OES
Iron - Leachate	INOR-171-6011, INOR-6201	In-House Leachate; EATON 2005	ICP/OES
Lead - Leachate	INOR-171-6011, INOR-6201	In-House Leachate; EATON 2005	ICP/OES
Mercury - Leachate	SOIL 0420; INST 0140	In-House Leachate; EATON 2005	ICP/OES
Nickel - Leachate	INOR-171-6011, INOR-6201	In-House Leachate; EATON 2005	ICP/OES
Selenium - Leachate	INOR-171-6011, INOR-6201	In-House Leachate; EATON 2005	ICP/OES
Silver - Leachate	INOR-171-6011, INOR-6201	In-House Leachate; EATON 2005	ICP/OES
Thallium - Leachate	INOR-171-6011, INOR-6201	In-House Leachate; EATON 2005	ICP/OES
Uranium - Leachate	INOR-171-6011, INOR-6201	In-House Leachate; EATON 2005	ICP/OES
Vanadium - Leachate	INOR-171-6011, INOR-6201	In-House Leachate;EATON 2005	ICP/OES
Zinc - Leachate	INOR-171-6011, INOR-6201	In-House Leachate; EATON 2005	ICP/OES
Zirconium - Leachate	INOR-171-6011, INOR-6201	In-House Leachate; EATON 2005	ICP/OES

AGAT Laboratories

6310 ROPER ROAD
EDMONTON, ALBERTA
CANADA T6B 3P9
TEL (780)395-2525
FAX (780)462-2490
http://www.agatlabs.com

Method Summary

CLIENT NAME: IEG CONSULTANTS LTD

AGAT WORK ORDER: 16E131607

PROJECT: A04012A08

ATTENTION TO: Konrad Ross

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Flash point (Closed Cup)	ORG-170-5210	ASTM D93-02A	PENSKY-MARTENS CLOSED CUP
Benzene - Leachable	ORG-170-5100/5430/5440	In-House Leachate	GC/MS
Toluene - Leachable	ORG-170-5100/5430/5440	In-House Leachate	GC/MS
Ethylbenzene - Leachable	ORG-170-5100/5430/5440	In-House Leachate	GC/MS
Xylenes - Leachable	ORG-170-5100/5430/5440	In-House Leachate	GC/MS
Toluene-d8 (BTEX)	ORG-170-5100/5430/5440	In-House Leachate	GC/MS
Benzene	ORG-170-5110/5140/5430/5440	EPA SW-846 8260-S	GC/MS
Toluene	ORG-170-5110/5140/5430/5440	EPA SW-846 8260-S	GC/MS
Ethylbenzene	ORG-170-5110/5140/5430/5440	EPA SW-846 8260-S	GC/MS
Xylenes	ORG-170-5110/5140/5430/5440	EPA SW-846 8260-S	GC/MS
C6 - C10 (F1)	ORG-170-5110/5140/5430/5440	CCME Tier 1 Method-S L	GC/FID
C6 - C10 (F1 minus BTEX)	ORG-170-5110/5140/5430/5440	CCME Tier 1 Method-S L	GC/FID
C10 - C16 (F2)	ORG-170-5120/5300	CCME Tier 1 Method-S H	GC/FID
C16 - C34 (F3)	ORG-170-5120/5300	CCME Tier 1 Method-S H	GC/FID
C34 - C50 (F4)	ORG-170-5120/5300	CCME Tier 1 Method-S H	GC/FID
Gravimetric Heavy Hydrocarbons	ORG-170-5120/5300	CCME Tier 1 Method-S H	GC/FID
Moisture Content	LAB-175-4002	CCME Tier 1 Method-S %	GRAVIMETRIC
Toluene-d8 (BTEX)	ORG-170-5110/5140/5430/5440	EPA SW-846 8260-S	GC/MS
Ethylbenzene-d10 (BTEX)	ORG-170-5110/5140/5430/5440	EPA SW-846 8260-S	GC/MS
o-Terphenyl (F2-F4)	ORG-170-5120/5300	CCME Tier 1 Method-S H	GC/FID

AGAT Laboratories
2910 12 Street NE
Calgary, Alberta T2E 7P7
P: 403.735.2005 • F: 403.735.2771
webearth.agatlabs.com

Laboratory Use Only
Arrival Temperature: 4.1°C
AGAT Job Number: 16E131607
Date and Time: '16 AUG 27 10:49

Chain of Custody Record

Emergency Support Services Hotline 1-855-AGAT 245 (1-855-242-8245)

