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Your file - Votre référence
NWB1JER0410
Our file - Notre référence
9545-1-1JERG / CIDMS 142798

April 30th, 2007

Phyllis Beaulieu
Licensing Administrator
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU, X0A 1J0

Re: Jericho Mine Project - Landfill Design, Waste and Hazardous Materials Management Plan

Indian and Northern Affairs Canada (INAC) has performed a review of the Landfill Design, Waste and Hazardous Materials Management Plan (Plan), submitted to the Nunavut Water Board. In conducting our review INAC has made reference to the following documents:

i. Landfill Design, Waste and Hazardous Materials Management Plan (January 2007)
ii. Contingency Plan, Jericho Diamond Project. Tahera Diamond Corporation (April 2005)
iii. Nunavut Water Board Licence NWB1JER0410
iv. Guidelines for the Planning, Design, Operation and Management, of Modified Solid Waste Sites I NWT" (Ferguson, Simek, Clark, April 2003)

The INAC submission contains three sections a comparison of licence requirements to information provided in the plan, a review of landfill design, waste and hazardous materials management plan and a summary.

Section I - Comparison of Licence Requirements to information Provided in the Plan

Part D - Conditions Applying to Construction

As per **Part D Item 6, Schedule D Item 6, Part D Item 17, Part D Item 18**, **Part D Item 19** of Nunavut Water Board Licence **NWB1JER0410:**

(Part D.6)
The Licensee shall submit to the Board for approval, a detailed Landfill Design Plan at least

sixty (60) days prior to the construction of the Landfill including drawings, stamped by an Engineer. This plan shall be developed in accordance with the Schedule D, Item 6.

The Plan submitted by the proponent does not contain drawings, stamped by an Engineer. INAC requests that drawings, stamped by an Engineer be provided to the NWB sixty days prior to construction for review by interveners and inspectors.

(Schedule D.6)
The detailed design plan for the landfill referred to in Part D, Item 6 of the Licence, shall include but not necessarily be limited to the following:

a. Consideration for the "Guidelines for the Planning, Design, Operation and Management, of Modified Solid Waste Sites I NWT" (Ferguson, Simek, Clark, April 2003).
b. Detailed Implementation schedule;
c. A plan on how the landfill will be incorporated into the reclamation of Waste Rock Dump No. 1:
d. Design criteria and material specifications;
e. Estimates of cover thickness to ensure encapsulation in permafrost
f. Consideration of global warming effects;
g. Overview Operation and Maintenance needs;
h. Runoff and seepage control measures; and
i. Monitoring requirements during construction.

The landfill may have been partially constructed and operated before design and drawings were approved. The Plan, Appendix C, Section 2.0 states *"It is understood that the landfill waste has been placed into the landfill area over the placed till material since 2006"*. The proponent should explain whether these activities preceded the authorship of the Plan (January 2007), submission to the Nunavut Water Board and review by interveners (February 23, 2007) of a detailed Landfill Design Plan as required under Part D Item 6 of Nunavut Water Board Licence **NWB1JER0410.**

Schedule D, item 6c states the landfill will be incorporated into Waste Rock Dump No. 1, whereas the Plan states the landfill will reside within Waste Rock Dump No. 2. This item should be clarified, and possibly **NWB1JER0410** should be amended to reflect the change in landfill location.

(Part D.17)
The Licensee shall ensure that all containment and runoff control structures are constructed and maintained to prevent escape of wastes to the surface or ground water systems.

Does the Nunavut Water Board feel this portion of the licence applies to the landfill? If yes, has the licencee indicated to the NWB that this condition has been fulfilled?

(Part D.18)
The Licensee shall, within ninety (90) days of completion of any structure designed to contain, withhold, divert or retain, waters or wastes, submit to the Board for review, a construction report prepared by a qualified Engineer that shall include as-built drawings, documentation of field decisions that deviate from original plans and any data used to support these decisions.

Does the Nunavut Water Board feel this portion of the licence applies to the landfill, since it retains waste? If yes, has the licencee provided sufficient information to the NWB to determine if the conditions have be fulfilled? Will the NWB inform the inspector if the as-built drawings are received within the 90 days specified in the licence?

