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RE: NWB4NUN – Nunatta Environmental Services Inc. – Petroleum Impacted Soil Landfarm Facility

On behalf of Environment Canada (EC), I have reviewed the information submitted with the above-mentioned application. The following specialist advice has been provided pursuant to Environment Canada's mandated responsibilities for the enforcement of the *Canadian Environmental Protection Act*, Section 36(3) of the *Fisheries Act*, the *Migratory Birds Convention Act,* and the *Species at Risk Act*.

Nunatta Environmental Services Inc. has submitted an application for a water license for a landfarm facility located at the North 40 in Iqaluit, NU. The application includes a spill contingency plan and a groundwater monitoring plan. The landfarm is currently operational and consists of 3 treatment platforms ("cells") lined with a geo-synthetic liner. The perimeter of the landfarm is enclosed with a compacted granular berm.

General Design and Operating Requirements for Landfarms

With respect to the general operation of land farms, EC has the following recommendations. Please note that these recommendations are not intended to serve as a comprehensive set of design and operational specifications. Please see the attached guideline produced by the Government of Yukon for additional information.

Design plans and specifications should incorporate the following requirements:

- A natural or engineered soil berm and impermeable liner system to restrict leachate migration.
- A means of collecting and holding contaminated runoff water and leachate.
- A means of controlling dust from and precipitation infiltration into the land treatment facility.
- Access to the site should be restricted through fencing or other suitable means and signs warning of the potential hazard.
- Prior to the placement of contaminated soil in the land treatment facility:
  - The contaminated soil in question should be characterized with respect to the quality and level of contamination and a treatability study carried out to determine the feasibility of remediating the contaminated soil to an acceptable level that meets the appropriate criteria as set forth in Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guidelines (CSQG).
  - A detailed set of operational procedures should be prepared which identifies:
    - The recommended frequency and method of soil tillage.

    - The type and application rate of any land treatment amendments, i.e., water, air, lime, nutrients, or inoculum which may be required.
  - A health and safety plan should be developed which addresses both the site workers and, where applicable, nearby inhabitants.

Monitoring and Record Keeping Requirements

- For the purpose of monitoring the performance of the land treatment process, soil samples should be taken no less frequently than once every four months, during the period of active land treatment to monitor contamination levels until analytical results are below acceptable levels as set forth in the CCME's Canadian Soil Quality Guidelines (CSQG).
- For the purpose of monitoring for potential impact of the facility on groundwater quality in the active layer, groundwater samples should be taken from the down gradient monitoring wells no less frequently than twice per year and analyzed for indicators of petroleum hydrocarbon contamination. Should analytical results indicate groundwater contamination associated with the land treatment facility, corrective action should be taken as soon as possible.
- Accurate records should be maintained by the owner/operator which contain the following information:
  - A detailed description of the size and location of the land treatment facility
  - Quantitative and qualitative data on the soil treated at the site
  - Monitoring data as set forth above
  - The final destination of the treated soil and its intended use.

Decommissioning

- Prior to the decommissioning of a land treatment facility, a plan should be prepared which:
  - Outlines removal procedures for any remaining soil and all other works at the site. i.e., liners, drain lines, etc.
  - Identifies the nature and level of any residual contamination that will remain on the site.
  - Identifies the intended use of the site once the land treatment facility has been decommissioned.
- The land treatment facility should be decommissioned in accordance with the above noted plan and associated records retained by the responsible owner/operator.

Site Specific

Environment Canada offers the following recommendations in relation to Nunatta Environmental Service's Landfarm operation:

- In order to facilitate review of this application, EC requires information regarding the frequency of the mechanical aeration of the landfarm, the frequency of the moisture treatment, and the percent moisture that which the landfarm operates. Care should be taken to ensure that the landfarm does not become water saturated. Water saturation will stop the remediation process and create contaminated waters that would also have to be treated.
- The landfarm cells are currently 1.5 meters deep, and could have a depth of 3.5 meters. Other landfarms currently permitted at former military sites have maximum depths of 12 inches in order to facilitate mechanical aeration via tilling and increase volatilization of the hydrocarbons. Environment Canada recommends that the landfarm cells not be allowed to exceed 0.5 m in depth.
- As outlined above, the proponent should implement a soil monitoring program for the purpose of monitoring the performance of the land treatment process. Given the stated potential that low levels of heavy metals may be present in the landfarmed soil, soil samples should be taken no less frequently than twice per year during the period of active treatment, to

monitor contamination levels until analytical results are below acceptable levels as set forth in the CCME's Canadian Soil Quality Guidelines (CSQG).