Report Information

Company: IEG
Contact: Konrad Ross
Address: 2618 Hopewell Place NE
Calgary
Phone: 403-464-7677 Fax:
LSD:
Client Project #: A04012A08

Invoice To

Same ☑ Yes ☐ No

Company:
Contact:
Address:
Phone: Fax:
PO/AFE#

Report Information

1. Name: Konrad Ross
Email: Kross@klohn.com
2. Name: Nicole Wills
Email: nwills@klohn.com
3. Name:
Email:

Report Format

☐ Single Sample per Page
☐ Multiple Samples per Page

Turnaround Time Required (TAT)

Regular TAT ☑ 5-7 Business Days
Rush TAT (Surcharge) ☐ Less than 24 Hours (200%) ☐ Less than 48 Hours (100%) ☐ Less than 72 Hours (50%)
Date Required:

Requirements (Selection may impact detection limits)

☐ CCME ☑ AB Tier 1 ☐ BC CSR
☐ Agricultural ☐ Agricultural ☐ AW
☐ Industrial ☐ Industrial ☐ IW
☐ Residential/ Park ☐ Residential/ Park ☐ LW
☐ Commercial ☐ Commercial ☐ DW
☐ Drinking Water ☐ Natural Area
☐ FWAL ☐ AB Surface Water
☐ Other:
☐ D50 (Drilling) ☐ SPIGEC ☐

LABORATORY USE (LAB ID#)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/ TIME SAMPLED	COMMENTS- SITE SAMPLE INFO, SAMPLE CONTAINMENT	# of CONTAINERS	Detailed Soil Salinity (Saturated Paste)	CCME BTEX/ F1-F4	Soil Metals: ☐ HWS-B ☐ Cr^{6+} ☐ Hg	Water Metals: ☐ Dissolved ☐ Total ☐ Hg ☐ Cr^{6+}	Routine Water Potability	AB Class 2 Landfill	BC Landfill	D50 Detailed Salinity (As Received)	Microtox	☐ BTEXS/VPH/EPH ☐ LEPH/HEPH							HOLD FOR 60 DAYS	PRESERVED	CONTAMINATED/ HAZARDOUS
7808860	GS16-277	Soil	22-Aug-16		2		X																
861	GS16-278	Soil	22-Aug-16		2		X																
862	GS16-279	Soil	22-Aug-16		2		X																
863	GS16-280	Soil	22-Aug-16		2		X																
864	GS16-281	Soil	22-Aug-16		2		X																
865	GS16-282	Soil	22-Aug-16		2		X																
866	GS16-283	Soil	22-Aug-16		2		X																
867	GS16-284	Soil	22-Aug-16		2		X																
868	GS16-285	Soil	22-Aug-16		2		X																
869	GS16-286	Soil	22-Aug-16		2		X																
870	GS16-287	Soil	22-Aug-16		2		X																
871	GS16-288	Soil	22-Aug-16		2		X																

Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:
		Jason Trasmonte	27 Aug. 2016 1049H
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:
Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:

Page _ of _

Document ID: DIV-50-1507.003

E 08954

AGAT Laboratories
2910 12 Street NE
Calgary, Alberta T2E 7P7
P: 403.735.2005 ▪ F: 403.735.2771
webearth.agatlabs.com

Chain of Custody Record

Emergency Support Services Hotline 1-855-AGAT 245 (1-855-242-8245)

Report to:

Company: _____ Same as COC#: _____

LABORATORY USE (LAB ID#)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/ TIME SAMPLED	COMMENTS- SITE SAMPLE INFO, SAMPLE CONTAINMENT	# of CONTAINERS	Detailed Soil Salinity (Saturated Paste)	CCME BTEX/ F1-F4	Soil Metals: ☐ HWS-B ☐ Cr6+ ☐ Hg	Water Metals: ☐ Dissolved ☐ Total ☐ Hg ☐ Cr6+	Routine Water Potability	AB Class 2 Landfill	BC Landfill	D50 Detailed Salinity (As Received)	Microtox	☐ BTEXS/VPH/EPH ☐ LEPH/HEPH	Landfill analysis	HOLD FOR 60 DAYS	PRESERVED	CONTAMINATED/ HAZARDOUS
7808872	GS16-289	Soil	22-Aug-16		2		X												
873	GS16-290	Soil	22-Aug-16		2		X												
874	GS16-291	Soil	22-Aug-16		2		X												
875	GS16-292	Soil	22-Aug-16		2		X												
876	GS16-293	Soil	22-Aug-16		2		X												
877	GS16-294	Soil	22-Aug-16		2		X												
878	GS16-295	Soil	25-Aug-16		4											X			

