



Shell Canada Energy

Camp Farewell

Environmental Supervision for 2015 Decommissioning Program



April 9, 2015

Inuvialuit Water Board
PO Box 2531
Inuvik, NT
X0E 0T0

Ms. Mardy Semmler
Executive Director

Dear Ms. Semmler:

Camp Farewell
Environmental Supervision during 2014 Decommissioning Program

IEG Consultants Ltd., on behalf of Shell Canada Energy, is pleased to submit the Camp Farewell Environmental Supervision during 2014 Decommissioning Program Report to the Inuvialuit Water Board.

If you have any questions, please call the undersigned at (403) 730-6809.

Yours truly,
IEG CONSULTANTS LTD.

Nicole Wills, P.Ag.
Project Manager

NW

Shell Canada Energy

Camp Farewell

Environmental Supervision for 2015 Decommissioning Program

EXECUTIVE SUMMARY

Shell Canada Energy (Shell) retained IEG Consultants Ltd (IEG) to provide environmental supervision during a Decommissioning Program at Camp Farewell (Site) 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 Site is leased and under the stewardship of Shell since the early 1970's. Historically, the Site was utilized as a staging area for seismic and drilling operations. In addition, the Site was used for camp facilities and the storage of equipment and fuel. The Site is currently inactive. Currently one 93,000 L diesel fuel storage above ground storage tank (AST) remains in use and exists on-Site adjacent to the camp building.

Recent activities at the Site have been limited to those involved in the closure and decommissioning of the Site. Activities have included dismantling and removal of infrastructure, removal of stockpiled materials and consumables, remediation and assessment activities, and environmental monitoring work.

The field portion of the Decommissioning Program was conducted between August 7, 2014 and September 18, 2014.

Infrastructure and materials were decommissioned and removed strategically and required the use of equipment including a back hoe, bull dozer, skid steer, and loaders. Shed #2, Shed #3, and the camp building were disassembled. Materials that could be recycled such as metals were separated from debris and waste material, for shipment to appropriate facilities.

On August 13, 2014, two barges loaded with approximately 410 rig mats, three loaders, a hydro vac truck, and miscellaneous materials including office furniture, scrap metal, and piping, departed the Site for Hay River.

Additional barges arrived at Site in late August for transport of the remaining infrastructure and materials. Materials to be barged included scrap metal, cable wire, assorted hoses, assorted pieces of pipe, five gallon pails of nuts, bolts and screws, pieces of conduit, steel caps, pup joints, tarps, rolls of polyliner, absorbants, steel skis for sleighs, large drums of jet fuel and engine oil, and assorted chemicals in small quantities. Approximately 18 m³ of remaining waste soil from the 2014 remediation program was packed into soil bags or wooden crates and also loaded on the barge. The barges departed Site on September 18, 2014.

Rig mats and large pieces of metal were stacked on the barges while smaller materials were transported in 1 m by 1 m wooden crates or Seacans. Rig mats were placed down to avoid rutting and protect the river shore during the loading of the barges.

Wood materials containing no paint or contaminants were burned in a burn pit located on the southeast corner of the Site.

Remaining contents of the tank farm on-Site were transferred with a pump to a small portable AST. ASTs at the on-Site tank farm are currently empty.

As a result of the investigative sampling conducted on August 14, 2014, PHC parameters F2 and F3 were identified as contaminants in the dirt floor of Shed #1. Further investigation is recommended in this area during the 2015 Environmental Site Assessment (ESA).

As a component of barite, barium is not considered a significant contaminant. To confirm this conclusion, it is recommended that soil samples exceeding the applicable guideline for total barium during the 2015 ESA be further analyzed for extractable barium and true total barium by fusion. Analytical results for extractable barium and true total barium parameters should be compared to the Alberta Environment Soil Remediation Guidelines for Barite: Environmental Health and Human Health.

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1 INTRODUCTION

Shell Canada Energy (Shell) retained IEG Consultants Ltd. (IEG) to provide environmental supervision services during the 2014 Decommissioning Program at Camp Farewell (Site). Camp Farewell is 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 of environmental supervision services undertaken during the 2014 Decommissioning Program.

The 2014 Decommissioning Program entailed the dismantling and removal of the camp and two shed buildings; the packaging and removal of materials stored inside the buildings and on-Site; packaging and removal of waste material remaining from the 2013 Lagoon Remediation Program; the removal of contents in the tank farm to a small portable above ground storage tank (AST); transport of materials to appropriate facilities via barge; and, minor investigative soil sampling.

During the 2014 Decommissioning Program, Tervita was the prime contractor on-Site managing and directing the decommissioning, removal, and packaging of infrastructure and materials on-Site. Tervita also coordinated logistical and safety aspects of the 2014 Decommissioning Program. IEG provided environmental supervision and conducted minor investigative soil sampling.

The field portion of the Decommissioning Program was conducted between August 7, 2014 and September 18, 2014.

2 SCOPE OF WORK

IEG's objective during the 2014 Decommissioning Program was to provide environmental supervision during the decommissioning and removal of infrastructure and materials from Camp Farewell. IEG's scope of work included:

- document and photograph Site conditions and decommissioning activities;
- collect composite soil samples from remaining waste material that was stockpiled during the 2013 remediation program;
- collect investigative soil samples as required; and,
- provide a summary report of Site observations and activities in 2014.

3 SETTING

3.1 Site Setting and Current Conditions

The Site is located approximately 125 km northwest of Inuvik, Northwest Territories (NT) and approximately 135 km west of Tuktoyaktuk, NT. The Site lies within the Inuvialuit Settlement Region (ISR) on the northeast bank of Middle Channel in the Kendall Island Bird Sanctuary (KIBS) (Figure 1).

The Site consists of an approximately 6.5 hectare (ha) gravel pad, a gravel airstrip, and two access roads extending from the Middle Channel of the Mackenzie River to the gravel pad. The gravel pad is approximately 0.5 m to 0.7 m thick, and was constructed on a foam and fibre geomembrane which overlays native tundra. Existing infrastructure at Camp Farewell includes one storage shed, a 93,000 L fuel AST, and a decommissioned bermed and lined petroleum tank farm consisting of five ASTs.

Camp Farewell is surrounded by stable tundra vegetation including patches of alder (*Alnus sp.*) and willow (*Salix sp.*) (IEG, 2012a).

For a detailed Site description, refer to the report prepared by IEG for Shell entitled, “*Shell Camp Farewell Project Description, Decommissioning the Lagoon at Camp Farewell*”, dated May 2012.

3.2 Regional Setting

3.2.1 Climate

Camp Farewell is classified as having a high subarctic eco-climate, with very cold winters and generally cool summers. Mean daily temperatures range from -22.8°C in January to 19.5°C in July (Environment Canada, 2015).

Winter in this area is approximately six months long and there is a period of approximately two months when the sun does not rise above the horizon. During this period, very cold conditions prevail and may last for several weeks at a time. When temperatures reach such lows, the ability of the air to contain moisture is limited and very little precipitation falls. The mean annual precipitation is 241 mm (Environment Canada, 2015).

3.2.2 Physiography

Camp Farewell is within the Tuktoyaktuk Coastal Plain Ecoregion of the Southern Arctic Ecozone. This ecoregion covers the outer Mackenzie River Delta and Tuktoyaktuk Peninsula bordering the Beaufort Sea (ESWG, 1996).

There are two main landscape types within the Tuktoyaktuk Coastal Plain Ecoregion. One is composed of distinctive delta landforms at the mouth of the Mackenzie River. These include wetlands, active alluvial channels, and estuarine deposits. Characteristic wetlands, which cover 25 to 50 percent of the area, are lowland polygon fens of both the low and high centre varieties.

The second landscape type consists of the broadly rolling uplands. Discontinuous moraine deposits mantle much of the area, except near the coast where fine textured marine sediments cover the surface. Outwash aprons of crudely-sorted sand and gravel, and raised beach ridges along the shores of pre-glacial lakes, occur less frequently. The resulting undulating terrain is studded with many lakes and ponds (ESWG, 1996).

The region is underlain by continuous permafrost with high ice content, sometimes in the form of ice wedges and pingos.

3.2.3 Soils and Permafrost

Dominant soils of the Tuktoyaktuk Coastal Plain Ecoregion consist of Organic Turbic Cryosols developed on level to rolling organic, morainal, alluvial, fluvio-glacial, and marine deposits (ESWG, 1996). Typically these soils are underlain by a continuous layer of permafrost (greater than 90 percent permafrost). However, more recent data describes the outer Mackenzie River Delta and portions of Richards Island as being discontinuous permafrost with about 35 to 65 percent permafrost beneath the area (Heginbottom, 1998).

In the Mackenzie River Delta, permafrost thickness is generally less than 90 m thick, and contains deep unfrozen zones (taliks), which may extend to the base of the permafrost. The depth of the active layer generally ranges from 30 to 100 cm but is largely a function of ground surface insulation, vegetation cover, level of ground disturbance, and winter snow cover.

3.2.4 Vegetation

Permafrost detracts from soil productivity by chilling the soil and creating waterlogged conditions in the thawed active layer near the soil surface. Plant communities found in the vicinity of the project area are relatively simple and are dominated by a few species that are well adapted to poor soil (low nutrient) conditions and the harsh climate.

Vegetation grows on a veneer of unfrozen organic or granular substrate overlying the permafrost boundary.

Vegetation in the area is complex, and includes the following: delta shrub communities on active river terraces, sedge (*Carex sp.*) and cotton grass (*Eriophorum angustifolium*) communities in wet inactive areas, and patterned ground comprised of low centred polygons which typically develop in poorly drained conditions. Both standing and moving water are prominent features of the landscape.

3.2.5 Hydrology

The Mackenzie River Delta is a dynamic complex of lakes, islands, braided channels, and oxbows. The hydrological regime is the primary factor controlling vegetation and wildlife habitat in the area. It is an estuarine delta with poorly developed levees, formed largely from sediments transported by the Mackenzie River over the last 13,000 years. The southwest portion of the delta also receives sediment from the Peel River and Rat River. The major channels (East, Middle, and West) appear largely unchanged in the last century. The present delta is flat and dotted with numerous lakes, ponds, and river channels, but also contains land varying from stable forested areas to tidal flats (MRBC, 1981).

Ice covers the waters of the delta for approximately eight months of the year and can be up to 2.5 m thick in the main stem of the Mackenzie River. Ice break-up usually begins in late April to early May, and ice movement occurs before peak spring water levels. Water levels recede during late summer and into the fall. The basic hydrology of the Mackenzie River Delta is a complex interaction of aggrading and degrading forces, with spring break-up being the major hydrological event each year (MRBC, 1981).

4 BACKGROUND

4.1 Site 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 camp operated as a 60 to 70 person camp full time until 1978, after which it was in operation periodically until 1994. During full operation in the 1970's, infrastructure on-Site included: a single story accommodations building and a tank farm consisting of two 5,000 barrel (bbl) ASTs, one 3,000 bbl AST, and three 2,000 bbl ASTs. In the mid 1980's, the accommodations building was replaced with a smaller building, designed for approximately 32 people. Storage information included in previous WorleyParsons reports indicates the following fuel and materials have been stored on-Site: up to 6.8 million litres of fuel (including gasoline, diesel, and aviation fuel), building materials, drilling mats, piping, and drilling additives (including barite, Aqua Seal™, and caustic soda).

The Site was constructed on permafrost. During construction, a layer of polyurethane (either 50 mm foam or pads) was installed prior to laying down 0.45 m of compacted gravel, to act as a thermal barrier and prevent contamination of underlying soils and groundwater (WorleyParsons Komex, 2006). In 2006, WorleyParsons Komex conducted test pitting on-Site and encountered remnants of liner between approximately 0.38 and 0.62 metres below ground surface (m bgs) in some, but not all of the test pits. This suggests that while liner was used, the gravel pad extended beyond the liner. Sand and gravel comprised the pad fill material and extended between approximately 0.5 and 1 m bgs. Clay mineral additive (bentonite) appears to have been mixed with gravel as well to aid in compaction and adhesion of gravel throughout the Site (WorleyParsons, 2011).

4.1.1 Historical Site Operations

The Site has been utilized by many different corporations for different activities over the years; however, it has been maintained under the stewardship of Shell. Historically, the Site was utilized as a staging area for seismic and drilling operations. In addition, the Site was used for camp facilities and the storage of equipment and fuel.

