Operations and Maintenance Plan
Cambridge Bay Airport Land Treatment Unit (LTU), Nunavut

Prepared by

Transport Canada
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Operations and Maintenance Plan
Cambridge Bay Airport Land Treatment Unit (LTU)

Part E Section 3

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b) Effective date: July 1, 2012

c) Inspection and Maintenance Procedures: Once the Land Treatment Unit (LTU) facility is constructed, the facility will be inspected once per year to ensure it is performing as it is designed. The following parameters are used to assess the LTU facility:

i. Cell Dike Crest – the height of the dike ensuring the proper slope is maintained
ii. Liner Anchor – the material used to anchor the liner to ensure it is properly seated on the berm. This also requires a certain slope for stability and ensures the liner is locked into place.
iii. Base – the base of the LTU is assessed to endure it is on a "prepared surface" to ensure a flat smooth surface to construct the LTU on.
iv. Drainage – the LTU is constructed with a designated slope for water to drain to one side in the sump area.
v. Contaminated Soil – is assessed to ensure what contaminants are placed in the LTU and placed to a certain depth, usually 1 meter.
vi. Monitoring Wells – are assessed for location and functionality.

d) Procedures for snow removal/treatment: No snow removal is required at the LTU facility.

e) Dust Control: Dust shouldn't be an issue at the LTU. Precipitation infiltration shouldn't be an issue at the facility due to the low volumes of precipitation recorded at this location. If the sump of the LTU becomes full, the water can be treated first prior to removal or removed and sent to a facility to treat the water.

f) Access to Site: The location of the LTU is on the restricted airport property. No access to the site is allowed.

g) Soil Characterization in LTU: The soil deposited into the facility will be tested and verified at a certified lab for the contents. No PCBs are allowed in the facility. Only soil contaminated with petroleum hydrocarbons will be accepted into the LTU.

h) Maintenance Procedures: Nutrient Amendments and Tilling - Biodegradation requires micro-organisms are meeting nutritional requirements. The optimal range of carbon:nitrogen:phosphorus (C:N:P) is 100:10:1 to 100:1:0.5. Soil amendments in the form of commercially used solid fertilizers will be applied in sufficient amounts as recommended by the manufacturer to achieve this target ratio for the specified volume of soil in the LTU.

Once the nutrients have been added to the LTU the soil will be turned over with the use of a backhoe. This will expose the soil to oxygen and for micro-organisms as well as distributes nutrients and moisture in the soil, thereby aiding in biodegradation. Care must be taken by the backhoe operator not to tear the liner and report any cracks, blisters or punctures to the liner.

Leachate Management

The LTU will be constructed with a 1% slope which allows any leachate to collect in the sump area. Visual monitoring of the sump ensures that water is collecting in the sump area indicates the liner is not damaged. Leachate may be recirculated over the LTU soil surface as a means of irrigation to maintain optimal biodegradation rates. Discharge of the leachate may be required if the sump collection area rises to within 1 foot of the top of the berm. This is not likely to happen due to the height of the engineered berms taking into consideration the amount of precipitation and evaporation rates at this location. If the leachate is required to be discharged it must first meet the discharge levels within CCME EQGs and the Water License agreement for LTU wastewater discharge criteria:

Parameter	Maximum Allowable Concentration (ug/l)
Oil & Grease	**5000**
Lead	**1**
Benzyene	**370**
Toluene	**2**
Ethylbenzene	**90**

The LTU will continue to be monitored each field season to ensure the facility is operating as it has been designed. Additional soil sampling will be conducted in the fall of each year to determine the effectiveness of the previous amendments in the spring. A soil sampling program will be conducted in August or September as described earlier including monitoring wells. The following outlines when the samples and activities will be conducted:

Activity	Time of Year	Time of Year
Soil Sample	**June**	**August - September**
Monitoring Well Sample	**June**	**August - September**
Tilling/Fertilizer	**June**	**If Required Aug - Sept**

i) Maintenance Frequency:

Monitoring Well Sampling

TC will undertake sampling the eight (8) monitoring wells and the sump inside the LTU. The frequency and time of year are outlined in the above table. The sump

will be tested prior to any required discharge and tested prior to the decommissioning of the facility. The parameters for testing the monitoring wells are as follows:

Location	Parameter	Frequency
Sump	**PTH, BTEX, HM,PAH**	**Discharge**
Upgradient - LTU	**PTH, BTEX, HM,PAH**	**Twice/year**
Downgradient - LTU	**PTH, BTEX, HM,PAH**	**Twice/year**

j) PCBs on Site: No PCBs present in facility. PCB contaminated soil will not be allowed in the LTU.

k) QA/QC Plan: All samples must be sent to an accredited lab according to ISO/IEC Standard 17025. The contractor taking the samples must adhere to the CCME Guidance Manual on Sampling, Analysis, and Data Management for Contaminated Sites, 1993. The QA/QC Sampling program will be as follows:

<u>Sampling Program</u>

The first objective is to conduct a comprehensive soil sampling program at the beginning of each field season to identify the levels of PHC contamination in the soil. Due to the long winter season at this location, TC anticipates initially sampling the LTU in the beginning of June depending on weather conditions. The soil criteria used for this site will be under the CCME Canada Wide Standards for Petroleum Hydrocarbon Contaminated Soils Tier 1, coarse grain soil, Industrial site. To access the site airport security clearance is required. The location will not be used for commercial development due to the location adjacent to the runway.