- The pH of the soil at the landfarm should be between 6.5 and 8.5. Soil pH levels above or below these levels are harmful to the soil microbial population.
- Environment Canada requests clarification regarding why batteries and anti-freeze (glycol) used in heavy equipment and other vehicles are kept at the landfarm facility. Environment Canada recommends that spent batteries and used anti-freeze be stored at the hazardous waste storage facility at the City of Iqaluit landfill. The proponent shall ensure that all hazardous materials receive proper storage and disposal at an approved facility.
- Environment Canada recommends that water from the rainwater holding tanks be tested prior to release to the environment. The proponent currently proposes to treat the water prior to release by forcing it though an activated carbon water treatment facility. However, given that heavy metals are stated to be present in the soils in low concentrations, EC recommends that the water be tested prior to release, as the activated carbon treatment will not remove all contaminants from the water.
- All soils entering into the landfarm facility for treatment should be tested prior to placement in the landfarm to ensure that only hydrocarbon contaminated soils are accepted. Soils must not be contaminated with waste engine oils or petroleum hydrocarbon mixtures containing waste engine oil. Waste engine oil contains metals from the engine which are usually toxic to the soil microbes that biodegrade the petroleum hydrocarbons. The proponent shall also ensure soils impacted with other contaminants (ex. PCBs) are not placed within the landfarm.

Groundwater Monitoring Plan

- A map outlining the location of the groundwater monitoring wells in relation to the active landfarm cells and any surrounding waterbodies should be submitted for review.
- The proponent currently proposes to sample the groundwater monitoring wells on a rotating basis, with all wells being sampled once every two years. Given that the landfarm facility is inspected weekly during the operating months, EC recommends that that all groundwater monitoring wells be sampled no less frequently than twice per year and analyzed for indicators of petroleum hydrocarbon contamination. Should analytical results indicate groundwater contamination associated with the land treatment facility, corrective action should be taken as soon as possible.

Post-Closure Plan

- The Post Closure Plan indicates that upon closure, contaminated soils will be treated until they reach acceptable levels as dictated by the CCME criteria. Environment Canada requests information regarding the treatment method that will be employed. Environment Canada also recommends that upon closure, soils within the landfarm be tested to characterize the contamination on site and to determine concentrations.
- If the groundwater monitoring wells detect the presence of contaminants, EC requests to opportunity to review the remediation procedures proposed by the proponent to treat/contain the water prior to their implementation.
- The rainwater holding tanks should be cleaned prior to disposal and the water used during the cleaning should be treated prior to discharging it to the environment.

Spill Contingency Plan

- Environment Canada recommends that drip pans, or other similar preventative measure, be used when refueling equipment on site.
- The plan states that in the event of a spill of fuel, hydraulic fluid, lubricants and anti-freeze, the contaminated soil and any absorbent material used to contain the spill will be placed in one of the landfarm treatment cells for final disposal. Given that landfarms are designed for the treatment of certain hydrocarbon fractions only, EC does not recommend that soils contaminated with materials other than acceptable hydrocarbons (ex. glycol (i.e. anti-freeze)) be placed in the landfarm.

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The Canadian Wildlife Service (CWS) of Environment Canada has reviewed the amendment application and makes the following comments and recommendations pursuant to the *Migratory Birds Convention Act* (the *Act*) and *Migratory Birds Regulations* (the *Regulations)*, and the *Species at Risk Act* (SARA).

- The migratory bird breeding season in the project area extends from approximately June 1 to August 1. Some project activities associated with the operation of this land farm will likely be scheduled during this period. Section 6 (a) of the *Migratory Birds Regulations* states that no one shall disturb or destroy the nests or eggs of migratory birds. The migratory bird breeding season extends from approximately June 1 to August 1. These dates are approximate, and if active nests (i.e. nests containing eggs or young) are encountered outside of these dates the proponent should avoid the area until nesting is complete (i.e. the young have left the vicinity of the nest).
- If activities are permitted to occur during the breeding season, CWS recommends that the proponent confirm there are no active nests (i.e. nests containing eggs or young) in the vicinity of their (ground-based) operations before activities commence. If active nests of migratory birds are discovered, the proponent should halt all activities until nesting is completed (i.e. the young have left the vicinity of the nest).
- Section 35 of the *Migratory Birds Regulations* states that no person shall deposit or permit to be deposited, oil, oil wastes or any other substance harmful to migratory birds in any waters or any area frequented by migratory birds. **Operation of the landfarm must be such that migratory birds are not attracted to pooled liquids in the landfarm area; access must be prevented.**
- Environment Canada recommends that all field operations staff and contractors be made aware of the required mitigation measures and provided with appropriate advice / training on how to implement these measures.
- Implementation of these measures may help to reduce or eliminate some effects of the project on migratory birds, but will not necessarily ensure that the proponent remains in compliance with the *Migratory Birds Convention Act* (the *Act*) and *Migratory Birds Regulations (*the *Regulations)*. The proponent must ensure they remain in compliance with the *Act* and *Regulations* during all phases and in all undertakings related to the project.
- The *Species at Risk Act* (SARA) came into full effect on June 1, 2004. Species at risk that may be encountered in this area include Peregrine Falcons (subspecies *tundrius*) and Polar Bears, both listed as species of Special Concern on Schedule 3 of the *Species at Risk Act* (SARA). While conducting their operations, the proponent should be aware of this special status, and minimize disturbance or contact with these species.

If there are any changes in the proposed project, EC should be notified, as further review may be necessary. Please do not hesitate to contact me with any questions or comments with regards to the foregoing at (867) 975-4639 or by email at colette.meloche@ec.gc.ca.

Yours truly,

Original signed by

Colette Meloche
Environmental Assessment / Contaminated Sites Specialist

cc: (Stephen Harbicht, Head, Assessment and Monitoring, Environment Canada, Yellowknife)