Recent activities at the Site have been limited to those involved in the closure and decommissioning of the Site. Activities have included dismantling and removal of infrastructure, removal of stockpiled materials and consumables, remediation and assessment activities, and environmental monitoring work.

4.1.2 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. Canadian Marine Drilling (CanMar, a subsidiary of Dome Petroleum) was occupying Camp Farewell and was responsible for the two 5,000 bbl ASTs located in the tank farm. 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 (WorleyParsons, 2011).

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. Free fuel within the berm and camp area was collected and pumped into holding ASTs, while residual fuel was collected using sorbent pads. Fuel that spilled onto the frozen river was also collected using the sorbent pads. These pads were incinerated in a Sacke Portable Burner (WorleyParsons, 2011).

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

5 PREVIOUS ENVIRONMENTAL INVESTIGATIONS

Various ESA programs have been conducted at Camp Farewell. IEG has reviewed the available reports concerning ESA programs and provided summaries in 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.), 2012b. 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.), 2012b. 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.

6 DECOMMISSIONING PROGRAM LOGISTICS AND PROGRAM SUPERVISION

As part of the environmental supervision scope of work, IEG completed several tasks concerning logistics management and permitting for the 2014 Decommissioning Program. Each of these tasks is described in the following sections.

6.1 Permitting and Licensing

IEG obtained permits and licenses for several on-Site and off-Site activities prior to commencement of the 2014 Decommissioning Program. The following sections provide information on each permit or license. Copies of permits and licenses are provided in Appendix II.

6.1.1 Environmental Impact Screening Committee

Due to the non-intrusive nature of activities being conducted on-Site in 2014, a project description was not required by the Environmental Impact Screening Committee (EISC) and the project was deemed exempt from the EISC process. The exemption letter issued by the EISC is provided in Appendix III.

6.1.2 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 m³ per day from the McKenzie River to construct an ice road should remedial activities occur during winter months and to withdraw up to 50 m³ for operation of the on-Site camp. Water License N7L1-1834 was granted on July 18, 2012 for the withdrawal of 150 m³ per day for industrial undertakings and associated uses. The permit expires July 18, 2017.

6.1.3 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 permit during the Camp Farewell Remediation Program was issued on January 22, 2014 and expired on December 31, 2014.

6.2 Camp Mobilization/Demobilization

A barge camp was mobilized to the Site from Hay River, NT in July 2014 via the Mackenzie River, arriving at Camp Farewell in early August. The barge was anchored to bollards in the boat docking area at the Site (Figure 2). The barge comprised two levels, consisting of a kitchen and dining unit, a common lounge area, and sleeping accommodations. A fuel spill kit, generators, and a wastewater AST 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 approximately September 18, 2014 the barge camp was demobilized from the Site via the Mackenzie River.

7 DECOMMISSIONING PROGRAM METHODOLOGIES

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. IEG documented each of these activities as part of the environmental supervision program, and conducted a soil investigative sampling program. The following sections describe decommissioning activities supervised by IEG and the details of the sampling program. Photographs are provided in Appendix IV. A Site plan is shown on Figure 2.

7.1 Infrastructure Decommissioning and Removal

Decommissioning and removal of Site infrastructure and materials occurred from August 6, 2014 to September 18, 2014. Infrastructure and associated materials were decommissioned and removed strategically and required the use of equipment including a back hoe, bull dozer, skid steer, and loaders.

Shed #2, Shed #3, and the camp building were disassembled (Photographs 1 and 2). Materials that could be recycled such as metals were separated from 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.

On August 13, 2014, two barges loaded with approximately 410 rig mats, three loaders, a hydro vac truck, and miscellaneous materials including office furniture, scrap metal, and piping, departed the Site for Hay River (Photographs 3 and 4).

Additional barges arrived at Site in late August for transport of the remaining infrastructure and materials. Materials to be barged included scrap metal, cable wire, assorted hoses, assorted pieces of pipe, five gallon pails of nuts, bolts and screws, pieces of conduit, steel caps, pup joints, tarps, rolls of polyliner, absorbants, steel skis for sleighs, large drums of jet fuel and engine oil, and assorted chemicals in small quantities (Photographs 5 to 9). The barges departed Site September 18, 2014.

Rig mats and large pieces of metal were stacked on the barges while smaller materials were transported in 1 m by 1 m wooden crates or Seacans (Photographs 8 to 10). Rig mats were placed down to avoid rutting and protect the river shore during the loading of the barges (Photograph 11).

Throughout the Decommissioning Program, wood materials absent of paint and/or contaminants were burned in a burn pit located on the southeast corner of the Site (Figure 2; Photograph 12).

On August 17, 2014, remaining contents of the ASTs within the tank farm on-Site were transferred with a pump to a small portable AST (Photograph 13). ASTs at the on-Site tank farm are currently empty.

7.2 Waste Disposal

Approximately 18 m³ of remaining waste soil from the 2014 remediation program was packed into soil bags or wooden crates provided by Tervita. Each soil bag and wooden crate contained approximately 1 m³ of impacted soil. Soils bags and crates were packed carefully with the track hoe bucket and placed in the staging area on-Site located east of the shops.

The soil bags and crates were loaded onto a barge for transport to Hay River. The barges departed Site on September 18, 2014 but were unable to move south of Inuvik due to freezing conditions and remain docked at Inuvik until the river thaws in spring 2015. When the barges reach Hay River in the spring, the soil bags and crates will be transferred to trucks and further transported to Tervita Rainbow Lake Landfill (approximately 2,800 km from Camp Farewell).

Waste water generated at the barge camp was contained in a waste water holding AST and disposed at an approved facility by the barge operator. Domestic waste was contained in garbage bins on the barge and burned on-Site in an incinerator (Photograph 15). Domestic waste was produced at a rate of approximately three garbage bags per day according to the barge master.

7.3 Investigative Sampling

On August 14, 2014, two composite soil samples were collected from the dirt floor of Shed #1 to assess for contaminants (Photograph 14). The dirt floor of Shed #1 was compacted and the sampling device could only penetrate to a depth of approximately 0.1 m bgs. The composite soil samples consisted of soil collected from multiple areas of the shed floor with suspected impact, based on visual observations. The samples were submitted for analysis of detailed salinity, trace metals, PHC, and PAH parameter analysis.

On August 19, 2014 one composite ash sample was collected from the burn pit. The sample was submitted for analysis of landfill parameters.

Samples collected were placed directly into sterile plastic bags and glass containers equipped with Teflon-lined lids. Standard chain-of-custody protocol was followed for collected samples. 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.

Analytical results for the soil and ash samples are summarized in Tables 1, 2, and 3. Laboratory analytical reports are included in Appendix V. Values in the data summary tables that exceed applicable guidelines have been highlighted.

8 SOIL ASSESSMENT GUIDELINES

Guidelines for salinity, trace metals, PHC, and PAH parameters in soil are provided by the by the GNWT, *Environmental Guideline for Affected Site Remediation*, November 2003. The GNWT CSR defines the same land uses and soil textures as Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines (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 edge of the Site is 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; 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.

The following guideline was used to assess the suitability of the ash for landfill disposal:

- Alberta Environment Protection (AEP), 1995. Alberta Users Guide for Waste Managers.

8.1 Soil Quality

Based on the land use of the Site and the surrounding properties, benzene, toluene, ethylbenzene, xylenes (BTEX) and inorganic parameters (salinity and metals) in soil were compared to the coarse-textured soil guidelines found in the GNWT Environmental Guideline for Contaminated Site Remediation (November, 2003), where applicable. Barium, extractable barium, and true total barium results were compared to the AENV Soil Remediation Guidelines for Barite: Environmental Health and Human Health guidelines (AENV, 2009).

The analytical results for PHC fractions F1 (C₆-C₁₀), F2 (C₁₀-C₁₆), F3 (C₁₆-C₃₄) and F4 (C₃₄-C₅₀) were compared to the GNWT *Environmental Guideline for Contaminated Site Remediation* 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.

8.2 Background Soil Conditions

In 2001, two background soil samples were collected from locations 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 SAR (0.9 to 1.1), were reported within the regulatory guidelines for residential/parkland and industrial land uses for both locations. Concentrations of metals parameters were reported below applicable guidelines (WorleyParsons Komex, 2006).

In 2006, two background soil locations and two background groundwater locations were established and tested to the northeast of the Site, in areas not likely to have been affected by historical activities. Soil and groundwater background soil locations were advanced to 0.4 m bgs, to the depth of permafrost. Findings for the background locations indicated concentrations of hydrocarbons which were attributed to naturally occurring organic material. Salinity parameters EC, pH, and SAR reported values of 251 uS/cm, 6.7, and 0.6, respectively, within and/or below applicable guidelines (WorleyParsons Komex, 2006). Background chloride and sodium reported values of 15 mg/kg and 17 mg/kg, respectively. Concentrations for metals parameters were below applicable guidelines with the exception of selenium which measured 1.6 mg/kg.

9 SOIL INVESTIGATION ANALYTICAL PROGRAM

Two composite soil samples (GS14-004 and GS14-005) were collected during the Decommissioning Program. The soil samples were analyzed for one or more of the following parameters:

- detailed salinity including pH, EC, SAR, and various cations and anions;
- trace metals;
- BTEX and PHC fractions F1 to F4; and,
- PAHs.

One composite ash sample (GS14-005) was also collected during the Decommissioning Program. The same sample ID for the ash composite sample was used in error. The ash sample was analyzed for landfill analyses including:

- pH, leachable BTEX, flashpoint (°C), free liquid, and leachable metals (antimony, arsenic, barium, beryllium, boron, cadmium, chromium, cobalt, copper, iron, lead, mercury, nickel, selenium, silver, thallium, uranium, vanadium, zinc, and zirconium);

Samples were analyzed at AGAT Laboratories (AGAT) in Edmonton, Alberta. AGAT is registered with the Standards Council of Canada and the Canadian Association of Environmental Analytical Laboratories for environmental analyses. Comprehensive analytical reports are included in Appendix V.

9.1 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;
- cleaning and decontaminating any sampling tools and/or equipment prior to the collection of 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.

10 SOIL INVESTIGATION RESULTS

A total of two investigative soil samples (GS14-004 and GS14-005) were collected from the dirt floor of Shed #1. Soil analytical results are summarized in Tables 1 and 2. Results of the investigative soil sampling are provided below:

- 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 exceeded the applicable guideline (500 mg/kg) in both composite samples (measuring 3,501 mg/kg for sample GS14-004 and 1,700 mg/kg for sample GS14-005).
- The concentration of PHC parameter F2 (1,090 mg/kg) exceeded the applicable guideline (150 mg/kg) in composite sample GS14-005. Concentrations of PHC parameter F3 (3,850 mg/kg and 2,580 mg/kg) exceeded the applicable guideline (400 mg/kg) in composite soil samples GS14-004 and GS14-005.

One composite ash sample (GS14-005) was collected from the burn pit and submitted for analysis of landfill parameters. The same sample ID for the ash composite sample was used in error. Ash analytical results are summarized in Table 3.

- Parameters analyzed were reported below the applicable guidelines.

11 DISCUSSION

Concentrations of EC, SAR, sodium, and chloride exceeding the applicable guidelines reported in the composite soil samples are expected due to brackish water infiltration, overland flooding, and the close proximity to the source area (Middle Channel and the Beaufort Sea). Elevated concentrations of EC, SAR, and soluble salts were measured on-Site during previous investigations. It is likely that the salinity parameter exceedances measured during the soil investigative sampling program are naturally occurring rather than associated with historical Site operations.

Barium can be a major component of drilling fluid. Elevated concentrations of total barium were measured at the Site during the current and previous investigations, and the concentrations could result from barite (BaSO_4), a common weighting agent in drilling mud. Barite in soil has a very low mobility and has an inconsequential effect on barium bioavailability (AENV, 2009). As a component of barite, barium is not considered a significant contaminant.

12 CONCLUSIONS

Decommissioning activities occurred from August 6, 2014 to September 18, 2014. Infrastructure and materials were decommissioned and removed strategically and required the use of equipment including a back hoe, bull dozer, skid steer, and loaders.

Shed #2, Shed #3, and the camp building were disassembled. Materials that could be recycled such as metals were separated from 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.