(Part D.19)
The Licensee shall ensure that all construction of engineered structures will be supervised and field checked by an appropriately qualified and experienced Engineer in such a manner that the project specification can be enforced and, where required, the quality control measures can be followed. The licensee shall also ensure that the construction records of all engineered structures are maintained and made available at the request of the Board and/or an Inspector.

Does the Nunavut Water Board feel this portion of the licence applies to the landfill? Did the NWB intend for the landfill to be considered as an engineered structure? Would the NWB indicate if the construction records for the Landfill construction activities competed to date have been received? Has the NWB informed the INAC inspector that the licencee has submitted construction records for the Landfill construction activities competed to date?

Part G: Conditions Applying to Waste Management

As per **Part G Item 3, Part G Item 4, Part G Item 10, Part G Items 12-15** of Nunavut Water Board Licence **NWB1JER0410:**

(Part G.3)
The Licensee shall carry out, at a minimum, weekly (regular) inspections, including, but not limited to, all major earthworks, retention structures, dams and diversion structures, stockpiles, dumps, berms as well as open pit slopes, and the records shall be kept for review upon request of an Inspector.

Does the Nunavut Water Board feel this portion of the licence applies to the landfill?

(Part G.4)
The Geotechnical Engineer inspection to be carried out annually as required by Part G, Item 2 (g) … shall include, not limited to: Landfill, Landfarm, Fuel Containment Facility, Collection Ponds (if applicable) and facilities provided in the Waste Rock Management Plan.

The NWB should indicate to the inspector if an annual inspection report has been provided by the licencee? Has the NWB informed the INAC inspector of the an annual inspection report?

(Part G.10)
During the first year of construction and operation, the Licensee shall dispose of and contain all solid waste at the Short Term Landfill or as otherwise approved by the Board.

Based on the Plan it is unclear if an short term landfill exists. Furthermore, the licencee does not mention whether material in the short term landfill will be transferred into the 'long term' landfill.

(Part G.12)
The licensee shall implement measures to ensure leachate from the Landfill does not enter the water.

Information addressing this portion of **NWB1JER0410** was not presented in the Plan. Although the intent of the Plan states that the body of waste material will remain frozen, early years freezing of the body of waste may not occur, thus, leachate may be generated. Has the licencee provided the NWB with the contingency plan to capture any such leachate? Has the NWB informed the inspector that a leachate continency plan has been filed?

(Part G.13)
The Licensee shall dispose of and contain all identified hydrocarbon-contaminated soils from spills in the Landfarm.

This condition implies that there will be on-site treatment of petroleum contaminated soil. However, the Plan states that all petroleum contaminated soil will be removed off site to a licensed disposal facility. For consistency in reporting this conflict should be resolved.

(Part G.14)
The Licensee shall dispose of and contain all identified hydrocarbon-contaminated snow and ice in a segregated sump in the Coarse Processed Kimberlite stockpile.

Part G.14 appears to conflict with Section 7.3.4.1 of the Plan which states "snow and ice will be allowed to be melted on an annual basis inside the hazardous material storage area." INAC requests the conflict of information be clarified to ensure all licence conditions are adhered to.

(Part G.15)
The Licensee shall dispose of and contain all identified hydrocarbon-contaminated rock in a segregated area of Waste Dump No. 1.

INAC was unable to find mention of any separation of hydrocarbon-contaminated soil and contaminated rock in the Plan. The Plan only mentions hydrocarbon-contaminated soil, and states: *"Petroleum contaminated soils, snow and ice will be stored in the hazardous materials storage area." and "Soil will be backhauled to a licensed disposal facility on the winter road".*

Part H - Conditions Applying to Waste Management Plans

As per **Part H Item 5 and Schedule H Item 3** of Nunavut Water Board Licence **NWB1JER0410:**

(Part H.5)

The Licensee shall, within one (1) year of the effective date of this License, submit to the Board for approval, an Operation and Management Plan for the Waste Water Treatment Plant, the Landfill and the Landfarm. The plan(s) shall be developed in accordance with Schedule H, Item 3.

