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RE: NWB4NUN – Nunatta Environmental Services Inc. – Landfarm Facility, Iqaluit Additional Informaiton

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. (Nunatta) submitted an application for a water license for a landfarm facility located at the North 40 in Iqaluit, NU in September 2004. 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.
In response to information requests by various parties, the Nunavut Water Board (NWB) directed Nunatta to submit additional information (letter from NWB dated January 12, 2005). This information was submitted to the NWB in March 2005. This review takes into consideration both the original application and the additional information.

Environment Canada recommends that the following conditions be applied throughout all stages of the project:

Water Use

- The additional information submitted indicates that water used on site to ensure adequate moisture rates may be filtered and re-circulated rainwater collected from the perimeter of the facility. Environment Canada recommends that a sample of this water be analyzed once per year to ensure that no metals or other contaminants of concern are present. If metals or other contaminants of concern are present, the water should be treated prior to disposal, or sent to an approved disposal facility. If only hydrocarbons are present in the collected water, EC recommends that the water be filtered through the activated granular carbon treatment system prior to recirculation to help prevent the reintroduction of leached hydrocarbons into the treatment cells.

Groundwater Monitoring

- The additional information submitted indicates that the planned monitoring of the groundwater monitoring wells is to occur once per year for downgradient wells and once every second year for upgradient wells. Environment Canada recommends that the

downgradient wells be monitored no less frequently than twice/year, after the freshet and again at the end of the active treatment season. These wells (GW1, GW2, and GW3) should be analyzed for indicators of petroleum hydrocarbon contamination, including Total Petroleum Hydrocarbons (TPH), BTEX, heavy metals, PAH, and PCBs. Should analytical results indicate groundwater contamination associated with the land treatment facility, corrective action should be proposed and implemented.

Temporary Storage Area

- The additional information submitted states that during summer 2005, the geomembrane under Cell 2 will be replaced, requiring the storage of the material from Cell 2 in Cell 3. Further, the additional information submitted also indicates that on occasion, incoming soils require temporary storage. These soils are typically temporarily stored on Cells 2 or 3. Given that research has shown that treatment is not effective if oxygen is not incorporated into the soil, EC recommends that a separate storage area be created on site specifically for the temporary storage of materials prior to their placement in the active cells. The map included with the new information would seem to indicate that space is available within the facility to create such an area. This will allow for continuous active remediation of the materials in Cells 2 and 3 even when new material is submitted.

Landfarm Operation and Maintenance

- The additional information submitted provides information regarding the testing of incoming soil. It is stated that chemical analysis will be required for every 500 m^3 of soil entering the facility. However, no information is provided regarding the quality assurance /quality control (QA/QC) program for the sampling. Environment Canada recommends that a QA/QC program be developed and implemented for sampling completed on site.
- Nunatta currently states that incoming soil will only be tested for PAHs and PCBs when the soil is suspected of containing contaminants others than heating fuel, diesel or gasoline. In order to ensure that the facility only accepts acceptable material, EC recommends that the chemical analysis of all samples greater than 500 m^3 include testing for PCBs and PAHs.
- Environment Canada recommends that Nunatta keep accurate and thorough records so success rates can be determined and if required, operations modified to improve treatment. Records of parameters including, but not limited to, frequency and depth of tillage, soil profile temperatures, pH, moisture content, the quantity and frequency of fertilizer application (e.g., nitrogen, carbon, phosphorus), if soil warming is undertaken, if bioaugmentation occurs, and changes in permafrost depth.
- The previous application submitted to the NWB indicated that the cells in the landfarm currently have depths of 1.5 to 3.5 m. However, the additional information submitted states that the aeration equipment on site can only reach depths of 60 cm below ground level. Given this limitation, EC strongly recommends that the areas within the existing cells that exceed depths of 70-80 cm be recontoured so that they can be effectively aerated and prevent the creation of anaerobic conditions within the cells.
- The additional information submitted indicates that 3 blended soil samples will be obtained from the active cells at the end of each field season. However, given the stated potential in the original application 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 additional information submitted makes reference to reducing the hydrocarbon concentrations in the soils to below the CCME commercial TPH guidelines. However, further on the submission, it is stated that TPH concentrations will be below CCME criteria for residential or commercial uses. Information is also provided regarding the

potential final use for the reclaimed soils, listing potential uses as foundation material for roadways, and daily cover at the landfill. Environment Canada recommends that the final end use for the material be determined, and remediation levels set appropriately. All soils should be tested for a full suite of parameters prior to final use to ensure that remediation criteria have been met and no additional contaminants of concerns are present.

- The new information submitted indicates that the maximum efficiency expected to be achieved in the cells is a 90% reduction in TPH levels. Therefore, if the maximum concentration accepted is 11,000 ppm, a 90% reduction would mean that the maximum level of treatment obtained would reduce TPH concentrations to 1,100 ppm. Nunatta states that 1,100 ppm is below the "CCME commercial TPH guidelines". However, Nunatta has not stated what CCME guidelines they are referring to (i.e. Canada Wide Standards for Petroleum Hydrocarbons in Soil?). Further, the Canada Wide Standards for Petroleum Hydrocarbons vary depending on the final use of the soil, the soil type, and the fraction under consideration. Therefore, it is difficult to determine if 1,100 ppm will indeed be below CCME guidelines for commercial use. The Canada Wide Standards for Petroleum Hydrocarbons in Soil are attached for reference. Environment Canada recommends that once the final use of the soil is determined, Nunatta ensure that the remediation criteria adopted are protective for all PHC fractions, based on the end use for the soil.

Migratory Birds and Species at Risk

- Nunatta is encouraged to consult EC's comments on the original application, dated October 12, 2004, for specific recommendations regarding the protection of migratory birds and species at risk.

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.spagnuolo@ec.gc.ca.

Yours truly,

Original signed by

Colette Spagnuolo
Environmental Assessment / Contaminated Sites Specialist

cc: (Stephen Harbicht, Head, Assessment and Monitoring, Environment Canada, Yellowknife)
attachments: Canada Wide Standards for Petroleum Hydrocarbons in Soil