Rig mats and large pieces of metal were stacked on the barges while smaller materials were transported in 1 m by 1 m wooden crates or Seacans. Rig mats were placed down to avoid rutting and protect the river shore during the loading of the barges.

Approximately 18 m³ of remaining waste soil from the 2013 remediation program was packed into soil bags or wooden crates for transport to Hay River via barge and further transport to Tervita Rainbow Lake Landfill via truck.

Throughout the Decommissioning Program, wood materials with no paint or contaminants were burned in a burn pit located on the southeast corner of the Site.

On August 17, 2014, remaining contents of the ASTs at the tank farm on-Site were transferred with a pump to a small portable AST. ASTs at the on-Site tank farm are currently empty.

As a result of the investigative sampling, PHC parameters F2 and F3 were identified as contaminants in the area of Shed #1. Further investigation is recommended in this area during the 2015 ESA.

As a component of barite, barium is not considered a significant contaminant. To confirm this conclusion, it is recommended that soil samples exceeding the applicable guideline for total barium during the 2015 ESA be further analyzed for extractable barium and true total barium by fusion. Analytical results for extractable barium and true total barium parameters should be compared to the Alberta Environment Soil Remediation Guidelines for Barite: Environmental Health and Human Health.

13 CLARIFICATIONS OF THIS REPORT

This report is an instrument of service of IEG Consultants Ltd. The report has been prepared for the exclusive use of the account of Shell Canada Energy. The material in it reflects IEG Consultant Ltd. best judgment in light of the information available to it at the time of preparation. The report's contents may not be relied upon by any other party without the express written permission of IEG Consultants Ltd. 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. In this report, IEG Consultants Ltd. has endeavored to comply with generally accepted practice common to the local area. IEG Consultants Ltd. makes no other warranty, express or implied.

The analyses, conclusions, and recommendations contained in this report are based on data derived from a limited number of test holes obtained from widely spaced subsurface explorations. The methods used indicate subsurface conditions only at the specific locations where samples were obtained or where in-situ tests would infer, only at the time they were obtained, and only to the depths penetrated. The samples and tests cannot be relied on to accurately reflect the nature and extent of strata variations that usually exist between sampling or testing locations.

IEG Consultants Ltd. cannot assume responsibility or liability for damages, decisions, and/or actions of Tervita during the 2014 Decommissioning Program.

IEG Consultants Ltd. cannot assume responsibility or liability for the adequacy of its recommendations when they are used in the field without IEG Consultants Ltd. being retained to direct field activities.

14 CLOSING

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

IEG CONSULTANTS LTD.



Nicole Wills, P. Ag.
Project Manager



Liza Flemming, RPG
Senior Environmental Scientist

APEGA Permit to Practice No. P09196

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TABLES

Table 1: Analytical Results for Detailed Salinity, Physical, and Trace Metals Parameters

GENERAL				DETAILED SALINITY									PHYSICAL			TRACE METALS																							
Location	Sample Designation	Sample Depth (m bgs)	Sample Date (yyyy-mm-dd)	pH (CaCl ₂ Extraction)	Electrical Conductivity, EC (dS/m)	Sodium Adsorption Ratio, SAR	Calcium	Magnesium	Sodium	Potassium	Chloride	Sulphate	Saturation Percentage	75 micron sieve	Grain Size	Boron	Chromium (Hexavalent)	Antimony	Arsenic	Barium (Total)	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Tin	Uranium	Vanadium	Zinc			
Units				-	dS/cm	-	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	-	-	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg		
GUIDELINES																																							
GNWT 2003	Residential/Parkland Area - Coarse Surface Soil			6 - 8	-	-	-	-	-	-	-	-	-	-	-	-	0.4	20	12	500	4	10.0	64	50	63	140	6.6	10	50	1	20	1	50	-	130	200			
SOIL DATA																																							
Shed #1 Floor	GS14-004	0.0 - 0.1	2014-08-14	6.80	0.95	3.07	74	12	52	10	38	107	48	-	-	3.2	<0.3	0.9	6.2	3,501	<0.5	<0.5	31.8	3.1	16.8	48	<0.5	3.3	14.5	<0.5	<0.5	<0.5	2.1	<0.5	18.2	93			
Shed #1 Floor	GS14-005	0.0 - 0.1	2014-08-14	6.15	0.85	1.31	93	22	26	11	22	106	49	-	-	3	<0.3	1.4	6.2	1,700	<0.5	<0.5	39.5	4.2	39	25.6	<0.5	3.6	19.5	<0.5	<0.5	<0.5	0.7	<0.5	18.2	99			

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.
 5. The same sample ID (GS14-005) for the 'Ash from burn pit' sample was used in error.

Table 2: Analytical Results for Petroleum Hydrocarbon and Polycyclic Aromatic Hydrocarbon Parameters

GENERAL				PETROLEUM HYDROCARBONS								POLYCYCLIC AROMATIC HYDROCARBONS																
Location	Sample Designation	Sample Depth (m bgs)	Sample Date (yyyy-mm-dd)	Benzene	Toluene	Ethylbenzene	Xylenes	F1	F2	F3	F4	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene		
Units				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	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	-	-	-	1	0.7	-	1	-	1	-	-	1	0.6	5	10		
SOILS DATA																												
Shed #1 Floor	GS14-004	0.0 - 0.1	2014-08-14	<0.005	<0.05	<0.01	<0.05	<10	1,090	3,850	513	<0.005	<0.005	0.03	<0.03	<0.03	<0.05	<0.05	<0.05	<0.05	<0.01	<0.02	<0.05	<0.005	0.02	0.21		
Shed #1 Floor	GS14-005	0.0 - 0.1	2014-08-14	<0.005	<0.05	<0.01	<0.05	<10	83	2,580	453	<0.005	<0.005	0.04	<0.03	<0.03	<0.05	<0.05	<0.05	<0.05	<0.01	<0.02	<0.05	<0.005	0.02	0.08		

- 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.
 5. The same sample ID (GS14-005) for the 'Ash from burn pit' sample was used in error.

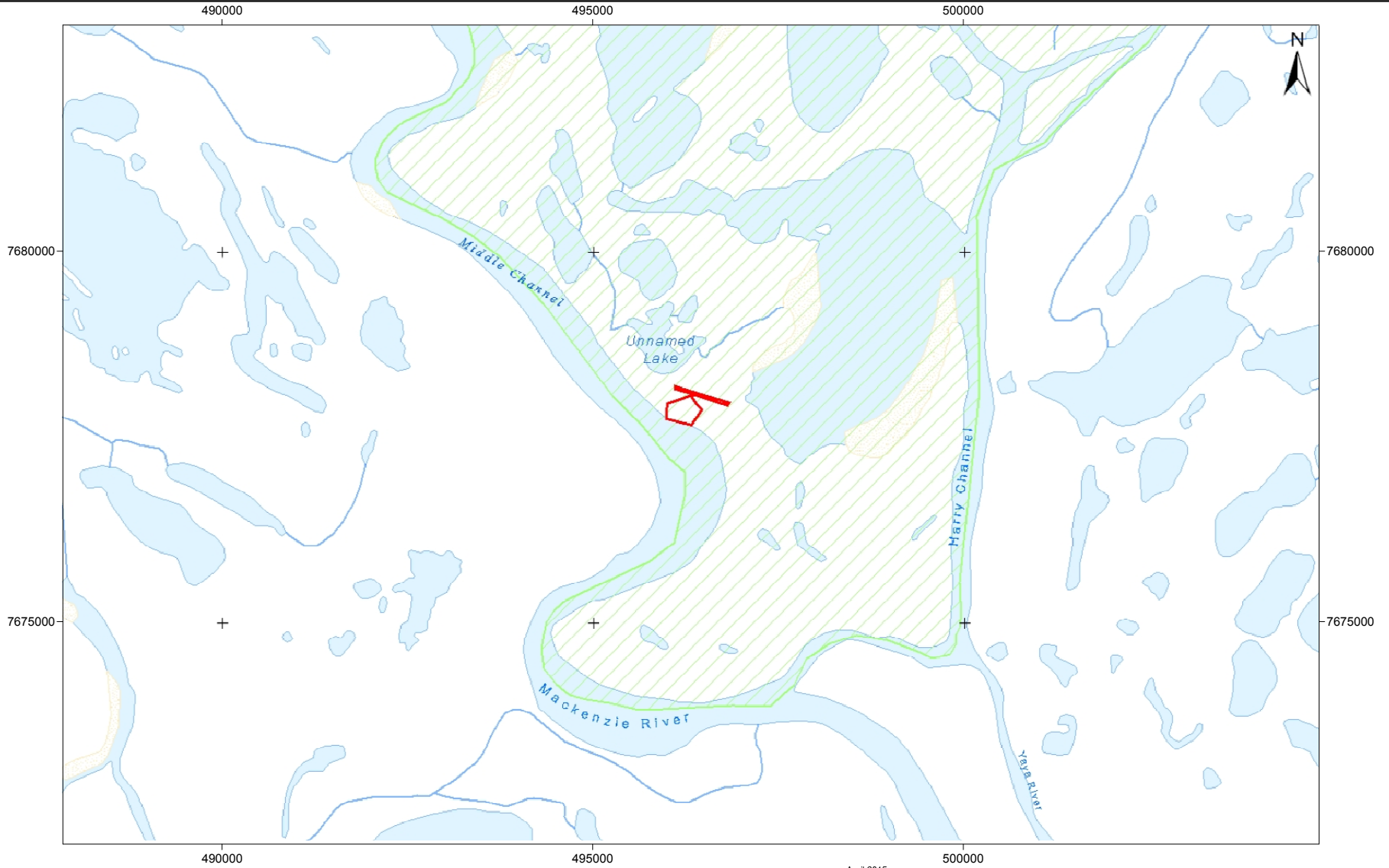
Table 3: Ash Analytical Results for Landfill Characterization

GENERAL				HAZARDOUS WASTE CRITERIA																										
Location	Sample Designation	Sample Depth (m bgs)	Sample Date (yyyy-mm-dd)	Leachable Benzene	Leachable Toluene	Leachable Ethylbenzene	Leachable Xylenes	Flashpoint (°C)	Free Liquid	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Uranium	Vanadium	Zinc	Zirconium	
Units				pH	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
GUIDELINES																														
AEP 1995 Hazardous Waste				2-12.5	0.5	0.5	0.5	0.5	>61	Neg	500	5	100	5.0	500	1.0	5	100	100	1000	5.0	0	5	1	5.0	5.0	2	100	500	500
SOIL DATA																														
Ash from burn pit	GS14-005	-	2014-08-19	10.61	0.005	<0.005	<0.005	<0.005	>100	Neg	<0.5	<0.5	0.6	<0.5	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3	<0.5



- Notes:
1. m bgs = metres below ground surface
 2. Current and/or applicable guidelines are bolded
 3. (yellow highlight) = Exceeds applicable guidelines
 3. View analytical report for more comprehensive results
 4. AEP 1995 Hazardous Waste = AEP (Alberta Environmental Protection), 1995. *Alberta Users Guide for Waste Managers*. March 1995.