(Schedule H.3)

The detailed Operation and Maintenance Plan for the Waste Water Treatment Plant, Landfill and Landfarm referred to in Part H, Item 5 of the License, shall include but not necessarily be limited to the following:

1. *consideration for the "Guidelines for the Preparation on an Operation and maintenance Manual for Sewage and Solid Waste Disposal Facilities in the NWT"*

Does the proponent intend that Section 6.0, Landfill Management, of the Plan is an O&M plan, or is that plan forthcoming? The EBA report contains some of the data typically found in an O&M plan, but not all details INAC would expect.

Part J - Conditions Applying to Contingency Planning

As per **Part J Item 1 and Part J Item 4** of Nunavut Water Board Licence **NWB1JER0410:**

(Part J.1)

The Licensee shall submit to the Board for approval within thirty (30) days of the effective (date) of this Licence, a revised Contingency Plan prepared in accordance with the NWT Water Board's "Guidelines for Contingency Planning January 1987" or subsequent edition. This Plan shall be developed in accordance with Schedule J, Item 1.

(Part J.5)

The Licensee shall review the Contingency Plan annually and revise as necessary to reflect changes in operation and technology.

The contingency plan provided to review is dated April 2005, which appears to be the first one issued after the license was issued in January 2005. Has the proponent filed any revisions to the plan with the NWB? Has the NWB provided notice of revisions to the

inspector and interveners? If not, did the licencee explain why the revisions were not included with the Plan?

Section II-
Review of Landfill Design, Waste and Hazardous Materials Management Plan

Section 3.1 - Design Life

This section contains only basic information. The only reference to the size of the landfill is the plan view outline on Figure 3. The body of the report does not mention how the landfill dimensions as presented in Figure 3 were derived. At this stage, little information was provided by the proponent to show that the proposed landfill dimensions are adequate.

Furthermore the Plan does not contain an estimate for the annual quantity of waste to be produced. The annual waste production amounts are required to predict the volume of waste to be managed during the operating life of the mine. Additionally, there is no indication if the landfill is intended for closure waste and demolition disposal. Depending on Tahera's closure plans, quantities of these materials should also be identified.

Section 3.2 - Permafrost Encapsulation During Operation and Closure

This section states that ongoing daily operation through the life of the landfill will be such that frozen waste will be covered in the spring to reduce the movement of seasonal thaw in the material. Details are lacking however. The statement implies that a cover (of unspecified thickness) will be placed sometime in the spring prior to the commencement of thawing of the waste material. The proponent should be encouraged to provide more detail, perhaps in the form of a Standard Operation Procedure (SOP) that can be reviewed, which should include reporting that can be audited to ensure compliance.

Section 3.2 states that encapsulation is consistent with the design, operation and closure of other landfill sites under licence in the Northwest Territories and Nunavut. Are there specific landfills the proponent wishes to reference with this statement? Alternatively, the proponent should be encouraged to provide evidence to support this contention.

Construction of the final cover should be proceeded by a topographic survey so that the cover thickness can be verified. There is no analysis to describe the rate of permafrost aggradation into the waste. This should be provided to demonstrate that there will not be seepage which could cause impacts. The analysis should consider any moisture which may be associated with snow melt in the waste and any sludge which is placed in the landfill.

Section 3.4 - Fencing

Section 3.4 states waste placed in the site will be covered regularly and particularly when wind conditions are elevated. Given that extreme weather conditions including elevated wind speeds often occur with little notice accompanied by very inclement weather, this statement appears unfounded. That being said, given the nature of material to be placed in

the landfill, high winds may not be problematic. Site experience will likely dictate how best to deal with cover material to limit wind blown scattering of materials. The proponent should update their Landfill Operation and Management to reflect site experience.

Section 3.5 - Burning

The proponent is ambiguous concerning it's commitment to the FSC (2003) guideline. In Section 2.1, they state "those principals that are applicable have been adopted in the design and operation of the landfill". However, in Section 3.0 they state "the landfill has been designed to conform to the requirements of the *Guideline*". In Section 3.1, it is stated that the landfill has associated with it, a burn pit and sludge pit. Burning is a practice which is strongly discouraged in the FSC (2003) guideline. The proponent should clearly describe when a portion of the Plan has been tailored to meet the objectives of the FSC (2003) guideline.