Samples Relinquished By (Print Name and Sign):	Date/ Time:	Samples Relinquished By (Print Name and Sign):	Date/ Time:
		Jason Trasmonte	27 Aug. 2016 10:49

Page _____ of _____

Document ID: DIV-50-1507.002

E 08955

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM

RECEIVING BASICS - Shipping

Company/Consultant: IEG

Courier: Canadian North Cargo Prepaid Collect

Waybill# 518-YEV-7061-9555

Branch: (EDM) GP FN FM RD VAN LYD FSJ EST Other:____

If multiple sites were submitted at once: (Yes) No

Custody Seal Intact: Yes No (NA)

TAT: <24hr 24-48hr 48-72hr (Reg) Other_____

Cooler Quantity: 1

TIME SENSITIVE ISSUES - Shipping

ALREADY EXCEEDED HOLD TIME? Yes (No)

Inorganic Tests (Please Circle): Mibi , BOD , Nitrate/Nitrite , Turbidity , Microtox , Ortho PO4 , Tedlar Bag , Residual Chlorine , Chlorophyll* , Chloroamines*

Earliest Expiry: N/A

Hydrocarbons: Earliest Expiry Sept. 29, 2016

SAMPLE INTEGRITY - Shipping

Hazardous Samples: YES (NO) Precaution Taken:_____

Legal Samples: Yes (No)

International Samples: Yes (No)

Tape Sealed: Yes (No)

Coolant Used: Icepack Bagged Ice (Free Ice) Free Water None

Temperature (Bottles/Jars only) N/A if only Soil Bags Received

FROZEN (Please Circle if samples received Frozen)

1 (Bottle/Jar) (5.5+3.5+3.2=4.1 °C 2(Bottle/Jar)___+___+___=____ °C

3 (Bottle/Jar)___+___+___=____ °C 4 (Bottle/Jar)___+___+___=____ °C

5 (Bottle/Jar)___+___+___=____ °C 6 (Bottle/Jar)___+___+___=____ °C

7 (Bottle/Jar)___+___+___=____ °C 8 (Bottle/Jar)___+___+___=____ °C

9 (Bottle/Jar)___+___+___=____ °C 10 (Bottle/Jar)___+___+___=____ °C

(If more than 10 coolers are received use another sheet of paper and attach)

LOGISTICS USE ONLY

Workorder No: 16E131607

Samples Damaged: Yes (No) If YES why?

No Bubble Wrap Frozen Courier

Other: _____

Account Project Manager: _____ have they been notified of the above issues: Yes No

Whom spoken to: _____ Date/Time: _____

CPM Initial_____

General Comments: _____

* Subcontracted Analysis (See CPM)

Date issued: October 05, 2015
Document ID: SR-9505.003

518-YEV-7061-9555

SHIPPER'S NAME AND ADDRESS

Northwind Industries Inc.
146 Navy Rd.
PO Box 1130
Inuvik, NT X0E 0T0
Canada
Fred Bailey 867-777-2426
Registered

SHIPPER'S ACCOUNT NUMBER: NOR178CW

CONSIGNEE'S NAME AND ADDRESS

AGAT Laboratories Ltd
6310 Roper Road
Edmonton, AB T6B 3P9
Canada
403 542 9356 403-735-2745

CONSIGNEE'S ACCOUNT NUMBER: AGA100CW

NOT NEGOTIABLE

AIR WAYBILL

(AIR CONSIGNMENT NOTE)

Canadian North
101 3731 52 Ave E
Edmonton Int Arpt, AB T9E 0V4
Canada

GST #: R 892440629

Copies 1, 2 and 3 of this Air Waybill are originals and have the same validity.

It is agreed that the goods described herein are accepted in apparent good order and condition (except as noted) for carriage SUBJECT TO THE CONDITIONS OF CONTRACT ON THE REVERSE HEREOF. ALL GOODS MAY BE CARRIED BY ANY OTHER MEANS INCLUDING ROAD OR ANY OTHER CARRIER UNLESS SPECIFIC CONTRARY INSTRUCTIONS ARE GIVEN HEREON BY THE SHIPPER, AND THE SHIPPER AGREES THAT THE SHIPMENTS MAY BE CARRIED VIA INTERMEDIATE STOPPING PLACES WHICH THE CARRIER DEEMS APPROPRIATE. THE SHIPPER'S ATTENTION IS DRAWN TO THE NOTICE CONCERNING CARRIER'S LIMITATION OF LIABILITY. Shipper may increase such limitation of liability by declaring a higher value for carriage and paying a supplemental charge if required.