FIGURES

Time: 15:02:18
 Date: 09/31/15
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Legend

-  Camp Farewell
-  Kendall Island Bird Sanctuary

NOT FOR CONSTRUCTION

NOTES

1. HORIZONTAL DATUM: NAD83
2. GRID ZONE: UTM ZONE 8N
3. IMAGE SOURCE: NTS map sheet 107C with permission of Her Majesty the Queen in Right of Canada

To be read with IEG Consultants Ltd. report dated April 2015

CLIENT



Shell Canada Energy



PROJECT

Camp Farewell 2014 Decommissioning Program

TITLE

Location of Camp Farewell

SCALE

~1:77,500

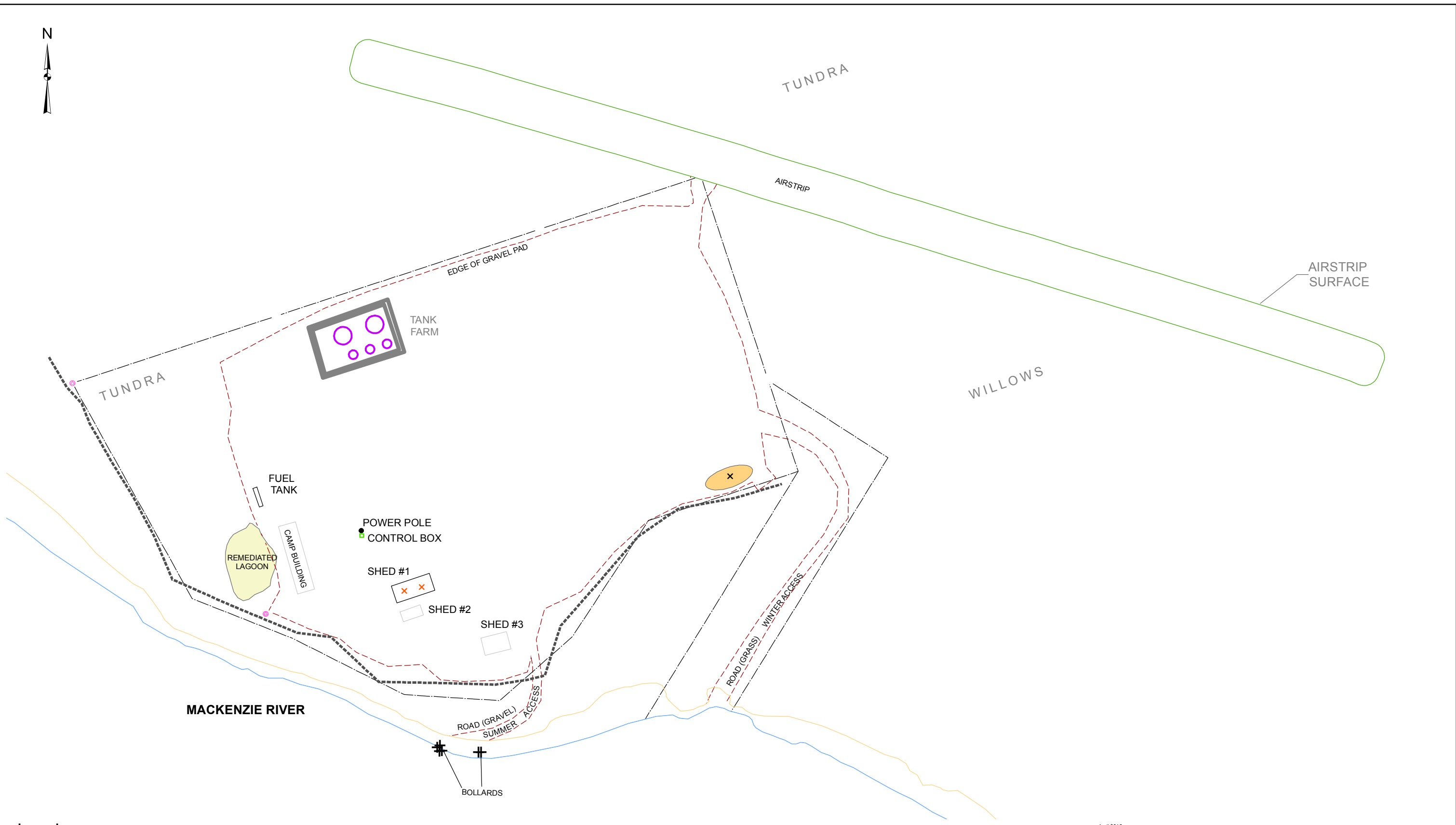
PROJECT No.

A04012A06

FIG. No.

1

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Legend	
	Aboveground Storage Tank
	Location of Ash Composite Sample
	Location of Soil Composite Sample
	Airstrip
	Removed infrastructure
	Burn Pit
	Boundary
	Edge of Gravel
	River
	Sand
	Top of Bank



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.

To be read with IEG Consultants Ltd. report dated April 2015

CLIENT

PROJECT Camp Farewell 2014 Decommissioning Program		
TITLE Camp Farewell Site Plan		
SCALE 1:2,500	PROJECT No. A04012A06	FIG No. 2

APPENDIX I

Previous Environmental Investigations

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 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

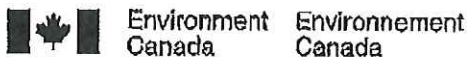
In 2013, IEG conducted a remediation program at the former lagoon at Camp Farewell. The lagoon excavation was located on the west side of the camp building with the Mackenzie River bordering the south and east sides. The dimensions of the excavation were approximately 52 m by 34 m. The maximum depth 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.

A total of 96 soil samples were taken 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 m³ 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 m³ remained on-site in a secured metal shed, to be barged to the landfill during 2014 decommissioning activities (IEG, 2014).

APPENDIX II

Permits and Licenses



Canadian Wildlife Service
Prairie and Northern Region
Box 2310, 5019 - 52 Street
Yellowknife NT X1A 2P7

DATE: January 22, 2014

FROM: Paul Latour
CWS

TO: Randall Warren,
Shell Canada,
Calgary, AB

Yellowknife, NT

TEL:

TEL: 867-669-4769

FAX: 403-269-7948

FAX: 867-873-8185

TOTAL # OF PAGES: 4

SUBJECT: EC/CWS Sanctuary Permit

MESSAGE:

Randall:

Attached is a Migratory Birds Sanctuary Permit for care and maintenance of the Camp Farewell staging site in the Kendall Island Bird Sanctuary. Please sign the Permittee line on the last page, then fax it back to me.

A handwritten signature in cursive script that reads "Paul".

Paul Latour

Canada



Environment
Canada

Environnement
Canada

**ENVIRONMENT CANADA
PERMIT**

Migratory Birds - Sanctuary

NWT-MBS-14-01

Permit for
Northwest Territories

Permit no.

province(s), territories

9
Issued under section

Randall Warren
Shell Canada Ltd.,
P.O. Box 100 Station "M"
Calgary, AB
T2P 2H5

Migratory Bird Sanctuary Regulations

Permittee

For the Minister

Date of issue: January 22, 2014

Date of expire: December 31, 2014

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



Environment
Canada

Environnement
Canada

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 nominees 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. The conditions of this permit apply to all employees, agents, contractors, volunteers, and visitors of the Permittee.
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.

Environment
CanadaEnvironnement
Canada

SPECIAL CONDITIONS

1. PROTECTION OF TERRESTRIAL HABITAT

1. The Permittee shall not conduct any activities in the Kendall Island Bird Sanctuary outside the Camp Farewell and Stockpile lease area.
2. The Permittee shall use portable ramps during loading or unloading ships or barges.
3. The Permittee shall not remove or relocate earth, except contaminated soils collected as part of a clean-up program.

3. PROTECTION OF AQUATIC HABITAT

1. The Permittee shall not place dirt or debris into streams to serve as ramps for loading or unloading ships or barges.
2. The Permittee shall not cut any bank of a waterbody.

2. WILDLIFE DISTURBANCE AND INTERACTION

1. The Permittee shall not feed wildlife or attempt to attract wildlife.
2. The Camp Farewell airstrip is not permitted to be used from 10 May – 20 June and 25 August – 30 September, except for emergencies.
3. Aircraft activity is restricted to flights necessary to carry out care and maintenance of the Camp Farewell and Stockpile lease area.
4. Aircraft shall maintain a minimum horizontal distance of 1.5 km from any observed concentrations of migratory birds.
5. The Permittee shall notify the Manager of any birds nesting on the infrastructure within the lease area.

3. FUEL STORAGE AND HANDLING

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

4. HAZARDOUS MATERIALS AND CONTAMINANTS – HANDLING AND DISPOSAL

1. The Permittee shall have the appropriate Workplace Hazardous Material Information System, 'Material Safety Data Sheets' identification available on site.
2. The Permittee shall remove and dispose of all hazardous materials at an approved facility.
3. The Permittee shall conduct maintenance, oil changes, refuelling and lubricating of mobile equipment no closer than 100 m from waterbodies (lakes, ponds and streams).

5. GARBAGE AND WASTE WATER HANDLING AND REMOVAL

1. The Permittee shall ensure that all domestic garbage and other wildlife attractants are inaccessible to wildlife at all times.
2. The Permittee shall regularly collect all waste, debris and domestic garbage and dispose of it using appropriate technology and accepted practices.
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.

Environment
CanadaEnvironnement
Canada

6. REPORTING

1. The Permittee shall submit a detailed report within thirty (30) days of the expiration date of this permit. The report shall include all activities that occurred at Camp Farewell during 2014, the number and species name of all wildlife observed, and other items of interest.

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.

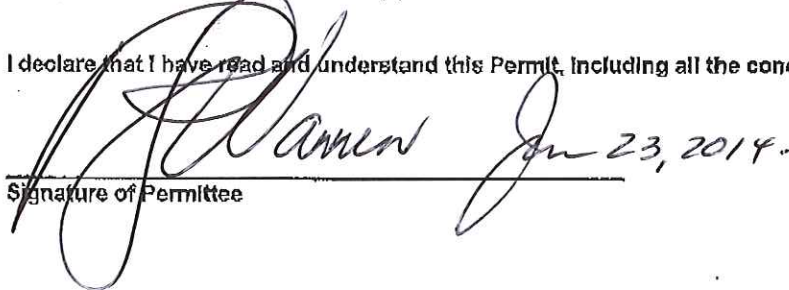
Waterbody: Any river, stream, creek, lake, or pond.

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):

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

Signature of Permittee


Jun 23, 2014.

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 placed 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:

[“Customer” can be used instead of “Applicant”]

[Company’s Name]

[Company’s Address]

BENEFICIARY:

RECEIVER GENERAL FOR CANADA
ON BEHALF OF THE MINISTER OF
INDIAN AFFAIRS AND NORTHERN
DEVELOPMENT
4923 – 52nd STREET, 2nd FLOOR
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 INITIAL 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)
400- 4 Avenue S.W., P.O. Box 100, Station M
of 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.
Longitude 135°06'04" W.
MACKENZIE RIVER DELTA, N.W.T

Purpose TO USE WATER AND DISPOSE OF WASTE
FOR INDUSTRIAL UNDERTAKINGS AND
ASSOCIATED USES

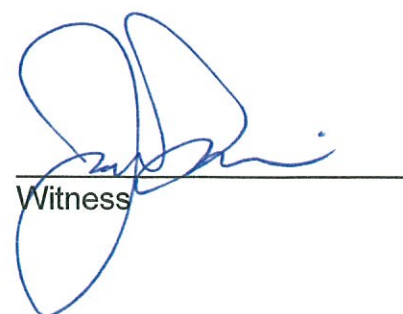
Description OIL AND GAS EXPLORATION
AND DEVELOPMENT

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.


Witness

NORTHWEST TERRITORIES WATER BOARD


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.

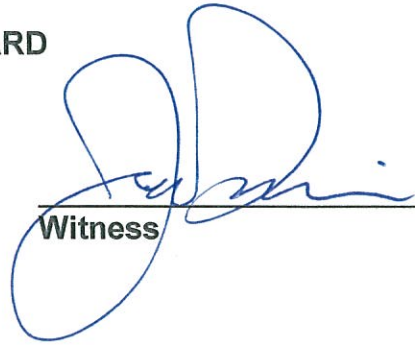
PART G: CONDITIONS APPLYING TO ABANDONMENT AND RESTORATION

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

<u>Station Number</u>	<u>Description</u>
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.

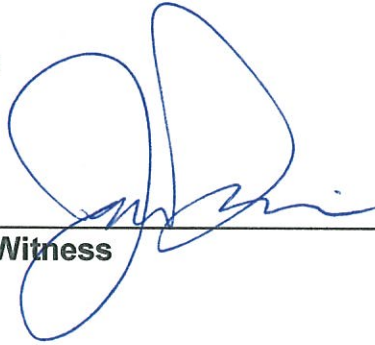
C. Reports

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

Environmental Impact Screening Committee Exemption Letter



ENVIRONMENTAL IMPACT SCREENING COMMITTEE

Submission Number: [01/12-01]

January 22, 2014

Randall Warren
Manager, DAR and Drilling Waste
Shell Canada Energy
400 – 4 Avenue SW
Calgary, AB T2P 2H5

Dear Mr. Warren:

RE: Shell Canada Energy, CWS Permit Application / Renewal

On January 30th, 2012 an EISC Decision Letter was issued for EISC Registry file 01/12-01. This Decision Letter was placed on the registry file as per EISC procedures.

At that time it was determined that your project, as described in the Project Summary Questionnaire for the file, was deemed exempt from the EISC process. It is noted here that this project is multi-year in scope, and that the nature of this project is unchanged. Therefore, the Decision Letter issued last year will be valid – for this project only – and for the life of this project only.

If there are questions or concerns re this letter, please contact me.

Sincerely,

Darrell Christie
EISC Coordinator

APPENDIX IV

Site Photographs



Photograph 1: Camp building in the process of decommissioning (August 19, 2014).



Photograph 2: Disassembly of Shed #2 (August 19, 2014).



Photograph 3: Barges loaded with rig mats, equipment, and scrap materials (August 13, 2014).



Photograph 4: Barges loaded with rig mats, equipment, and scrap materials (August 13, 2014).



Photograph 5: Large drums of jet fuel and engine oil and small quantities of chemicals (August 17, 2014).



Photograph 6: Scrap materials (August 18, 2014).



Photograph 7: Materials to be removed from Site (August 19, 2014).



Photograph 8: Materials to be removed from Site (August 19, 2014).



Photograph 9: Materials to be removed from Site (August 9, 2014).



Photograph 10: Wooden crates for transporting materials (August 19, 2014).



Photograph 11: Rig mats laid down on river shore for equipment to load barges (August 11, 2014).



Photograph 12: Burn pit (August 17, 2014).



Photograph 13: Transferring contents of large tank in tank farm to small portable tank (August 17, 2014).



Photograph 14: Dirt floor of Shed #1 where composite soil samples were collected (August 17, 2014).



**Photograph 15: Incinerator used to burn domestic waste produced by barge camp
(August 17, 2014).**

APPENDIX V

Laboratory Analytical Reports



**CLIENT NAME: IEG ENVIRONMENTAL (NORTH)
PO BOX 3178
INUVIK, NT X0E0T0
(403) 262-5505**

ATTENTION TO: Nicole Wills

PROJECT: A04012A06

AGAT WORK ORDER: 14E878992

SOIL ANALYSIS REVIEWED BY: Joydee Saez, Technical Reviewer

TRACE ORGANICS REVIEWED BY: Joydee Saez, Technical Reviewer

DATE REPORTED: Aug 21, 2014

PAGES (INCLUDING COVER): 6

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.



Certificate of Analysis

AGAT WORK ORDER: 14E878992

PROJECT: A04012A06

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

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

ATTENTION TO: Nicole Wills

SAMPLING SITE:

SAMPLED BY:

Landfill, Inorganics - Class II

DATE RECEIVED: 2014-08-21

DATE REPORTED: 2014-08-21

SAMPLE DESCRIPTION: GS14-005

SAMPLE TYPE: Soil

DATE SAMPLED: 8/19/2014

Parameter	Unit	G / S	RDL	5720197
pH (1:1 Water:Soil extraction)	pH Units	2.0-12.5		10.61
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	0.6
Beryllium - Leachate	mg/L	5.0	0.5	<0.5
Boron - Leachate	mg/L	500	0.5	1.2
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	<0.5
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	3
Zirconium - Leachate	mg/L		0.5	<0.5

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Class 2 Landfill
5720197 Analysis based on "as received"

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 14E878992

PROJECT: A04012A06

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

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

ATTENTION TO: Nicole Wills

SAMPLING SITE:

SAMPLED BY:

Landfill, Organics - Class II

DATE RECEIVED: 2014-08-21

DATE REPORTED: 2014-08-21

SAMPLE DESCRIPTION: GS14-005

SAMPLE TYPE: Soil

DATE SAMPLED: 8/19/2014

Parameter	Unit	G / S	RDL	5720197
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		100

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Class 2 Landfill
5720197 Flashpoint corrected to Sea Level.
 Zero Headspace Extraction for Leachable BTEX.

Certified By: _____

Quality Assurance

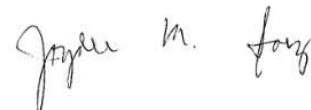
CLIENT NAME: IEG ENVIRONMENTAL (NORTH)
PROJECT: A04012A06
SAMPLING SITE:

AGAT WORK ORDER: 14E878992
ATTENTION TO: Nicole Wills
SAMPLED BY:

Soil Analysis															
RPT Date: Aug 21, 2014			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	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)	232	5712259	10.14	10.01	1.3%	<	100%	90%	110%						
Free Liquid	232	5712259	Neg	Neg	NA	N/A									
Antimony - Leachate	233	5712259	<0.5	<0.5	NA	< 0.5	91%	80%	120%			102%	80%	120%	
Arsenic - Leachate	233	5712259	<0.5	<0.5	NA	< 0.5	81%	80%	120%			100%	80%	120%	
Barium - Leachate	233	5712259	<0.5	<0.5	NA	< 0.5	90%	80%	120%			103%	80%	120%	
Beryllium - Leachate	233	5712259	<0.5	<0.5	NA	< 0.5	98%	80%	120%			105%	80%	120%	
Boron - Leachate	233	5712259	1.0	1.1	9.5%	< 0.5	102%	80%	120%			104%	80%	120%	
Cadmium - Leachate	233	5712259	<0.5	<0.5	NA	< 0.5	96%	80%	120%			100%	80%	120%	
Chromium - Leachate	233	5712259	<0.5	<0.5	NA	< 0.5	96%	80%	120%			105%	80%	120%	
Cobalt - Leachate	233	5712259	<0.5	<0.5	NA	< 0.5	97%	80%	120%			101%	80%	120%	
Copper - Leachate	233	5712259	<0.5	<0.5	NA	< 0.5	93%	80%	120%			109%	80%	120%	
Iron - Leachate	233	5712259	7.9	7.9	NA	< 0.5	97%	80%	120%			100%	80%	120%	
Lead - Leachate	233	5712259	<0.5	<0.5	NA	< 0.5	96%	80%	120%			100%	80%	120%	
Mercury - Leachate	233	5712259	<0.1	<0.1	NA	< 0.1	102%	80%	120%			105%	80%	120%	
Nickel - Leachate	233	5712259	<0.5	<0.5	NA	< 0.5	104%	80%	120%			108%	80%	120%	
Selenium - Leachate	233	5712259	<0.5	<0.5	NA	< 0.5	94%	80%	120%			108%	80%	120%	
Silver - Leachate	233	5712259	<0.5	<0.5	NA	< 0.5	110%	80%	120%			100%	80%	120%	
Thallium - Leachate	233	5712259	<0.5	<0.5	NA	< 0.5	93%	80%	120%			106%	80%	120%	
Uranium - Leachate	233	5712259	<0.5	<0.5	NA	< 0.5	97%	80%	120%			89%	80%	120%	
Vanadium - Leachate	233	5712259	<0.5	<0.5	NA	< 0.5	93%	80%	120%			106%	80%	120%	
Zinc - Leachate	233	5712259	<1	<1	NA	< 1	104%	80%	120%			103%	80%	120%	
Zirconium - Leachate	233	5712259	<0.5	<0.5	NA	< 0.5	100%	80%	120%			102%	80%	120%	

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

Certified By: _____



Quality Assurance

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)
PROJECT: A04012A06
SAMPLING SITE:

AGAT WORK ORDER: 14E878992
ATTENTION TO: Nicole Wills
SAMPLED BY:

Trace Organics Analysis

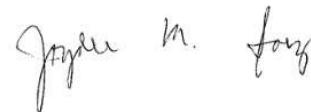
RPT Date: Aug 21, 2014			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits			Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper	Lower		Upper	Lower		Upper	

Landfill, Organics - Class II

Flash point (Closed Cup)	844	Butanol	39	39	0.0%	<	111%	80%	120%						
Benzene - Leachable	631	5712259	< 0.005	< 0.005	NA	< 0.005	95%	80%	120%	98%	80%	120%	96%	70%	130%
Toluene - Leachable	631	5712259	< 0.005	< 0.005	NA	< 0.005	91%	80%	120%	91%	80%	120%	93%	70%	130%
Ethylbenzene - Leachable	631	5712259	< 0.005	< 0.005	NA	< 0.005	98%	80%	120%	100%	80%	120%	104%	70%	130%
Xylenes - Leachable	631	5712259	< 0.005	< 0.005	NA	< 0.005	101%	80%	120%	98%	80%	120%	101%	60%	140%

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

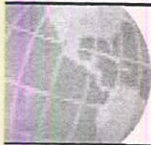
Certified By: _____



Method Summary

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)
AGAT WORK ORDER: 14E878992
PROJECT: A04012A06
ATTENTION TO: Nicole Wills
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-MS
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-MS
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
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



AGAT Laboratories

2910 12 Street NE
Calgary, Alberta
T2E 7P7
webearth.agatlabs.com

P: 403.735.2005 • F: 403.735.2771

Chain of Custody Record

Report Information

Company: IEG Consultants Ltd.
Contact: Nicole Wills
Address: 2618 Hopewell Place NE
Calgary, AB
Phone: 403-829-3048 Fax: _____
LSD: _____
Client Project #: A04012A06

Report Information

1. Name: Nicole Wills
Email: nwills@klohn.com
2. Name: _____
Email: _____
3. Name: _____
Email: 1

Report Format

Single Sample per Page
 Multiple Samples per Page

Laboratory Use Only

Arrival Temperature: NIA
AGAT Job Number: HE878992
Date and Time: _____

Turnaround Time Required (TAT)

Regular TAT 5 to 7 business days
Rush TAT Less than 24 hours
 24 to 48 hours
 48 to 72 hours

Date Required: _____

RUSH TAT REQUESTS UPON SELECTING A RUSH TAT, THE CLIENT ACCEPTS THAT A RUSH SURCHARGE WILL BE ADDED TO THE INVOICE. SEE BACK FOR SURCHARGE.

Invoice To Same Yes / No

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

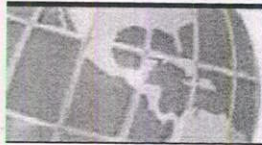
Requirements (Check one)

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
 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 <input type="checkbox"/> HWS-B <input type="checkbox"/> Cr ⁶ <input type="checkbox"/> Hg	Water Metals <input type="checkbox"/> Dissolved <input type="checkbox"/> Total <input type="checkbox"/> Hg	Routine Water Potability	AB Class 2 Landfill	BC Landfill	D50 Detailed Soil Salinity (As Received)	Microtox	BTEX/MPH/EPH <input type="checkbox"/> LEPH/HEPH <input type="checkbox"/>	P	HOLD FOR 60 DAYS	PRESERVED (Y/N)	CONTAMINATED/HAZARDOUS (Y/N)
5720197	GS14-005	Ash	August 19, 2014	Ash from burn pit	6						<input checked="" type="checkbox"/>							n	n

Samples Relinquished By (Print Name and Sign): Nicole Wills	Date/Time: Aug. 19, 2014 19:00	Samples Received By (Print Name and Sign): <i>Shelley Katelyn Wright</i>	Date/Time: 21 Aug 14 @ 1:56pm	Pink Copy - Client	Page 1 of 1 E 04893
Samples Relinquished By (Print Name and Sign):	Date/Time:	Samples Received By (Print Name and Sign):	Date/Time:	Yellow Copy - AGAT	
Samples Relinquished By (Print Name and Sign):	Date/Time:	Samples Received By (Print Name and Sign):	Date/Time:	White Copy - AGAT	



RECEIVING BASICS - Shipping

Company/Consultant: IEG Consultants
 Courier: Canadian North Prepaid Collect
 Waybill #: 518-YEN-6934-4472
 Branch: EDM GP FN FM RD VAN LYD FSJ EST Other: _____
 Custody Seal Intact: Yes No NA
 TAT: <24hr 24-48hr 48-72hr Reg Other _____
 Cooler Quantity: 1

TIME SENSITIVE ISSUES - Shipping

Earliest Date Sampled: 19 Aug 14 ALREADY EXCEEDED? Yes No
 MIBI/Time Sensitive Test*: _____ Expiry: _____
 Hydrocarbon Test: _____ Expiry: _____
 Are samples received more than 5 days after sampling: Yes No
 *Residual Chlorine, DO, Turbidity, BOD, Nitrate/Nitrite, Microtox

Temperature (to be recorded from bottles/jars only)