Furthermore, the proponent should clearly describe the rational behind portions of the Plan which do not adhere to the FSC (2003) guideline. For instance the Plan may be in conflict with the following parts of the FSC (2003) guideline:

1.4 OPEN BURING IS NOT ACCEPTABLE

This section states that only wood and paper may be burned. In photo 18 of the Plan it appears that there is material other than wood and paper in the burn pit. The proponent should provide justification for burning material other than wood and paper as this practice conflicts with the FSC (2003) guideline

2.8.2 SURFACE WATER

All land and water boards will require routine surface water monitoring program. At minimum three sampling stations will be required: upstream; immediately downstream; and at a receiving body. Large sites may require additional stations. Generally, the requirements will be outlined in a licence. These requirements are not well documented in the Plan and need to be better addressed. No mention of upstream monitoring is included in the Plan though given the nature of the site, this may not be possible. However, downstream monitoring needs a more detailed plan.

4.6.1 OPERATION AND MAINTENANCE MANUAL

An O&M manual will need to be developed for the proposed landfill.

Section 3.6 - Sludge Pit

Section 3.6 deals with disposal of solids received from the wastewater clarifier (WWC). The solids are to be placed into a pit adjacent to the landfill within the waste rock dump. The Plan specifies that downslope groundwater water quality monitoring is used to maintain a review of any potential changes to surface and subsurface water quality from flows that may come from the rock dump area. All downslope flow is directed to the pit catchment area.

INAC has concerns about the operation and performance of this Sludge Pit. WWC solids will likely bleed water out. The proponent should explain how will the water be managed and if a liner will be used to and capture any bleed out water. Furthemore, will bleed water be encapsulated by permafrost? The licencee should provide justification for their methodology. This type of water should not flow overland, in the active layer or interacting with the landfill since it may contain pathogens and have a high organic loading. How will such water be collected should it exit the waste rock pile? What is the proposed contingency plan if/when water quality does not meet defined limits or criteria (i.e. what are the contingencies)? Although disposal of sludge will occur adjacent to the landfill any interaction between the two project components clearly conflicts with the concept of industrial dry waste landfill. Will the proponent position and construct these projects elements such that no interaction can occur?

Section 3.7 - Surface Water Sampling

Section 3.7 states that surface water is sampled at several locations around the site. Currently sampling of surface water or seepage water (as dictated by the Water Licence) is at three locations:

1. one location in the pit,
2. one location off the crusher, and
3. one location off (down slope) of the till dump (Waste Dump No. 2) where the landfill is located.

Section 3.7 further states should any seepage occur (resulting from water seeping through the landfill waste), seepage will be observed at the down slope monitoring location. This statement suggests that only surface water is being sampled, however "seepage water" may imply subsurface flow or may imply surface flow from within the Waste Dump. The Plan states that surface water will be sampled, but perhaps implies that this sampling will detect subsurface water. Details on sampling are lacking, and the locations of sampling are ambiguous based on the report. Appropriately labelled drawings should be provided, and photos of the locations would be beneficial. There is concern that this sampling may be inadequate to detect flow from the WWC solids as well as from the landfill. Details of the sampling program should be provided and reviewed for particulars such as, exact locations, when will sampling be done, what parameters are analyzed for, and what criteria will trigger an operational reaction.

Section 3.8 - Hazardous Waste Storage Facilities

Section 3.8 addresses hazardous waste storage facilities. A QA/QC protocol to ensure that hazardous wastes are not inadvertently disposed in the landfill was not evident.

Section 4 - Landfill Location

Only approximate dimensions are provided (see information under Section 3.1 - Design Life). Information was not found concerning potential seepage pathways. Seepage could emerge at the perimeter of the waste rock pile during or following operations, depending upon the rate of freezing. Monitoring points should be established at select locations.

Additionally, Figure 2 proposes an approximate landfill location. The proponent should update Figure 2 to include final locations for the landfill, burn pit and sludge pit.

