INUVIALUIT SIVUNNIUQPAIT IMAKKUN

INUVIALUIT WATER BOARD

SCHEDULE C

(Waters Regulations *Subsection 5(1)*)

APPLICATION FOR LICENCE, AMENDMENT OF LICENCE, OR RENEWAL OF LICENCE

APPLICATION/LICENCE NO: N7L1-1834 Amendment
(*amendment or renewal only*)

1. NAME AND MAILING ADDRESS OF APPLICANT

David A. Brown
Shell Canada Energy
150 N. Dairy Ashford Road Houston Texas 77079

TELEPHONE: 907-223-3055 FAX: _____

2. ADDRESS OF HEAD OFFICE IN CANADA IF INCORPORATED

400-4 Ave SW Calgary AB T2P 0J4

TELEPHONE: 403-384-5091 FAX: _____

3. LOCATION OF UNDERTAKING

Camp Farewell is located approximately 125 km northwest of Inuvik.

Latitude: 69°12'30.0" N Longitude: 135°06'04.4" W

4. DESCRIPTION OF UNDERTAKING (*describe and attach plans*)

Excavation of impacted soil, windrowing impacted soil, and on-site treatment of impacted soil via an Allu bucket.
See attached scope of work in Appendix I.

5. TYPE OF UNDERTAKING

1. Industrial X
2. Mining and Milling _____
3. Municipal _____
4. Power _____
5. Agriculture _____
6. Conservation _____
7. Recreation _____
8. Miscellaneous (describe) _____

Activities related to the closure and decommissioning of the Site. The Camp Farewell Decommissioning and Remediation Program is designed to decommission and remove remaining infrastructure from the Site as well as conduct soil remediation.

6. WATER USE

_____To Obtain Water

_____ Flood Control

_____X_____ To cross a watercourse

_____ To divert water

_____ To modify the bed or bank of a watercourse

_____ To alter the flow of, or store, water

Other (describe)

Barges and boats will be required to navigate the middle channel of the Mackenzie River from Inuvik to Camp Farewell for field activities. There will be no water or watercourse banks obtained, controlled, diverted, modified, or altered by Shell for the purpose of the remediation program. Any water required for operation of a barge camp during field activities will be the responsibility of the barge owner.

7. QUANTITY OF WATER INVOLVED (litres per second, litres per day or cubic metres per year, including both quantity to be used and quality to be returned to source)

Not applicable.

8. WASTE DEPOSITED (quantity, quality, treatment and disposal)

Domestic waste will be transported to Inuvik for disposal. Waste produced on the barge camp will be the responsibility of the barge owner.

9. OTHER PERSONS OR PROPERTIES AFFECTED BY THIS UNDERTAKING

(give name, mailing address and location; attach a list if necessary)

Inuvik Hunter and Trapper Committee	Aklavik Hunter and Trapper Committee	Tuktoyaktuk Hunter and Trapper Committee
102 Mackenzie Rd., PO Box 1720, Inuvik NT, X0E 0T0	P.O. Box 133, Aklavik NT, X0E 0A0	P.O Box 286, Tuktoyaktuk NT, X0E 1C0
Phone: 867-777-3671 Fax: 867-777-2478	Phone: 867-978-2723 Fax: 867-978-2726	Phone: 867-977-2457 Fax: 867-977-2433
Inuvik HTC Resource Person: Martha Blake	Aklavik HTC Resource Person: Michelle Gruben	Tuktoyaktuk HTC Resource Person: Glenna Emaghok

10. PREDICTED ENVIRONMENTAL IMPACTS OF UNDERTAKING AND PROPOSED MITIGATION

Please see Appendix II.

11. CONTRACTOR AND SUBCONTRACTOR (names, addresses and functions)

Shell Canada Energy (Shell)	Tervita Inc. (Tervita)	IEG Environmental Consultants Ltd. (IEG)
400-4th Ave SW	#9919 Shepard Road SE	500, 2618 Hopewell Place NE
Calgary, AB T2P 0J4	Calgary AB T2C 3C5	Calgary, AB T1Y 7J7
Function: Client	Function: Prime Contractor	Function: Environmental Consultant

12. STUDIES UNDERTAKEN TO DATE (attach list if necessary)

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

Previous Environmental Investigations are summarized in Appendix III.