N/A - Only Soil Bags Received

(1) (Bottle/Jar) 1 + + = _____ °C (2) (Bottle/Jar) _____ + + = _____ °C
 (3) (Bottle/Jar) _____ + + = _____ °C (4) (Bottle/Jar) _____ + + = _____ °C
 (5) (Bottle/Jar) _____ + + = _____ °C (6) (Bottle/Jar) _____ + + = _____ °C

(If more than 6 coolers are received use another sheet of paper and attach)

SAMPLE INTEGRITY - Shipping

Hazardous Samples: Why Hazardous: _____
 Precaution taken: _____
 Legal Samples: Yes No
 International Samples: Yes No Tape Sealed: Yes No
 Coolant used: Icepack Bagged Ice Free Ice Free Water None

LOGISTICS USE ONLY

Workorder No: 14E878992
 Samples Damaged: Yes No YES why?
 No Bubble Wrap Frozen Courier
 Other: _____
 Correct Sample Requirements for Testing
 Correct Bottles: Yes No Correct Amount: Yes No
 Correct Labels: Yes No
 If NO to any of the above, explain why: _____
 Visible Sediment in Waters: Yes No
 Additional Integrity Issues or concerns:

 Account Project Manager: _____ have they been notified of the above issues: Yes No
 Whom spoken to: _____ Date/Time: _____
 CPM Initial _____

518|YEV|6934-4472

518-YEV-6934-4472

SHIPPER'S NAME AND ADDRESS Nicole Wills IEG Consultants C/O EGT Inuvik, NT 403 829 3048 P# A04012A06 RSTSJV7564706		SHIPPER'S ACCOUNT NUMBER		NOT NEGOTIABLE AIR WAYBILL (AIR CONSIGNMENT NOTE) Canadian North 101 3731 52 Ave E Edmonton International Airport, Canada GST #: R 892440629 Copies 1, 2 and 3 of this Air Waybill are originals and have the same validity.	
CONSIGNEE'S NAME AND ADDRESS AGAT Laboratories Ltd 6310 Roper Road Edmonton, AB T6B 3P9 Canada 780 243 8889 Alvelyn Pasco		CONSIGNEE'S ACCOUNT NUMBER AGAL00CW		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.	
ISSUING CARRIER'S AGENT NAME AND CITY		SIGNATURE		RECEIVED IN GOOD ORDER	PLACE DATE/TIME
AGENT'S IATA CODE		ACCOUNT NO.		PRINTED NAME	
AIRPORT OF DEPARTURE (ADDR OF FIRST CARRIER) AND REQUESTED ROUTING Inuvik		ALSO NOTIFY: NAME AND ADDRESS (OPTIONAL ACCOUNTING INFORMATION) Acc. #: AGAL00CW AGAT Laboratories Ltd 6310 Roper Road Edmonton, AB T6B 3P9 Canada		TO EXPEDITE MOVEMENT, SHIPMENT MAY BE DIVERTED TO MOTOR OR OTHER CARRIER UNLESS SHIPPER GIVES OTHER INSTRUCTIONS HERE	
ROUTING AND DESTINATION		DECLARED VALUE FOR CARRIAGE		DECLARED VALUE FOR CUSTOMS	
TO	BY FIRST CARRIER	TO	BY	TO	BY
YEG	Canadian North				
AIRPORT OF DESTINATION Edmonton		FOR CARRIER USE ONLY FLIGHT/DATE 445/20 AU		CURRENCY CAD	CHGS Code 3RD
HANDLING INFORMATION These commodities licensed by US for ultimate destination HFPU		AMOUNT OF INSURANCE		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 N/A	

DUPLICATE COPY

NO. OF PIECES RCP	GROSS WEIGHT lb	RATE CLASS COMMODITY ITEM NO.	CHARGEABLE WEIGHT	RATE / CHARGE	TOTAL	NATURE AND QUANTITY OF GOODS (INCL. DIMENSIONS OR VOLUME)	
3	26		27	\$6.64	179.28	Soil Samples / Elect DIMS 24x20x20IN (bulk)	
3	26				179.28		
PREPAID		WEIGHT CHARGE		COLLECT		P-UP ZONE	
0.00		179.28				PICKUP CHARGES	
						ORIGIN ADVANCE CHARGES	
						0.00	
VALUATION CHARGE		DEL ZONE		DELIVERY CHARGES		DEST. ADVANCE CHARGES	
0.00		0.00		0.00		0.00	
TAX		OTHER CHARGES AND DESCRIPTION				ITEMS PREPAID	ITEMS COLLECT
0.00		59.16 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		59.16					
COD →		CURRENCY					
		0.00					
TOTAL PREPAID		TOTAL COLLECT		PRINTED NAME			
0.00		250.36		SIGNATURE OF SHIPPER ABOVE AND INITIAL APPLICABLE BOX BELOW.			
CURRENCY CONVERSION RATES		TOTAL COLLECT IN DESTINATION CURRENCY		<input checked="" type="checkbox"/> THIS SHIPMENT DOES NOT CONTAIN DANGEROUS GOODS REGULATED IN AIR TRANSPORT.		<input type="checkbox"/> THIS SHIPMENT DOES CONTAIN DANGEROUS GOODS REGULATED IN AIR TRANSPORT.	
				EXECUTED ON		SIGNATURE OF ISSUING CARRIER OR ITS AGENT	
				8/20/2014 10:26		992091	
FOR CARRIERS USE ONLY AT DESTINATION		CHARGES AT DESTINATION		TOTAL COLLECT CHARGES			

518-YEV-6934-4472



CLIENT NAME: IEG ENVIRONMENTAL (NORTH)
PO BOX 3178
INUVIK, NT X0E0T0
(403) 262-5505

ATTENTION TO: Nicole Wills

PROJECT: Camp Farewell Decommissioning Program / A04012A06

AGAT WORK ORDER: 14E878257

SOIL ANALYSIS REVIEWED BY: Jarrod Roberts, Operations Manager

TRACE ORGANICS REVIEWED BY: Jarrod Roberts, Operations Manager

DATE REPORTED: Aug 28, 2014

PAGES (INCLUDING COVER): 10

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.



Certificate of Analysis

AGAT WORK ORDER: 14E878257

PROJECT: Camp Farewell Decommissioning Program / A04012A06

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

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

ATTENTION TO: Nicole Wills

SAMPLING SITE:

SAMPLED BY:

CCME / Alberta Tier 1 Metals + Hg + HWS B + Cr6 (soil)

DATE RECEIVED: 2014-08-20

DATE REPORTED: 2014-08-28

Parameter	Unit	SAMPLE DESCRIPTION:		GS14-004	GS14-005
		SAMPLE TYPE:		(0-0.1m)	(0-0.1m)
		DATE SAMPLED:		Soil	Soil
		G / S	RDL	8/14/2014	8/14/2014
		5712772	5712777		
Antimony	mg/kg	20	0.5	0.9	1.4
Arsenic	mg/kg	17	0.5	6.2	6.2
Barium	mg/kg	750	0.5	3501	1700
Beryllium	mg/kg	5	0.5	<0.5	<0.5
Boron (Hot Water Extr.)	mg/kg	2	0.5	3.2	3.0
Cadmium	mg/kg	1.4	0.5	<0.5	<0.5
Chromium	mg/kg	64	0.5	31.8	39.5
Chromium, Hexavalent	mg/kg	0.4	0.3	<0.3	<0.3
Cobalt	mg/kg	20	0.5	3.1	4.2
Copper	mg/kg	63	0.5	16.8	39.0
Lead	mg/kg	70	0.5	48.0	25.6
Mercury	mg/kg	6.6	0.5	<0.5	<0.5
Molybdenum	mg/kg	4	0.5	3.3	3.6
Nickel	mg/kg	50	0.5	14.5	19.5
Selenium	mg/kg	1	0.5	<0.5	<0.5
Silver	mg/kg	20	0.5	<0.5	<0.5
Thallium	mg/kg	1	0.5	<0.5	<0.5
Tin	mg/kg	5	0.5	2.1	0.7
Uranium	mg/kg	23	0.5	<0.5	<0.5
Vanadium	mg/kg	130	0.5	18.2	18.2
Zinc	mg/kg	200	1	93	99

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ABTier1 Soil (Ag, F)
5712772-5712777 Results are based on the dry weight of the sample.
Value verified with repeat analysis.

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 14E878257

PROJECT: Camp Farewell Decommissioning Program / A04012A06

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

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

ATTENTION TO: Nicole Wills

SAMPLING SITE:

SAMPLED BY:

Soil Analysis - Salinity (AB Tier 1 - pH Calcium Chloride)

DATE RECEIVED: 2014-08-20

DATE REPORTED: 2014-08-28

Parameter	Unit	SAMPLE DESCRIPTION:		GS14-004	GS14-005
		G / S	RDL	(0-0.1m)	(0-0.1m)
				Soil	Soil
				8/14/2014	8/14/2014
				5712772	5712777
pH (CaCl ₂ Extraction)	pH Units		0.02	6.80	6.15
Electrical Conductivity (Sat. Paste)	dS/m		0.01	0.95	0.85
Sodium Adsorption Ratio	N/A			3.07	1.31
Saturation Percentage	%		1	48	49
Chloride, Soluble	mg/L		5	80	45
Calcium, Soluble	mg/L		1	74	93
Potassium, Soluble	mg/L		2	20	22
Magnesium, Soluble	mg/L		2	12	22
Sodium, Soluble	mg/L		2	108	54
Sulfate, Soluble	mg/L		2	223	216
Calcium, Soluble (meq/L)	meq/L		0.05	3.69	4.64
Calcium, Soluble (mg/kg)	mg/kg		1	36	46
Chloride, Soluble (meq/L)	meq/L		0.06	2.26	1.27
Chloride, Soluble (mg/kg)	mg/kg		2	38	22
Magnesium, Soluble (meq/L)	meq/L		0.08	0.99	1.81
Magnesium, Soluble (mg/kg)	mg/kg		1	6	11
Potassium, Soluble (meq/L)	meq/L		0.05	0.51	0.56
Potassium, Soluble (mg/kg)	mg/kg		2	10	11
Sodium, Soluble (meq/L)	meq/L		0.09	4.70	2.35
Sodium, Soluble (mg/kg)	mg/kg		2	52	26
Sulfur (as Sulfate), Soluble (meq/L)	meq/L		0.04	4.64	4.50
Sulfur (as Sulfate), Soluble (mg/kg)	mg/kg		2	107	106
Theoretical Gypsum Requirement	tonnes/ha		0.01	<0.01	<0.01

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
5712772-5712777 If sodium results in mg/L are less than detection, SAR is non-calculable and is reported as 0.

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 14E878257

PROJECT: Camp Farewell Decommissioning Program / A04012A06

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

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

ATTENTION TO: Nicole Wills

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2014-08-20

DATE REPORTED: 2014-08-28

Parameter	Unit	SAMPLE DESCRIPTION:		GS14-004	GS14-005
		G / S	RDL	(0-0.1m)	(0-0.1m)
				Soil	Soil
				8/14/2014	8/14/2014
				5712772	5712777
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	1090	83
C16 - C34 (F3)	mg/kg		10	3850	2580
C34 - C50 (F4)	mg/kg		10	513	453
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A
Moisture Content	%		1	19	85
Surrogate	Unit	Acceptable Limits			
Toluene-d8 (BTEX)	%		50-150	105	106
Ethylbenzene-d10 (BTEX)	%		50-150	112	120
o-Terphenyl (F2-F4)	%		50-150	111	120

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ABTier1 (Ag,F)

5712772-5712777 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.