Section 5.1 - Types and Quantities of Waste

Section 5.1 lists the waste types, which are included below:

1. Scrap metal
   Structural steel, equipment guards, plate steel, steel pilings, tanks (decommissioned), bins, cladding, doors, rebar, filing cabinets, cable tray, metal furniture, wheels.
2. Rubble
   Broken concrete, masonry.
3. Wood products
   Timber dunnage, plywood and lumber from formwork and camp modules or burned in open burn pit.
4. Rubber products
   Conveyor belting, floor mats.
5. Construction
   Construction and demolition debris.
6. Glass
7. Piping
   Steel and plastic piping (fuel and glycol piping clean), including insulation, heat trace cable and support brackets.
8. Fabrics and liners
   HDPE liner, woven geotextile, insulation (liners cut into strips for burial to prevent water containment).
9. Electrical
   Cabling, cable support systems, electrical panels, switchgear, transformers (except oil-filled units).
10. Equipment (non-recyclable)
    Non-hydrocarbon-contaminated and cleaned equipment: electric motors, boilers, fans, heaters, bearings, gearboxes, pumps, screens, truck parts, conveyor idlers and pulleys, truck shop equipment, appliances.
11. Incinerator ash
    Ash from the incinerator.

INAC is concerned that inadequate cleaning of piping and equipment may occur (items 7, 10). Glycol, petroleum hydrocarbons, and solvents can be mobile at subzero temperatures, even through frozen soil. What measures will be taken to ensure adequate cleaning is done? Are these measures adequate, fail-proof, and/or auditable?

The Plan states that incinerator wastes will be disposed of in the landfill. Incinerator ash may contain contaminants of concern, depending on what was burned.

The Plan states that organics (food wastes) will be incinerated. This should not pose problematic leachate, providing nothing else is burned with it.

The Plan also states, however (Section 7.3.4.3) that small volumes of used rags and sorbents may be incinerated. Given the potential variability of incineration wastes, a program of periodic or regular sampling of the incineration ash and having chemical analysis performed would be prudent to ensure that no undesirable chemicals are being placed in the landfill.

Section 6.1 - Landfill Management - General

Section 6.1 states that burial on site of equipment that is drained of hydrocarbons is standard practice at mining operations. Equipment containing petroleum hydrocarbons will be drained prior to landfilling. The waste petroleum products will be disposed of in waste oil cubes for backhaul on the winter road to a licensed hazardous materials disposal contractor or burned in a waste oil burner. If required, petroleum reservoirs in the equipment will be cleaned with solvent or steam prior to landfilling.

On paper this sounds good. In practice it is highly dependent on the attitude and people on site. There should be a well defined SOP in place to ensure that this is done properly, and an audit process to keep all concerned motivated to do a proper job. Review of SOPs is warranted, and an audit process should be defined, agreed upon, and implemented.

The Plan states that the environmental coordinator will monitor landfill operation and report issues to the site services contractor and mine manager. Inspection by the environmental coordinator will include:

- Housekeeping.
- Evidence of unauthorized use of the landfill.
- Evidence of ponding of water on berms, mounds or unused areas.
- Any other items that may indicate problems with safe operation of the landfill.

Problems will be reported to the mine manager for action. Issues will be addressed on a priority basis.

Seepage out of rock pile should also be included in this reporting, especially in the vicinity of the landfill and WWC solids disposal area.

Section 7 - Hazardous Materials Management

A significant oversight in this section is the omission of hydrocarbon contaminated soil. This is a particularly important issue considering the proponent's ongoing record of fuel and contaminated soil management. It is not known if there have been additional significant contaminated soil problems during the construction and initial operations.

Section 7.2.5. - Inspections

Section 7.2.5 discusses the inspection schedule and reporting protocol for hazardous materials management. Does the NWB have a record of the audit by the proponent?

Section 7.3.4.1 - Petroleum Contaminated Soils, Snow and Ice

Section 7.3.4.1 states that petroleum contaminated snow and ice will be allowed to be melted on an annual basis inside the hazardous material storage area (HMSA). How will snow and ice melt be managed? Will this be in a separately bermed area within the HMSA so vehicles, equipment, and personnel entering the area cannot come into contact with hydrocarbons left over after melting? The license (Part G, Item 14) states this material shall be disposed of in a segregated sump in the Coarse Processed Kimberlite stockpile. The procedure in the report appears to contradict this.

