Environment Canada Environnement Canada

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17 February 2012

EC file : 4703 003 057
NWB file : 1BR-NUN0511

Phyllis Beaulieu
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Nunavut Water Board
PO Box 119
Gjoa Haven, NU X0B 1J0

Via email: licensing@nunavutwaterboard.org

RE: 120117 1BR-NUN0511 Nunnata Environmental Renewal Type B Qikiqtani Region

Environment Canada (EC) has reviewed the information submitted with the above-mentioned renewal application as submitted to the Nunavut Water Board (NWB). The following specialist advice has been provided pursuant to the *Canadian Environmental Protection Act 1999*, Section 36(3) of the *Fisheries Act*, the *Migratory Birds Convention Act*, and the *Species at Risk Act.*

Nunatta Environmental Services Inc. is requesting from the NWB a renewal of water license 1BR-NUN0511 for a period of ten years. The water license supports a currently operational four containment cell hydrocarbon-impacted soil landfarm facility in Iqaluit. Activities include the continued operation of the landfarm and associated activities of treatment and monitoring.

Based on a review of the proposed exemption, EC provides the following comments for the NWB's consideration:

General

- The proponent shall not deposit, nor permit the deposit of chemicals, sediment, wastes, or fuels associated with the project into any water body. According to the *Fisheries Act*, Section 36 (3), the deposition of deleterious substances of any type in water frequented by fish, or in any place under any conditions where the deleterious substance, or any deleterious substance that results from the deposit of the deleterious substance, may enter any such water, is prohibited.
- EC has available the Federal Guidelines for Landfarming Petroleum Hydrocarbon Contaminated Soils. Science Applications International Corporation (SAIC Canada), March, 2006. Information in this document addresses design, operation, monitoring, sampling, analytical methods, decommissioning/closure, record keeping and reporting requirements for landfarming projects. It is recommended that the consultant refer to this document as it relates to the future operations of the landfarming project.

Spill Contingency Plan

- Refuelling shall not take place below the high water mark of any water body and shall be done in such a manner as to prevent any hydrocarbons from entering any water body

frequented by fish. EC recommends that drip pans, or other similar preventative measures, should be used when refuelling equipment.

- EC recommends that a section should be included in the Plan that provides direction regarding response action for spills on various types of terrain (e.g. spills on land, water, snow/ice, etc.)
- Spills are to be documented and reported to the NWT/NU 24 hour Spill Line at (867)920-8130. EC recommends that all releases of harmful substances, regardless of quantity, are immediately reported where the release:
    - is near or into a water body;
    - is near or into a designated sensitive environment or sensitive wildlife habitat;
    - poses an imminent threat to human health or safety; or,
    - poses an imminent threat to a listed species at risk or its critical habitat.

Comments previously submitted on behalf of EC on 12 October 2004 and 17 May 2005 would still apply to this project (see attached). If there are any additional proposed changes to the project EC should be notified, as further review may be necessary. Please do not hesitate to contact the undersigned with any questions or comments with regards to the foregoing at (867) 975-4631 or by email at Paula.C.Smith@ec.gc.ca.

Yours truly,

Paula C. Smith
Environmental Assessment Coordinator

cc: Carey Ogilvie (Head, Environmental Assessment-North, EPO, Yellowknife, NT)
Ron Bujold (Environmental Assessment Officer, EPO, Yellowknife, NT)
Allison Dunn (Sr. Environmental Assessment Coordinator, EPO, Iqaluit, NU)

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October 12, 2004 Our file: 4703 003

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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)

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May 17, 2005 Our file: 4703 003

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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