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 14E878257

PROJECT: Camp Farewell Decommissioning Program / A04012A06

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

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

ATTENTION TO: Nicole Wills

SAMPLING SITE:

SAMPLED BY:

Polyaromatic Hydrocarbon Analysis - Soil

DATE RECEIVED: 2014-08-20

DATE REPORTED: 2014-08-28

Parameter	Unit	SAMPLE DESCRIPTION:		GS14-004	GS14-005
		G / S	RDL	(0-0.1m)	(0-0.1m)
		SAMPLE TYPE:		Soil	Soil
		DATE SAMPLED:		8/14/2014	8/14/2014
Naphthalene	mg/kg		0.005	<0.005	<0.005
2-Methylnaphthalene	mg/kg		0.005	0.013	0.026
Acenaphthylene	mg/kg		0.005	<0.005	<0.005
Acenaphthene	mg/kg		0.005	<0.005	<0.005
Fluorene	mg/kg		0.02	<0.02	<0.02
Phenanthrene	mg/kg		0.02	0.02	0.02
Anthracene	mg/kg		0.004	0.03	0.04
Fluoranthene	mg/kg		0.01	<0.01	<0.01
Pyrene	mg/kg		0.01	0.21	0.08
Benzo[a]anthracene	mg/kg		0.03	<0.03	<0.03
Chrysene	mg/kg		0.05	<0.05	<0.05
Benzo[b+ j]fluoranthene	mg/kg		0.05	<0.05	<0.05
Benzo[k]fluoranthene	mg/kg		0.05	<0.05	<0.05
Benzo[a]pyrene	mg/kg		0.03	<0.03	<0.03
Indeno[1,2,3-cd]pyrene	mg/kg		0.05	<0.05	<0.05
Dibenzo[ah]anthracene	mg/kg		0.005	<0.005	<0.005
Benzo[ghi]perylene	mg/kg		0.05	<0.05	<0.05
B[a]P TPE	mg/kg		0.05	<0.05	<0.05
IACR (Coarse Soil)	mg/kg		0.05	<0.05	<0.05
IACR (Fine Soil)	mg/kg		0.05	<0.05	<0.05
Surrogate	Unit	Acceptable Limits			
2-Fluorobiphenyl (PAH)	%	50-150		87	90
p-Terphenyl-d14 (PAH)	%	50-150		104	106

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

5712772-5712777 Results are based on the dry weight of the sample.

Based on GC/MS target ion analysis.

Isomers Benzo(b)fluoranthene and Benzo(j)fluoranthene have the same GC retention time and are reported as the sum of the two.

Certified By:

Quality Assurance

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

AGAT WORK ORDER: 14E878257

PROJECT: Camp Farewell Decommissioning Program / A04012A06

ATTENTION TO: Nicole Wills

SAMPLING SITE:

SAMPLED BY:

Soil Analysis																
RPT Date: Aug 28, 2014			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits		
							Lower	Upper	Lower		Upper	Lower		Upper		

Soil Analysis - Salinity (AB Tier 1 - pH Calcium Chloride)

pH (CaCl ₂ Extraction)	235	5725019	7.00	7.11	1.6%	< 0.02	99%	90%	110%						
Electrical Conductivity (Sat. Paste)	235	5725019	0.38	0.35	8.2%	< 0.01	102%	90%	110%						
Saturation Percentage	235	5725019	48	43	11.0%	< 1	104%	80%	120%						
Chloride, Soluble	1016	5697203	12	12	0.0%	< 5	102%	80%	120%	103%	80%	120%	106%	80%	120%
Calcium, Soluble	235	5717089	17	18	5.7%	< 1	109%	80%	120%				105%	80%	120%
Potassium, Soluble	235	5717089	<2	<2	NA	< 2	104%	80%	120%				110%	80%	120%
Magnesium, Soluble	235	5717089	3	3	0.0%	< 2	104%	80%	120%				107%	80%	120%
Sodium, Soluble	235	5717089	5	5	0.0%	< 2	97%	80%	120%				103%	80%	120%
Sulfate, Soluble	235	5717089	4	4	0.0%	< 2	91%	80%	120%				104%	80%	120%

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

CCME / Alberta Tier 1 Metals + Hg + HWS B + Cr6 (soil)

Antimony	234	5621580	< 0.5	< 0.5	NA	< 0.5	103%	80%	120%				97%	80%	120%
Arsenic	234	5621580	7.1	7.3	2.8%	< 0.5	98%	80%	120%				101%	80%	120%
Barium	234	5621580	1480	1490	0.7%	< 0.5	96%	80%	120%				88%	80%	120%
Beryllium	234	5621580	0.5	0.6	18.2%	< 0.5	92%	80%	120%				94%	80%	120%
Boron (Hot Water Extr.)	234	5721561	1.1	1.1	0.0%	< 0.5	94%	80%	120%				107%	80%	120%
Cadmium	234	5621580	< 0.5	< 0.5	NA	< 0.5	95%	80%	120%				93%	80%	120%
Chromium	234	5621580	29.6	31.5	6.2%	< 0.5	93%	80%	120%				96%	80%	120%
Chromium, Hexavalent	232	5710492	< 0.3	< 0.3	NA	< 0.3	98%	80%	120%				95%	80%	120%
Cobalt	234	5621580	8.4	9.1	8.0%	< 0.5	93%	80%	120%				95%	80%	120%
Copper	234	5621580	17.5	19.3	9.8%	< 0.5	98%	80%	120%				95%	80%	120%
Lead	234	5621580	10.2	10.2	0.0%	< 0.5	98%	80%	120%				97%	80%	120%
Mercury	234	5621580	< 0.5	< 0.5	NA	< 0.5	102%	80%	120%				102%	80%	120%
Molybdenum	234	5621580	1.6	1.6	0.0%	< 0.5	98%	80%	120%				98%	80%	120%
Nickel	234	5621580	26.0	28.3	8.5%	< 0.5	93%	80%	120%				94%	80%	120%
Selenium	234	5621580	0.5	0.5	0.0%	< 0.5	99%	80%	120%				99%	80%	120%
Silver	234	5621580	< 0.5	< 0.5	NA	< 0.5	95%	80%	120%				95%	80%	120%
Thallium	234	5621580	< 0.5	< 0.5	NA	< 0.5	96%	80%	120%				97%	80%	120%
Tin	234	5621580	0.5	0.5	0.0%	< 0.5	100%	80%	120%				95%	80%	120%
Uranium	234	5621580	0.9	0.9	0.0%	< 0.5	98%	80%	120%				99%	80%	120%
Vanadium	234	5621580	29.8	31.9	6.8%	< 0.5	94%	80%	120%				96%	80%	120%
Zinc	234	5621580	54	59	8.8%	< 1	102%	80%	120%				99%	80%	120%

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



Quality Assurance

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

AGAT WORK ORDER: 14E878257

PROJECT: Camp Farewell Decommissioning Program / A04012A06

ATTENTION TO: Nicole Wills

SAMPLING SITE:

SAMPLED BY:

Soil Analysis (Continued)

RPT Date: Aug 28, 2014			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE				
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Certified By: _____

Quality Assurance

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

AGAT WORK ORDER: 14E878257

PROJECT: Camp Farewell Decommissioning Program / A04012A06

ATTENTION TO: Nicole Wills

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis																
RPT Date: Aug 28, 2014			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	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	508	5724724	< 0.005	< 0.005	NA	< 0.005	87%	80%	120%	88%	80%	120%	75%	60%	140%
Toluene	508	5724724	< 0.05	< 0.05	NA	< 0.05	93%	80%	120%	87%	80%	120%	70%	60%	140%
Ethylbenzene	508	5724724	< 0.01	< 0.01	NA	< 0.01	82%	80%	120%	94%	80%	120%	70%	60%	140%
Xylenes	508	5724724	< 0.05	< 0.05	NA	< 0.05	87%	80%	120%	95%	80%	120%	74%	60%	140%
C6 - C10 (F1)	508	5724724	< 10	< 10	NA	< 10	100%	80%	120%	82%	80%	120%	109%	60%	140%
C10 - C16 (F2)	462	5702819	24	23	4.3%	< 10	102%	80%	120%	93%	80%	120%	95%	60%	140%
C16 - C34 (F3)	462	5702819	102	108	5.7%	< 10	108%	80%	120%	99%	80%	120%	105%	60%	140%
C34 - C50 (F4)	462	5702819	<10	25	NA	< 10	102%	80%	120%	97%	80%	120%	107%	60%	140%
Moisture Content	462	5702819	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.

Polyaromatic Hydrocarbon Analysis - Soil

Naphthalene	453	5705242	< 0.005	< 0.005	NA	< 0.005	101%	70%	130%	91%	70%	130%	92%	70%	130%
2-Methylnaphthalene	453	5705242	< 0.005	< 0.005	NA	< 0.005				86%	70%	130%	87%	70%	130%
Acenaphthylene	453	5705242	< 0.005	< 0.005	NA	< 0.005	86%	70%	130%	84%	70%	130%	92%	70%	130%
Acenaphthene	453	5705242	< 0.005	< 0.005	NA	< 0.005	94%	70%	130%	86%	70%	130%	87%	70%	130%
Fluorene	453	5705242	< 0.02	< 0.02	NA	< 0.02	92%	70%	130%	90%	70%	130%	92%	70%	130%
Phenanthrene	453	5705242	< 0.02	< 0.02	NA	< 0.02	98%	70%	130%	89%	70%	130%	90%	70%	130%
Anthracene	453	5705242	< 0.004	< 0.004	NA	< 0.004	87%	70%	130%	85%	70%	130%	93%	70%	130%
Fluoranthene	453	5705242	< 0.01	< 0.01	NA	< 0.01	85%	70%	130%	89%	70%	130%	91%	70%	130%
Pyrene	453	5705242	< 0.01	< 0.01	NA	< 0.01	86%	70%	130%	88%	70%	130%	91%	70%	130%
Benzo[a]anthracene	453	5705242	< 0.03	< 0.03	NA	< 0.03	87%	70%	130%	97%	70%	130%	101%	70%	130%
Chrysene	453	5705242	< 0.05	< 0.05	NA	< 0.05	108%	70%	130%	94%	70%	130%	95%	70%	130%
Benzo[b+j]fluoranthene	453	5705242	< 0.05	< 0.05	NA	< 0.05	95%	70%	130%	88%	70%	130%	86%	70%	130%
Benzo[k]fluoranthene	453	5705242	< 0.05	< 0.05	NA	< 0.05	101%	70%	130%	87%	70%	130%	88%	70%	130%
Benzo[a]pyrene	453	5705242	< 0.03	< 0.03	NA	< 0.03	81%	70%	130%	89%	70%	130%	92%	70%	130%
Indeno[1,2,3-cd]pyrene	453	5705242	< 0.05	< 0.05	NA	< 0.05	93%	70%	130%	82%	70%	130%	86%	70%	130%
Dibenzo[ah]anthracene	453	5705242	< 0.005	< 0.005	NA	< 0.005	95%	70%	130%	83%	70%	130%	87%	70%	130%
Benzo[ghi]perylene	453	5705242	< 0.05	< 0.05	NA	< 0.05	88%	70%	130%	75%	70%	130%	78%	70%	130%