1a) The sampling program will require twelve (12) composite soil samples and a sample from each monitoring well from the LTU for submission to a laboratory for analysis. The sampling protocol for the LTU will require a random grid pattern covering the entire area. All sampling procedures will be in accordance with the standards contained in the CCME Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites Volume I &II. Quality assurance/quality control will be observed while conducting the sampling program and include at a minimum the following:

- Use of trip, field and equipment blanks;
- Use of duplicate and spiked samples;
- Proper sample containment, preservation, chain of custody; and
- Due regard for necessary health and safety precautions.

1b) All samples should be analyzed for the following parameters:

- BTEX;
- Total Extractable Hydrocarbons (TEH);
- CCME Canada Wide Standards for Petroleum Hydrocarbons in Soil for Fractions #1 to #4 for the Tier 1 criteria, coarse grain soil for Industrial Sites.
- Polycyclic Aromatic Hydrocarbons (PAH);
- Total Heavy Metals (Al, As, Cd, Co, Cu, Fe, Pb, Mo, Ni, Se, Ag, T1, Zn).

Summary of Tier 1 Levels (mg/kg) for surface soil CCME.*

Land Use	Soil Texture	F 1	F 2	F 3	F 4
Agriculture	Coarse grain soil Fine grain soil	30b 210 (170a)	150 150	300 1300	2800 5600
Residential/Parkland	Coarse grain soil Fine grain soil	30b 210(170a)	150 150	300 1300	2800 5600
Commercial	Coarse grain soil Fine grain soil	320(240a) 320(170a)	260 260(230a)	1700 2500	3300 6600
Industrial	Coarse grain soil Fine grain soil	320 (240a) 320 (170a)	260 260 (230a)	1700 2500	3300 6600

* Additional Tier 1 levels are presented in Technical Supplement.
a= Where applicable, for protection of potable groundwater.
b= assumes contamination near residence

2a) The use of a gas Photo Ionization Detector (PID) or similar equipment to monitor hydrocarbon vapours will be required to field screen the soil sample taken. The use of field screening the soil will provide an immediate representation of the conditions and levels of the PHC in the soil. This process does not replace laboratory results, however it does give a good sense of the conditions.

The results of the laboratory analysis are to be compared to the Nunavut Environmental Guidelines for Site Remediation (most current edition), CCME Canada Wide Standards Petroleum Hydrocarbon Guidelines (most current edition) and the CCME Interim Canadian Environmental Quality Criteria for Contaminated Sites (most current edition) remediation criteria for industrial zoned sites. The selected laboratory must provide quality assurance (QA) and quality control (QC) procedures. All samples are to be procured through approved

methods and procedures and are to be submitted to a Certified Laboratory (CAEAL/ Standards Council of Canada) for formal analysis.

- TC inspects the LTU annually for operation and maintenance purposes;
- Address snow in the LTU;
- Address dust issues;
- Restricted access to the site;
- All soil placed in the LTU is characterized by sampling and analyzed at an accredited lab;
- Provided operations and procedures for O&M., tilling/amendment practices
- TC requires a health and safety plan on site while contractors are working at the location.

1) The soil criteria used under the CCME Guidelines for Industrial Site is appropriate for this location. The soil is located in a restricted developed infield area of the Cambridge Bay airport between the runway and Cambridge Bay. The soil is not intended to leave the site making the location logistically unreasonable to use this material as fill at a future date.
2) TC and the Cambridge Bay Airport maintain records that are required to be submitted to the NIRB, this is comprise of:
   - Description of the size and location of the LTU;
   - Quantitative and qualitative data on the soil treated at the site;
   - Monitoring data;
   - Final destination of the treated soil and its intended use.
3) Mandatory requirements under the *Fisheries Act.* TC meets the requirements set forth.
4) CEPA Spill Prevention, no storage of PHC on site. Emergency line – 24-hour Spill (867) 920-8130.
5) No storage of PHC on site and no re-fueling on site. Spill containment is required for refuelling practices.
6) Spill response equipment is on site at all times and is mandatory for contractors to have a spill response plan.
7) CEPA – Hazardous Waste: all hazardous waste will be addressed if encountered. It is not anticipated hazardous waste will be encountered at this location.
8) No hazardous waste on site.
9) Wildlife – no contaminated soil is deposited in a way or area such that it is harmful to migratory birds or waters frequented by migratory birds.