SIGNATURE | RECEIVED IN GOOD ORDER | PLACE | DATE/TIME

PRINTED NAME

ISSUING CARRIER'S AGENT NAME AND CITY

ALSO NOTIFY: NAME AND ADDRESS *(OPTIONAL ACCOUNTING INFORMATION)*

AGENT'S IATA CODE | ACCOUNT NO.

TO EXPEDITE MOVEMENT, SHIPMENT MAY BE DIVERTED TO MOTOR OR OTHER CARRIER UNLESS SHIPPER GIVES OTHER INSTRUCTIONS HEREON.

DOMESTIC LIABILITY:

AIRPORT OF DEPARTURE (ADDR OF FIRST CARRIER) AND REQUESTED ROUTING

Inuvik

ROUTING AND DESTINATION

TO	BY FIRST CARRIER	TO	BY	TO	BY
YEG	Canadian North				

CURRENCY	CHGS Code	WT/VAL PPD	WT/VAL COLL	OTHER PPD	OTHER COLL	DECLARED VALUE FOR CARRIAGE	DECLARED VALUE FOR CUSTOMS
CAD	PX	X		X		NVD	NCV

AIRPORT OF DESTINATION: Edmonton

FOR CARRIER USE ONLY: FLIGHT/DATE | FLIGHT/DATE

AMOUNT OF INSURANCE: NIL

INSURANCE - If carrier offers insurance, and such insurance is requested in accordance with the conditions thereof, indicate amount to be insured in figures in box marked "Amount of Insurance".

INSURANCE DECLINED INITIALS

HANDLING INFORMATION These commodities licensed by US for ultimate destination

HFPU
KEEP COOL

DUPLICATE COPY

GEN

NO. OF PIECES RCP	GROSS WEIGHT	kg/lb	RATE CLASS / COMMODITY ITEM NO.	CHARGEABLE WEIGHT	RATE / CHARGE	TOTAL	NATURE AND QUANTITY OF GOODS (INCL. DIMENSIONS OR VOLUME)
1	29	K	GCR 35	29	$3.62	104.98	Soil Samples DIMS 24x13x14IN (bulk)
1	29					104.98	

PREPAID	WEIGHT CHARGE	COLLECT	P-UP ZONE	PICKUP CHARGES	ORIGIN ADVANCE CHARGES	DESCRIPTION OF ORIGIN ADVANCE
104.98		0.00		0.00	0.00	

VALUATION CHARGE		DEL ZONE	DELIVERY CHARGES	DEST. ADVANCE CHARGES	DESCRIPTION OF DEST. ADVANCE
0.00	0.00		0.00	0.00	

TAX		OTHER CHARGES AND DESCRIPTION	ITEMS PREPAID	ITEMS COLLECT
6.82	0.00	31.50 Nav Canada, Fuel Surcharg		

TOTAL OTHER CHARGES DUE AGENT		Shipper certifies that the particulars on the face hereof are correct and that insofar as any part of the consignment contains dangerous goods, such part is properly described by name and is in proper condition for carriage by air according to the applicable Dangerous Goods Regulations.
0.00	0.00	
TOTAL OTHER CHARGES DUE CARRIER		**RE-WEIGH/DIMENSIONAL WEIGHT AND SHIPPER GUARANTEES ALL CHARGES SUBJECT TO RATE AUDIT**
31.50	0.00	
COD → CURRENCY: CAD	0.00	
TOTAL PREPAID	TOTAL COLLECT	PRINTED NAME _____ SIGNATURE _____
143.30	0.00	SIGNATURE OF SHIPPER ABOVE AND INITIAL APPLICABLE BOX BELOW. [X] THIS SHIPMENT DOES NOT CONTAIN DANGEROUS GOODS REGULATED IN AIR TRANSPORT. [ ] THIS SHIPMENT DOES CONTAIN DANGEROUS GOODS REGULATED IN AIR TRANSPORT.
CURRENCY CONVERSION RATES	TOTAL COLLECT IN DESTINATION CURRENCY	EXECUTED ON 8/25/2016 (Date) 12:48 (Time) at (Place) 995107 SIGNATURE OF ISSUING CARRIER OR ITS AGENT
FOR CARRIERS USE ONLY AT DESTINATION (ALL COLLECT CHARGES IN DESTINATION CURRENCY)	CHARGES AT DESTINATION	TOTAL COLLECT CHARGES

518-YEV-7061-9555