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

Certified By: _____



Method Summary

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

AGAT WORK ORDER: 14E878257

PROJECT: Camp Farewell Decommissioning Program / A04012A06

ATTENTION TO: Nicole Wills

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Antimony	INOR-171-6006, INOR-171-6202	EPA SW 846-3050/6010; SHEPPARD	ICP-MS
Arsenic	INOR-171-6006, INOR-171-6202	EPA SW 846-3050/6010; SHEPPARD S	ICP-MS
Barium	INOR-171-6006, INOR-171-6202	EPA SW 846-3050/6010; SHEPPARD	ICP-MS
Beryllium	INOR-171-6006, INOR-171-6202	EPA SW 846-3050/6010; SHEPPARD	ICP-MS
Boron (Hot Water Extr.)	INO-171-6005	Gupta, 1967, Soil Science 103: 424-428	ICP/OES
Cadmium	INOR-171-6006, INOR-171-6202	EPA SW 846-3050/6010; SHEPPARD	ICP-MS
Chromium	INOR-171-6006, INOR-171-6202	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Chromium, Hexavalent	INOR-171-6215	ASA 20-4.3; REISENAUER 1982	SPECTROPHOTOMETER
Cobalt	INOR-171-6006, INOR-171-6202	EPA SW 846-3050/6010; SHEPPARD	ICP-MS
Copper	INOR-171-6006, INOR-171-6202	EPA SW 846-3050/6010; SHEPPARD	ICP-MS
Lead	INOR-171-6006, INOR-171-6202	EPA SW 846-3050/6010; SHEPPARD	ICP-MS
Mercury	INOR-171-6006, -6202	EPA SW 846-3050/7470A; SHEPPARD 2007	ICP-MS
Molybdenum	INOR-171-6006, INOR-171-6202	EPA SW 846-3050/6010; SHEPPARD	ICP-MS
Nickel	INOR-171-6006, INOR-171-6202	EPA SW 846-3050/6010; SHEPPARD	ICP-MS
Selenium	INORG-171-6006, INOR-171-6202	EPA SW 846-3050/6010; SHEPPARD S	ICP-MS
Silver	INOR-171-6006, INOR-171-6202	EPA SW 846-3050/6010; SHEPPARD	ICP-MS
Thallium	INOR-171-6006, INOR-171-6202	EPA SW 846-3050/6010; SHEPPARD	ICP-MS
Tin	INOR-171-6006, INOR-171-6202	EPA SW 846-3050/6010; SHEPPARD	ICP-MS
Uranium	INOR-171-6006, INOR-171-6202	EPA SW 846-3050/6010; SHEPPARD	ICP-MS
Vanadium	INOR-171-6006, INOR-171-6202	EPA SW 846-3050/6010; SHEPPARD	ICP-MS
Zinc	INOR-171-6006, INOR-171-6202	EPA SW 846-3050/6010; SHEPPARD	ICP-MS
pH (CaCl ₂ Extraction)	INOR-171-6207	SHEPPARD 2007; HENDERSHOT 2008	PH METER
Electrical Conductivity (Sat. Paste)	INO-171-6208	SHEPPARD 2007; MILLER 2007	CONDUCTIVITY METER
Sodium Adsorption Ratio	INOR-171-6201 & INOR-171-6002	McKeague 3.26	CALCULATION
Saturation Percentage	SOIL 0140; SOIL 0110; SOIL 0120	MILLER 2007; SHEPPARD 2007	GRAVIMETRIC
Chloride, Soluble	INOR-171-6200 & INOR-171-6002	SHEPPARD 2007, EATON 2005	COLORIMETER
Calcium, Soluble	SOIL 0110; SOIL 0120; INST 0140	CARTER & GREGORICH 2007, SM 3120B	ICP/OES
Potassium, Soluble	SOIL 0110; SOIL 0120; INST 0140	CARTER & GREGORICH 2007, SM 3120B	ICP/OES

Method Summary

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

AGAT WORK ORDER: 14E878257

PROJECT: Camp Farewell Decommissioning Program / A04012A06

ATTENTION TO: Nicole Wills

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Magnesium, Soluble	SOIL 0110; SOIL 0120; INST 0140	CARTER & GREGORICH 2007, SM 3120B	ICP/OES
Sodium, Soluble	SOIL 0110; SOIL 0120; INST 0140	CARTER & GREGORICH 2007, SM 3120B	ICP/OES
Sulfate, Soluble	INOR-171-6201 & INOR-171-6002	SHEPPARD 2007; EATON 2005; MILLER 2007, SM 3120B	ICP/OES
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
Naphthalene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
2-Methylnaphthalene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Acenaphthylene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Acenaphthene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Fluorene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Phenanthrene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Anthracene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Fluoranthene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Pyrene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Benzo[a]anthracene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Chrysene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Benzo[b+j]fluoranthene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Benzo[k]fluoranthene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Benzo[a]pyrene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Indeno[1,2,3-cd]pyrene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Dibenzo[ah]anthracene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Benzo[ghi]perylene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
2-Fluorobiphenyl (PAH)	TO 0500	EPA SW846 8270 D/3540 C/3570	GC/MS
p-Terphenyl-d14 (PAH)	TO 0500	EPA SW846 8270 D/3540 C/3570	GC/MS



AGAT Laboratories

2910 12 Street NE
 Calgary, Alberta
 T2E 7P7
 webeearth.agatlabs.com

Laboratory Use Only

Arrival Temperature: 66°C
 AGAT Job Number: 146878257

Chain of Custody Record

P: 403.735.2005 • F: 403.735.2771

Report Information

Company: IEG Consultants Ltd.
 Contact: Nicole Wills
 Address: 2618 Hopewell Place NE
Calgary, AB
 Phone: 403-829-3048 Fax: _____
 LSD: _____
 Client Project #: A04012A06

Report Information

1. Name: Nicole Wills
 Email: nwills@klohn.com
 2. Name: _____
 Email: _____
 3. Name: _____
 Email: _____

Report Format

Single Sample per Page
 Multiple Samples per Page

Date and Time: _____

Turnaround Time Required (TAT)

Regular TAT: 5 to 7 business days
 Rush TAT: Less than 24 hours
 24 to 48 hours
 48 to 72 hours

RUSH TAT REQUESTS UPON SELECTING A RUSH TAT, THE CLIENT ACCEPTS THAT A RUSH SURCHARGE WILL BE ADDED TO THE INVOICE. SEE BACK FOR SURCHARGE.

Date Required: _____

Invoice To Same Yes / No

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

Requirements (Check one)

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
 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 <input type="checkbox"/> HWS-B <input type="checkbox"/> Cr ⁶ <input type="checkbox"/> Hg	Water Metals <input type="checkbox"/> Dissolved <input type="checkbox"/> Total <input type="checkbox"/> Hg	Routine Water Potability	AB Class 2 Landfill	BC Landfill	D50 Detailed Soil Salinity (As Received)	Microtox	BTEXS/VPH/EPH <input type="checkbox"/> LEPH/HEPH <input type="checkbox"/>	HOLD FOR 60 DAYS	PRESERVED (Y/N)	CONTAMINATED/HAZARDOUS (Y/N)
<u>5712772</u>	<u>GS14-004 (0-0.1m)</u>	<u>Soil</u>	<u>August 14, 2014</u>	<u>Dirt floor of shop building</u>	<u>3</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>									<u>Y</u>	<u>Y</u>
<u>2777</u>	<u>GS14-005 (0-0.1m)</u>	<u>Soil</u>	<u>August 14, 2014</u>	<u>Dirt floor of shop building</u>	<u>3</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>									<u>Y</u>	<u>Y</u>

Samples Relinquished By (Print Name and Sign): <u>Nicole Wills</u>	Date/Time: <u>Aug. 14, 2014 15:30</u>	Samples Received By (Print Name and Sign): <u>Calvin Wright</u>	Date/Time: <u>20 August</u>	Pink Copy - Client Yellow Copy - AGAT White Copy - AGAT	Page <u>1</u> of <u>1</u>
Samples Relinquished By (Print Name and Sign):	Date/Time:	Samples Received By (Print Name and Sign):	Date/Time: <u>20 August</u>		
Samples Relinquished By (Print Name and Sign):	Date/Time:	Samples Received By (Print Name and Sign):	Date/Time: <u>20 August</u>		



AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM

RECEIVING BASICS - Shipping

Company/Consultant: IEG Consultants
 Courier: Canadian North Prepaid Collect
 Waybill #: 518-YEV-6934-4052
 Branch: EDM GP FN FM RD VAN LYD FSJ EST Other: _____
 Custody Seal Intact: Yes No NA
 TAT: <24hr 24-48hr 48-72hr Reg Other _____
 Cooler Quantity: 1

TIME SENSITIVE ISSUES - Shipping

Earliest Date Sampled: 14 AUG 14 ALREADY EXCEEDED? Yes No
 MIBI/Time Sensitive Test*: N/A Expiry: N/A
 Hydrocarbon Test: BTEX, FI-F4, DAN Expiry: 21 AUG 14
 Are samples received more than 5 days after sampling: Yes No

*Residual Chlorine, DO, Turbidity, BOD, Nitrate/Nitrite, Microtox

Temperature (to be recorded from bottles/jars only)

N/A - Only Soil Bags Received

(1) (Bottle/Jar) 6.0 + 6.2 + 7.6 = 6.6 °C (2) (Bottle/Jar) ___ + ___ + ___ = ___ °C
 (3) (Bottle/Jar) ___ + ___ + ___ = ___ °C (4) (Bottle/Jar) ___ + ___ + ___ = ___ °C
 (5) (Bottle/Jar) ___ + ___ + ___ = ___ °C (6) (Bottle/Jar) ___ + ___ + ___ = ___ °C

(If more than 6 coolers are received use another sheet of paper and attach)

SAMPLE INTEGRITY - Shipping

Hazardous Samples: Why Hazardous: N/A
 Precaution taken: N/A
 Legal Samples: Yes No
 International Samples: Yes No Tape Sealed: Yes No
 Coolant used: Icepack Bagged Ice Free Ice Free Water None

LOGISTICS USE ONLY

Workorder No: 145878257
 Samples Damaged: Yes No If YES why?
 No Bubble Wrap Frozen Courier
 Other: N/A
 Correct Sample Requirements for Testing
 Correct Bottles: Yes No Correct Amount: Yes No
 Correct Labels: Yes No
 If NO to any of the above, explain why:

 Visible Sediment in Waters : Yes No

Additional Integrity Issues or concerns:

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

Whom spoken to: _____ Date/Time: _____

CPM Initial _____

518 YEV 6934-4052

518-YEV-6934-4052

SHIPPER'S NAME AND ADDRESS
 IBG Consultants Ltd
 Inuvik, NT
 403 829 3048
 RSHJCP3267672

SHIPPER'S ACCOUNT NUMBER

NOT NEGOTIABLE
AIR WAYBILL
 (AIR CONSIGNMENT NOTE)
 Canadian North
 101 3731 52 Ave E
 Edmonton International Airport,
 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
 780 243 8889 Alvelyn Pasco

CONSIGNEE'S ACCOUNT NUMBER
 AGA100CW

SIGNATURE RECEIVED IN GOOD ORDER PLACE DATE/TIME
 08/19/14 1:10

ISSUING CARRIER'S AGENT NAME AND CITY

PRINTED NAME
 ALSO NOTIFY: NAME AND ADDRESS (OPTIONAL ACCOUNTING INFORMATION)
 Acc.#: AGA100CW
 AGAT Laboratories Ltd
 6310 Roper Road
 Edmonton, AB T6B 3P9
 Canada
 TO EXPEDITE MOVEMENT, SHIPMENT MAY BE DIVERTED TO MOTOR OR OTHER CARRIER UNLESS SHIPPER GIVES OTHER INSTRUCTIONS HERE
 DOMESTIC LIABILITY:

AGENT'S IATA CODE ACCOUNT NO.

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 OTHER DECLARED VALUE FOR CARRIAGE DECLARED VALUE FOR CUSTOMS
 CAD 3RD PPD COLL X PPD COLL X NCV

AIRPORT OF DESTINATION FOR CARRIER USE ONLY
 Edmonton FLIGHT/DATE FLIGHT/DATE
 445/15 AU

AMOUNT OF INSURANCE 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)				
								1	15	K	
1	15					99.60					
PREPAID		WEIGHT CHARGE		COLLECT		P-UP ZONE PICKUP CHARGES		ORIGIN ADVANCE CHARGES		DESCRIPTION OF ORIGIN ADVANCE	
0.00		99.60				0.00		0.00			
VALUATION CHARGE		TAX		OTHER CHARGES AND DESCRIPTION		DEL ZONE DELIVERY CHARGES		DEST. ADVANCE CHARGES		DESCRIPTION OF DEST. ADVANCE	
0.00		0.00		32.87 Nav Canada Charge, Fuel S		0.00		0.00			
TOTAL OTHER CHARGES DUE AGENT		TOTAL OTHER CHARGES DUE CARRIER		RE-WEIGH/DIMENSIONAL WEIGHT AND SHIPPER GUARANTEES ALL CHARGES SUBJECT TO RATE AUDIT				ITEMS PREPAID		ITEMS COLLECT	
0.00		32.87									
COD →		CURRENCY		PRINTED NAME		SIGNATURE OF SHIPPER ABOVE AND INITIAL APPLICABLE BOX BELOW.		SIGNATURE			
0.00		139.09		8/15/2014 11:35		<input checked="" type="checkbox"/> THIS SHIPMENT DOES NOT CONTAIN DANGEROUS GOODS REGULATED IN AIR TRANSPORT.		<input type="checkbox"/> THIS SHIPMENT DOES CONTAIN DANGEROUS GOODS REGULATED IN AIR TRANSPORT.			
TOTAL PREPAID		TOTAL COLLECT		EXECUTED ON		Date		Time		at (Place)	
0.00		139.09		8/15/2014 11:35						992091	
CURRENCY CONVERSION RATES		ROYAL COLLECT AT DESTINATION		FOR CARRIERS USE ONLY AT DESTINATION		CHARGES AT DESTINATION		TOTAL COLLECT CHARGES		SIGNATURE OF ISSUING CARRIER OR ITS AGENT	

518-YEV-6934-4052