Appendix A - Tahera Diamond Mine Contingency Plan

Section 5 of the Contingency Plan discusses the inspection plan whereas Section 4 discusses emergency response (including spill response). Has the licencee audited these documents and reported such information to the NWB?

Section 12.0, Environmental Mapping states "Contaminated materials from spills will be placed in suitable containers and removed from the site or, if a petroleum product, remediated on site." This statement in the Contingency Plan appears to conflict with the EBA report that says petroleum contaminated soils will be removed from site.

Appendix C - Thermal Analysis

Thermal analysis assumes that permafrost will aggrade into the base tills, and ultimately into the waste. Although this appears to be a reasonable assumption, placement of waste during the summer, summer radiation, percolation of water in the spring due to thaw and precipitation in the summer, all serve to complicate the thermal regime. Additionally, the construction of the landfill is not proceeding as an engineered structure, similar to frozen core dams, so material properties and thermal boundary conditions necessary to model the temperature versus time behaviour are not well defined or controlled.

To verify the assumptions in the thermal analysis, and to check and calibrate the thermal analysis over time, the proponent would be prudent to install thermistors in key locations to measure the thermal regime beneath and within the waste pile to ensure that freeze-back is progressing as expected. This thermal could at least verify the assumed behaviour. In the case of unexpected behaviour, the data could be used to alter the input into the model to determine anticipated future behaviour, as well as providing an early detection of unanticipated behaviour that could trigger contingency plans to react to poor performance. Poor thermal performance within the waste material may lead to unexpected seeps emanating from the landfill. The thermal analysis used to determine the cover thickness of 4.6 m appears to be reasonable based on cover designs at Ekati and Diavik mines.

Section 2.0 - Landfill Site Conditions

The design of the landfill does not have any engineered liner, however, Section 2.0 of Appendix C states:

1. *Till from pit overburden excavation was initially placed over the original ground at the landfill area in winter 2005, and the thickness of the winter-placed till*

material was approximately 2 m;

2. *Additional till approximately 6 m thick was placed over the winter-placed till in summer 2005.*

No details of placement, compaction or QA/QC are discussed, so the quality of this underlying soil and the final condition of the till are unknown. Figure 3 of the Plan does not include the above detail of an approximately eight (8) meter thick till base beneath the landfill. Is the proponent expected to clarify this matter?

Section 4.2 - Soil Index and Thermal Properties

Table C3 summarizes the material properties used in the thermal analyses. It appears that there is one error in the data entry in the table; the waste rock has a higher thermal conductivity when unfrozen (1.67 W/m-K) than when frozen (1.45 W/m-K). It is unusual for a soil to have a higher unfrozen thermal conductivity than a frozen one. These values are likely transposed as a typographical error.

Section 4.3 - Results, Discussions, and Recommendations

Section 4.3 states that the thermal analysis results predicted that the till material placed in summer 2005 will be frozen back about two years after its placement; that would be effective summer 2007. This prediction should be verified this summer.

Closure Cost Implications

The proponent has proposed covering the 50 m x 150 m (approximate dimensions) with 4.6 m of rock to promote permafrost conditions. This will require 34,500 m^3 of rock. Assuming that none of this material was placed during operations and the dump geometry was not conducive to covering the waste by dozing, then the cost of covering could be in the range of $100,000 ($3/m^3 for load, haul, dump and spread rock). If dozing were practical, then the cost could be as low as 1/3 this amount.

In the 2004 reclamation security estimate by INAC, a very minor amount of $1900 was allowed for spreading overburden on the covered landfill. Rock cover was assumed to have been addressed in the dump dozing effort of $28,000.

The modified landfill design, primarily the thickness of the cover, may result in a short-fall of reclamation security by $30,000 to $100,000, depending upon the dump geometry at the end of operations. Given the absence of information on dump geometry, INAC would assume the reclamation security amount for the landfill should on the higher end of this estimate.