13. PROPOSED TIME SCHEDULE

Start Date: May 2017

Completion Date: 2020 (Estimated)

NAME: David A. Brown
(print)

TITLE: Staff Environmental Engineer
(print)

SIGNATURE: D J Brown

DATE: 16 May 2017

FOR OFFICE USE ONLY	
APPLICATION FEE Amount: $ _____	Receipt N°.: _____
WATER USE DEPOSIT Amount: $ _____	Receipt N°.: _____

Appendix I
Scope of Work

I-1 SCOPE OF WORK

Activities planned for the Camp Farewell Remediation Program include the following:

- amend the Camp Farewell water license to extend the expiry date;
- conduct Hunter and Trapper Committee consultations in Inuvik, Aklavik, and Tuktoyaktuk;
- prepare a Project Description encompassing expected remedial activities at Camp Farewell for submission to the Environmental Impact Screening Committee;
- excavate impacted soil (based on results of the 2015 Soil Assessment Program and 2016 remediation program);
- windrow impacted soil and treat on-Site with an Allu bucket;
- collect confirmatory soil samples from excavated areas and composite soil samples from windrowed piles of treated soil;
- document and photograph site conditions and remedial activities;
- backfill excavated areas with soil treated on-site; and,
- provide an annual summary report of site observations, analytical data, and remedial activities conducted at Camp Farewell.

The Remediation Program at Camp Farewell was initiated in 2016 and is expected to be complete by the end of 2020.

Appendix II
Environmental Impacts and Mitigations

Table 1 Proposed Mitigation and Anticipated Environmental Impacts

Concern and/or Anticipated Impact	Mitigation
Avoidance of Traditional and Cultural Activities and Sensitive Areas	A wildlife monitor will be involved in the project to ensure that sensitive areas and interference with harvesting and other activities are avoided.
	Transportation is restricted to the river and the footprint on the land is small.
	Timing of the project causes minimal temporal overlap with traditional and cultural activities.
Impacts to Aquatic and Terrestrial Wildlife	While there is a small potential for wildlife harm (*i.e.*, human protection from problem wildlife), training staff in operational procedures will minimize this potential. Please see Appendix VI of the 2015 Camp Farewell Project Description entitled: "*2015 Decommissioning and Soil Assessment Program at Camp Farewell*" (IEG 2015) for wildlife protocols.
	The wildlife monitor will be present to ensure impacts to wildlife are minimal.
	No fishing or hunting will be permitted by people working on the project.
	Feeding or harassment of wildlife will not be permitted.
	In the event water is withdrawn from water bodies, intake pipes will be screened with mesh to protect fish.
Sensory Disturbance to Wildlife	No non-emergency air transport will be used during this project.
	Wildlife attraction or avoidance at the Site is expected to be minimal. Attractants to wildlife, *i.e.*, garbage, will be removed from project area.
	Environment and Natural Resources' *Bear Encounter Response Guidelines for Oil and Gas Activities* will be followed.
	Wildlife monitor will monitor and advise if wildlife is disturbed.
	Existing routes at the Site will be used as much as possible.
	Field crews will be required to pack out all materials used during the project, *e.g.*, lunch wrappers, paper, sample containers.
Impacts to Terrestrial Habitat	Land based activities will be restricted to the lease area.
	Rare plant samples will not be collected and disturbance of existing vegetation on-site will be avoided where possible.
	The wildlife monitor will be present at all times to ensure impacts to habitats are minimal.
	Refueling will occur in designated areas and a drip tray will be used. Fuel spills will be reported, recorded, and cleaned up immediately. Transport trucks will fuel in Inuvik.
	Fuel storage will have secondary containment.
	Snow pads will be constructed on the Site to minimize ground disturbance in areas where heavy equipment and the camp are located.
Impacts to Aquatic Habitat	Drip trays will be located under equipment when not in use.
Soil and Surface Impacts	Spill pads and other spill prevention devices will be used to ensure that no spills occur during refueling of equipment.
	An emergency response plan and spill kits will be present at the Site.
	Soils containing contaminants of concern will be stockpiled in lined cells while on-Site.

