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RE: NWB4KRK – Government of Nunavut – Landfarm Project, Kugaaruk, NU

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*.

The Department of Public Works and Services with the Government of Nunavut is applying for a water license to allow for operation of a landfarm facility is Kugaaruk, NU. The facility is designed to treat approximately 3500 m3 of hydrocarbon contaminated soils removed from the vicinity of the bulk fuel storage area in the Hamlet. The landfarm will consist of a lined and bermed soil treatment cell and a water retention cell. The soils will be piled to a depth of 1 m and tilled on a weekly basis to a depth of 30 cm. Once the top 30 cm are remediated, the soils will be removed and the process repeated for the next 30 cm of soils, until the entire depth is remediated. Water collected in the water retention cell will be tested prior to release. Monitoring wells will be placed downslope of the landfarm. In order to remediate the contaminated soils, it is anticipated that the facility will be in operation for approximately seven years.

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.

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

- 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.
- 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 plan currently calls for monitoring of the groundwater wells once per year (mid-July) when the water retention cell is sampled. Environment Canada recommends that all of the groundwater monitoring wells be sampled no less frequently than twice per year. One sampling should occur during spring freshet, and the other during mid summer (which could coincide with the water retention cell testing). Should analytical results indicate groundwater contamination associated with the land treatment facility, corrective action should be taken as soon as possible.
- Appendix A of the license application indicates that "if contaminant levels have not been reduced significantly, consideration will be given to adding bacterial and/or nutrient amendments…" Environment Canada would like to remind the proponent of the

applicability of the New Substance Notification Regulations under the *Canadian Environmental Protection Act (1999)(CEPA 1999)* if the bacterial agents added to the landfarm are not listed on the Domestic Substances List under *CEPA 1999.*

- Environment Canada recommends that the proponent develop an Operation and Maintenance Manual for the landfarm. The Manual should clearly lay out operational procedures, monitoring requirements, sampling protocols, contingency plans, and closure plans for the site.
- Environment Canada notes that the proponent is proposing that water discharged from the water retention pond meet CCME Environmental Quality Guidelines for Marine Aquatic Life. Environment Canada recommends that the CCME Guidelines for the Protection of Freshwater Aquatic Life be used as the guideline for discharge, given that the water will not be pumped directly into a marine environment.

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)