

Site Remediation

Sulphur Dioxide & Suspended Particulates

Waste Antifreeze

Waste Asbestos

Waste Batteries

Waste Paint

Waste Solvents

Reference: *Detailed engineering and Design Report, Page 29, tables 4 &5*

Table 5 contains and number of assumptions used for the calculation of effluent concentrations; similarly Table 4 contains assumptions used for sludge generation rates. **The source of these assumptions should be referenced.**

Reference: *Detailed engineering and Design Report, Section 4.3 Page 33*

The report states 'It is anticipated that during the period between 2005 and 2027, the wetland treatment area will evolve into a functioning microbial, and terrestrial plant environment capable of providing additional treatment with some effluent evaporation and disinfection'

This implies that in the short term the wetland system will not be capable of treating effluent to license discharge limits. If this is the case what is the anticipated duration until effective treatment occurs and what will be the effluent quality in the short-term before effective treatment?

Furthermore, the proponent uses a predictive model developed by Alberta Department of Environment to describe the assimilative capacity of the wetland. A temperature correction of 5⁰C is applied to the model. Is there any evidence that the model is effective is predicting wetland assimilative capacities in northern climates? Are there any case studies where similar designs for sewage effluent treatment have been applied in northern Canada?

Reference: *Detailed engineering and Design Report, Page 35, Section 4.7.2*

The lagoon will be decanted by gravity each year and flow through an outlet valve to a perforated pipe at the base of the berm and dispersed through an exfiltration berm into an engineered wetland. The new lagoon, as is the case with existing lagoon will be unlined. The berms will be compacted to 95% standard proctor density; however, DOE is still concerned about the long-term

ability of the lagoon to retain sewage effluent. Seepage through the berms, and through the base of the lagoon is a possibility without a liner. In addition, wind action and the freeze/thaw cycle will also erode the berms and further reduce their water retention capabilities. If it is the intention that permafrost formation will seal the berms, then further information should be provided, supported by thermal modeling, on the depth of the active layer, geotechnical studies on the base of the lagoon, impact of warming climate trends, time for permafrost formation and monitoring requirements.

Additionally, the effluent will be dispersed through the wetland by means of a perforated pipe. The purpose of this pipe is to prevent preferential flow paths and possible trenching in the wetland leading to reduced effluent quality. However, DOE is concerned that this pipe will become frequently blocked and not serve its purpose. Again, a case study utilizing the same arrangement would be useful to convince that this proposal is a workable and practical in Nunavut's climate.

Reference: *Detailed engineering and Design Report, Page 41, Section 5.3.1*

'Some materials such as fuels and oils may be disposed of by using a mobile incinerator. The incinerator can be mobilized to the community and operated for a period of time to consume selected wastes that are suitable for incineration. A cost benefit analysis will be required once a stockpile has been accumulated'.

If the community is considering the use of an incinerator then emissions must conform to the Canada Wide Standards for dioxins, furans and mercury. The GN is signatory to the Canada Wide Standards Agreement and is therefore responsible for applying these standards within its own jurisdictional responsibility. These emission standards can only be achieved with a dual chamber, controlled air flow incinerator along with waste stream segregation and appropriate operation and maintenance of the incinerator. These considerations, along with stack testing to ensure compliance, must be taken into account in the decision making.

Reference: *Detailed engineering and Design Report, Page 42, Section 5.3.3*

The report discusses a hazardous waste storage area within the landfill that will be lined with a HDPE liner and contained within 1m high berms. There appears to be no consideration of drainage for this part of the site and DOE is concerned that ponding of contaminated water could occur. Drainage should be directed towards a sump, inspected for contamination and if there are no obvious signs of contamination, discharged to the water retention lagoon. An active system of snow removal should also occur to reduce runoff from the hazardous waste storage area during snow melt.

Reference: *Detailed engineering and Design Report, Page 42, Section 5.5*

This section discusses the fate of the former waste disposal site that will now be used as a bulky metal site. It states that existing ditching will be improved to control erosion and there will also be improvements to the cover. DOE requests further information on the abandonment and restoration of this old waste site. Are there any existing environmental issues, such as leachate discharge, contaminated soils etc? What is the depth of the existing cover material relative to the active layer? What improvements will be made to the cover; do these improvements take into account warming climate trends? What is the depth of the trenching around the site? Will runoff be collected and monitored? Will there be any routine inspections? A more complete abandonment and restoration plan for this site is required to ensure it does not become an environmental liability.

Furthermore, in relation to long term storage of bulky metals, it would be useful to provide an assessment of the number of end of life vehicles (ELV's) produced annually in Qikiqtarjuaq, as DOE is trying to address the issue of ELV through new policy and program development.

Reference: *Detailed engineering and Design Report, Page 43, Section 5.6*

Section 5.6 discusses the acceptability of open burning at municipal waste sites. The open burning of non-segregated municipal solid waste (MSW) remains a last option for the management of MSW. Continuation of this practice should not be allowed unless a site-specific assessment fails to identify a feasible and practical alternative. In this instance DOE accepts that the practicalities of waste disposal in Qikiqtarjuaq make it one of the only viable options for waste volume reduction and management. However DOE recommends the following:

Municipal solid wastes that are conditionally suitable for open burning are paper products, paperboard packing and untreated wood wastes only.

Conditions for this burning are:

1. The principle of source reduction should be utilized to reduce, reuse and recycle materials otherwise bound for landfill.
2. The appropriate materials are segregated and burned in a controlled manner and at a controlled site which is separate from the working landfill so that the fire cannot spread.
3. Standard burning conditions shall apply, such as burning on days where winds are light and blowing away from the community.
4. Materials are burned in manageable volumes so that fires do not get out of control.
5. Having applicable permits for burning.

6. Managed by authorized, qualified personnel from the community.
7. The above conditions are also recommended in the NWT Municipal and Community Affairs Solid Waste Modified Landfill Guidelines, which have been adopted for Nunavut.

Building demolition wastes should not be burned unless they have been sorted to remove non-wood waste such as roofing materials, electrical wire, plastics, asbestos and other non-wood wastes.

Waste wood treated with preservatives such as creosote, pentachlorophenol or heavy metal solutions shall not be burned. Examples of treated wood materials include railroad ties, telephone/hydro poles, pilings, cribbing and foundations.

Reference: *Appendix H2, Operation and Maintenance Manual, Sewage Treatment Facility, Page 9.*

The section states that de-sludging of the sewage lagoons will occur every 5-10 years, but provides no details on how this operation will occur and where the sludge will be disposed of. Will the sludge be spread to a designated piece of land or land farm? Will it be placed in a special cell within the landfill or even composted. How and when (time of year) will sludge removal occur? Where will the communities' sewage go when the lagoons are being de-sludged? Further details on the logistics and practicalities of this maintenance operation are required in this manual.

Reference: *Appendix E, Emergency Contingency Plan*

Please update the Contact information for the GN Manager Pollution Control as follows; Tel 867 975 7748, Fax 867 9757739

DOE thanks NWB for the opportunity to comment on this water license application

Yours sincerely,

Original signed by

Mike Atkinson
Manager Environmental Assessment and Land use
Department of Environment
Government of Nunavut
P.O. Box 1000, Stn. 1360
Iqaluit, Nu X0A 0H0
PH: (867) 975-7732