General Comments

The company has not proposed any specific strategy for management of hydrocarbon contaminated soil. However, should they opt for burial of this material in the rock piles for permafrost containment, as has been proposed at northern mines in NWT, then the following points should be considered:

1. Creation of numerous hazardous waste disposal sites in the arctic should be avoided. Permafrost encapsulation of hazardous waste is not an accepted industrial practice. If this starts with hydrocarbon contaminated soil, it could lead to other wastes, solid or even liquid. There may be cases where this is unavoidable. However, permafrost encapsulation should not be the default option.
2. A dump and bury approach to hydrocarbon contaminated soil does not promote (through cost avoidance) a high standard for handling of hydrocarbon products on site.
3. Off-site disposal has been proposed by the operators of the Diavik and Snap Lake projects.

Section III - Summary

1. The construction of the landfill preceded approval of the design and drawings by the NWB. Additionally, signed and approved drawings have not been provided to the interveners fro review.

2. There is uncertainly as to which conditions listed in Part D and E of NWB1JER0410 actually apply to the landfill. These issues need to be resolved so that any shortcomings in fulfilling the licence requirements can be resolved.

3. There is uncertainly as to which conditions listed in Schedule D Item 6 of NWB1JER0410 have been met. The Conditions Applying to Construction as defined in the licence should be adhered to. If conditions have not been met, these issues need to be addressed so that any shortcomings in fulfilling the licence requirements can be resolved.

4. Annual inspection reports do not appear to have been filed to date, although the actual start-up date of the landfill is uncertain. In the case that the landfill has not been in effect for one year, this comment can be disregarded.

5. The status of the short-term landfill is unclear.

6. Leachate may emanate from the landfill and the sludge pit in the short-term, prior to freeze back. The containment and management of this leachate does not appear to have been addressed in the Plan.

7. A plan for the disposal of hydrocarbon contaminated soil and water needs to be resolved. There is conflict between the Tahera Contingency Plan, the Plan (submitted by EBA) and the licence requirements.

8. The licence requires the contingency plan be reviewed and revised annually. This does not appear to have been implemented.

9. Since the landfill will be open for many years (which provides a poorly defined thermal boundary), modeling of the freeze back has significant uncertainty. Given that the plan is for freeze back of the landfill in the Waste Rock pile, this uncertainty impacts how fluids (precipitation and melt water in particular) will behave in the short-term certainly, and possibly in the long term. Consequently, it is recommended that temperature measurement instrumentation be installed to monitor the thermal performance. This can the be compared to modeled predicted behavior and if the performance is not as anticipated, then contingency measures may be implemented to ensure that no adverse impact results. The thermal analysis appears to provide reasonable results for closure, and the required cover over the landfill at that time. However, the thermal performance of the system during the operational life of the mine is not well defined, in particular whether the waste in the landfill will remain frozen.

10. The Plan should address the total and volumes of waste which will be placed in the landfill.

11. There appears to be inadequate documentation relating to the Operation and Maintenance of the landfill for the landfill operators. A Standard Operation Procedures (SOP) manual should be developed (and approved) which includes any reporting necessary that can then provide an auditable document to ensure that the landfill is being operated in a manner that is protective of the local environment.

12. More detail is likely required for the water sampling program to ensure that there is no adverse impact on surface and subsurface water due to the waste. Details in the plan were very limited so it was impossible to confirm whether or not the sampling program is adequate and protective of the environment.

13. There is concern that there are inadequate provisions to ensure that equipment that has contained hydrocarbons, glycol, etc. will be properly cleaned prior to being placed in the landfill. Protocol to provide assurance that hazardous materials are not disposed in the landfill. A more rigorous plan, complete with auditable documentation is recommended.

14. Burning of waste provides opportunity for poor waste handling practice, and is discouraged in the Guidelines. To minimize poor practice, a well defined plan needs to be developed, supervised and audited. As an additional precaution, sampling and chemical analysis of the ash for leachable chemical compounds may provide added incentive for proper burning practice.

15. Creation of a hazardous waste site should be avoided.

Should you have any questions or comments, please do not hesitate to contact me at (867) 975-4548 or by email at BathoryS@ainc-ianc.gc.ca.

Sincerely,

[Original Signed By]

Stephen Bathory
Regional Coordinator