Concern and/or Anticipated Impact	Mitigation
Cultural or Heritage Resources	There are no known cultural or heritage Sites within 150 m radius of the Site and no known heritage Sites will be impacted by the project. Should heritage resources be found during project activities, work will cease in the immediate vicinity and regulators and the Prince of Wales Northern Heritage Centre will be notified.
	Cultural areas identified through a search of the Prince of Wales Northern Heritage Centre will be given a buffer zone of 150 m.

Appendix III

III-1 PREVIOUS ENVIRONMENTAL SITE ASSESSMENT PROGRAMS

III-1.1.1 2000

In 2000, Golder and Associates (Golder) conducted a baseline environmental assessment of the Site. 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).

III-1.1.2 2001

Phase I and Phase II Environmental Site Assessments (ESAs) were conducted by Komex in 2001. Analyzed parameters were reported exceeding applicable guidelines, including: total petroleum hydrocarbons (TPHs), polycyclic aromatic hydrocarbons (PAHs), 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 potentially 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).

III-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 advanced 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).

III-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).

III-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.

III-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).

III-1.1.7 2013

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

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

Petroleum hydrocarbon (PHC) affected soil resulting from previous operations was effectively removed from the lagoon area during the 2013 Remediation Program based on laboratory analytical data. Approximately 1,900 m^3 of excavated soil was barged to Hay River and hauled to and disposed at the Tervita Rainbow Lake Landfill in Rainbow Lake, AB. The last load of the barged impacted soil arrived at the landfill on October 16, 2013. Approximately 100 m^3 remained on-site in a secured metal shed, to be barged to the landfill during 2014 decommissioning activities (IEG, 2014).

III-1.1.8 2014

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

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

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

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

III-1.1.9 2015

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

- The tank farm was decommissioned and removed during August 2015. Metal from the tank farm was compressed and packaged for removal via barge;
- The EM (electromagnetic) survey identified 15 subsurface anomalies which were investigated. Uncovered debris was removed. Two areas of elevated conductivity were identified on the northern half of the Site and to the west of the former tank farm, respectively;
- IEG Site assessment activities included installation of 124 boreholes and collection of groundwater samples from the existing piezometers on-site;
- Background soil and groundwater guidelines were established for the Site. Reported parameter concentrations for background soil samples were below the method detection limit and/or Government of Northwest Territories (GNWT) guideline for each parameter analyzed in 2015.
- pH values were reported below the guideline range in 56 samples collected from various locations across the extent of the Site. pH values reported for background samples were within the guideline range.

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

III-1.1.10 2016

The conclusions and key findings of the 2016 remediation program were as follows:

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

REFERENCES

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IEG Consultants Ltd. (IEG) 2012. Summary of 2012 Camp Farewell Activities. Letter report prepared for: Shell Canada Energy and Canadian Wildlife Services in compliance with Kendall Island Bird Sanctuary Permit. December 13, 2012.

IEG Consultants Ltd. (IEG) 2013a. 2012 Aklavik Hunters and Trappers Committee Consultation Letter. Letter report prepared for: Shell Canada Energy and Aklavik Hunters and Trappers Committee. March 26, 2013.

IEG Consultants Ltd. (IEG) 2013b. 2012 Annual Report, Type “B” Water License #N7L1-1834. Prepared for: Shell Canada Energy and the Northwest Territories Water Board. March 28, 2013.

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IEG Consultants Ltd. (IEG) 2016. 2015 Annual Report, Type “B” Water License #N7L1-1834. Prepared for: Shell Canada Energy and the Northwest Territories Water Board. April 19, 2016.

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WorleyParsons 2008. Interim Abandonment and Restoration Program, Camp Farewell, NT. Unpublished report prepared for Shell Canada Energy Limited, November, 2008. C52360500.

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