- The facility has monitoring wells to identify if there is any contamination leaking from the facility. The wells are tested once per year at a minimum. If fuel is identified in a well the following steps will be implemented:

- Sample the well and identify the contamination from a certified lab
- Identify the location where the potential contamination is originating
- The likely location will be from the LTU, therefore, limit the search to the area nearest to the monitoring well
- Sample soil outside the facility to identify the direction of the source of contamination
- Inspect the liner for any rips and tears
- Remove the contaminate soil from the LTU up gradient from the well. The soil can be placed further back in the LTU or if required place in the adjacent LTU. Inspect the liner for any rips and tears. Continue until the source can be identified. In the event of a tear in the liner, a proper weld/patch will be completed according to the manufacture specifications.
- If contaminated soil is identified outside the facility, remove and place into the LTU and backfill the excavation with clean fill material.
- Continue to sample monitoring wells 2-3 times per year to ensure the source of contamination has been eliminated

If the sump area is full of water and is required to be removed due to a wet season, the following steps are in place:

- Test the water to ensure the water may be discharged as per the requirements in the water license issued by NWB
- If the water does not meet the required discharge levels the water will need to be treated with in an oil water separator. The system will operate to treat the water prior to discharge. The water will be treated then sampled and sent to a certified lab to ensure it meets the discharge requirements under the water license. Only if it meets this requirement may it be discharged.
- If an oil water separator is not sufficient to treat the water, the water will be pumped into 205L drums and sent to a certified facility to treat the contaminated water.

l) Procedures for Prevention, Monitoring, Detection, Containment and Clean-up:

Potential spill sizes would likely not exceed 50 gallons of diesel fuel. This is based on the size of fuel tanks in a dump truck or a rubber tire backhoe. The

potential of a piece of equipment to tip over would be the source of the fuel. Should this occur in the LTU the spill would be contained in the LTU. If the spill occurs outside the LTU, the area would be small due to the limited amount of fuel stored in the equipment.

The procedure for initial action is to ensure the safety of the operator and safe extraction and remove all source of ignition. Once this is complete, the equipment will need to be assessed if fuel is leaking and take appropriate action to prevent and stop all fuel leaking. Once this is completed the spill can be assessed and the spill response kit may be used to absorb any free product. If fuel entered into the soil, this may be removed and placed into the LTU. The contractor on site will be required to enact and respond to the spill. If the spill kit absorbent pad/socks are used, they may be placed back into the spill kit container for later disposal at a licensed facility in Iqaluit.

The second form of spill may result due to contaminated soil spilled outside the LTU. In the event of a spill of contaminated soil, the soil will be collected and placed into the LTU. In the event of a spill, the following procedures should be considered:

a. First consider and then remove or minimize any hazards to human life, health, safety or the environment.
b. Take necessary steps to initially contain or prevent the spread of the spill.
c. Try to identify and stop the source of the spill or leak.
d. Collect liquids through the use of such equipment as absorbent pads.
e. Immediately, collect and transport any contaminated soil resulting from the spill to the LTU for treatment.
f. Send for help if required.
g. Report the spill to the INAC Spill Inspector and complete the NT-NU Spill Report Form (attached).
h. Complete the collection and disposal of contaminated materials as per direction from the regulatory agencies and applicable regulations.

Spill reporting consists of completing the attached NT-NU Spill Report form and submitting it to Government of Nunavut. Reporting should also consist of contacting the INAC's Manager of Field Operations pursuant to Schedule B of the Spill Contingency Planning and Reporting Regulations at (867) 975-4295 or by fax at (867) 979-6445. Spill reporting will be the responsibility of the contractor working on site.

The facility has monitoring wells to identify if there is any contamination leaking from the facility. The wells are tested once per year at a minimum. If fuel is identified in a well the following steps will be implemented:

1. Sample the well and identify the contamination from a certified lab
2. Identify the location where the potential contamination is originating

3. The likely location will be from the LTU, therefore, limit the search to the area nearest to the monitoring well
4. Sample soil outside the facility to identify the direction of the source of contamination
5. Inspect the liner for any rips and tears
6. Remove the contaminate soil from the LTU up gradient from the well. The soil can be placed further back in the LTU or if required place in the adjacent LTU. Inspect the liner for any rips and tears. Continue until the source can be identified. In the event of a tear in the liner, a proper weld/patch will be completed according to the manufacture specifications.
7. If contaminated soil is identified outside the facility, remove and place into the LTU and backfill the excavation with clean fill material.
8. Continue to sample monitoring wells 2-3 times per year to ensure the source of contamination has been eliminated. If the sump area is full of water and is required to be removed due to a wet season, the following steps are in place:

    - Test the water to ensure the water may be discharged as per the requirements in the water license issued by NWB
    - If the water does not meet the required discharge levels the water will need to be treated with in a oil water separator. The system will operate to treat the water prior to discharge. The water will be treated then sampled and sent to a certified lab to ensure it meets the discharge requirements under the water license. Only if it meets this requirement may it be discharged.
    - If an oil water separator is not sufficient to treat the water, the water will be pumped into 205L drums and sent to a certified facility to treat the contaminated water.

m) NT-NU Spill Report Form: