INFORMATION REQUEST RESPONSE

EA No: 0809-001 **Information Request No: YKDFN #05**

Date Received:

February 28, 2011

Linkage to Other IRs:

Review Board IR #12
Alternatives North IR #11
YKDFN IR #3

Date of this Response:

May 31, 2011

Request

Preamble:
The remediation plan for six of the eight open mine pits specified that any entrances to the mine workings be closed, pit slopes regraded if necessary, and a perimeter security fence installed. These six pits will remain open and unfilled (i.e., not backfilled or flooded). Select efforts to ensure that access to open pits, and associated safety, are uncertain.

Question:
a. It is requested that the criteria and/or standard that will be applied to ensuring a long-term safe closure of the mine opening and pit stability be provided.
b. It is requested that additional details be provided with regards to any independent monitoring that will be completed to ensure that the mine openings are satisfactorily closed and long term stability of the pit walls are achieved. It is requested that additional detail be provided on the post-remediation frequency of independent monitoring of the open pits.
c. Perimeter fences are prone to damage, vandalism, and may not limit access to the open pit by aggressive trespassers of the area. In short, fences are not perfect in limiting access to the open pit. Despite proposed efforts to improve safety of the pits by closing mine work openings and regrading pit site walls, the open pit will likely be a dangerous place for people and wildlife if there is a successful breach through the perimeter fence. Security of the site has been recommended as one method to control access to areas of the Giant mine site. It is requested that additional details regarding the efforts to limit/control access to the open pits are provided. It is requested that the response include a discussion on the frequency of inspections of the fence integrity, efforts to monitor activity in the vicinity of the fence, and any other relevant security monitoring efforts.

d. INAC should be directed to examine analogous sites from other parts of the country to evaluate risks. Particular attention should be paid to areas immediately adjacent to urban centres with high levels of winter outdoor activity.

Reference to DAR (relevant DAR Sections):

S.6.4 Open Pits

Reference to the EA Terms of Reference

S.3.2.4 (7) Development Description

Summary

Closure of open pits and post closure monitoring requirements are covered under the *Mine Site Reclamation Guidelines for the Northwest Territories* (INAC 2007). Fencing is a recommended closure method for the conditions at the Giant mine.

The NWT Guidelines do not specify an inspection frequency for fences around closed pits. Annual inspection is common at other sites.

Comparisons can be made to the Frood-Stobie Complex in Sudbury, Ontario which has large open pits close to residential areas. The Frood-Stobie site is off-limits to the public. The pit conditions are similar to the conditions at the Giant Mine where the pit walls are steep and in some places connected to the underground workings. The closure plan for the Frood-Stobie pits calls for fencing.

Response A

The Giant Mine Remediation Plan (Remediation Plan) for safe closure of open pits was based on geotechnical assessments of pit wall stability and regulations and guidelines concerning pit wall safety. The recommendation for safe long term closure is for ongoing monitoring of pit stability and of condition of berms/fences. Corrective action would be taken as indicated by the monitoring.

Geotechnical assessments of the pit walls have consistently shown that they are stable. Periodic inspections will ascertain whether any instabilities that are developing will be part of the long-term site monitoring plan. The issue for closure of the pits is therefore safety of people and wildlife.

The *Mine Health and Safety Regulations, N.W.T. Reg. 125-95* are specific about requirements for protection and closure of open pits:

- Surface Openings: Section **1.128.** The manager shall ensure that surface excavations or openings are securely fenced or otherwise protected against inadvertent access; and
- Cessation of Work: Section **17.03.** (1) Where work at a mine or exploration site is stopped for a period exceeding 30 days, the owner or manager shall cause the entrances to the mine or exploration site and all other pits and openings that are dangerous by reason of their depth or

otherwise, to be suitably protected against inadvertent access within the time limit specified by the Chief Inspector.

The *Mine Site Reclamation Guidelines for the Northwest Territories* (INAC 2007) (Guidelines) have information about mine closure activities including open pits. Closure methods for open pits recommended in the Guidelines are:

- Backfill open pits with appropriate materials (e.g. waste rock, tailings);
- Flood the pit (natural or accelerated);
- Allow gradual slope failure of pits involving rock masses, or slope pit walls;
- Block open pit access routes with boulder fences, berms, and/or inukshuks (guidance from local communities and Elders should be sought); and
- Post warning signs (with visible symbols placed close enough so they are visible from one to another) and fences or berms around the perimeters for actively managed sites (not acceptable for remote sites into the long-term).

Post-closure monitoring of open pits is also covered in the Guidelines:

- Identify areas that are not stable;
- Check ground conditions to confirm permafrost conditions are being re-established as predicted;
- Sample surface water and profiles of flooded ponds/pits;
- Ensure that there is sufficient water supplied to maintain an appropriate water depth for flooded pits;
- Sample water quality and volume at controlled discharge points of pit lakes;
- Sample quality of groundwater seeping from pit walls to assess potential for contamination of mine water due to melting permafrost and ARD/ML from pit walls;
- Identify and test water management points (including seepage) that were not anticipated;
- Inspect barriers such as berms, fences, signs, and inukshuks; and
- Inspect fish habitat in flooded pits where applicable.

Giant Mine does not have enough clean fill material on hand to backfill the pits. Tailings could be used as fill, but that would require excavating, hauling and placing large volume of tailings, which would significantly increase the risk of dust dispersion. The tailings would fill the base of the pits but would be very difficult to slope up the high walls, meaning that the safety risks would still be present. Clean fill to slope up the high walls would need to come from a new borrow source, causing disturbance to new areas and probably leaving behind another pit to be closed.

Flooding of the Giant Mine pits is not practical because of the interconnections with the underground mine.

Of the remaining options, fencing is the most appropriate. The Guidelines state specifically “Long-term fencing to prevent access may only be appropriate if the mine site is located close to a community where regular access for maintenance is possible and where there is a higher risk of access by the general population.”

Response B

It is proposed that pit walls, crown pillars, and closed mine entries will be inspected annually for five years and every second year for ten years thereafter or as otherwise in conformance with the NWT *Mine Health and Safety Act*[1]. Long term frequency of monitoring will be recommended during Class B designs for pit walls; crown pillars, and closed mine entries. Further monitoring requirements will be recommended by geotechnical engineers.

Response C

At Giant Mine, the portion of the site occupied by the passive freezing system will be fenced and subject to security over the long-term. That security may include daily inspection of the perimeter fence.

Inspection requirements for the fences around the pit highwalls are not as clear. There is no standard frequency for inspection of open pit fencing in NWT. Annual inspections are common at remote sites where maintenance is the primary concern. Deliberate access is probably more likely than maintenance failures at the Giant Mine, but individuals who deliberately breach a safety fence do so at their own risk. Therefore we do not expect that there will be daily inspections of the pit fences. A more likely inspection frequency may be quarterly or monthly.

Response D

As a comparison to the open pits and nearby residential areas at the Giant Mine, the nickel-copper open pits at the Frood-Stobie Complex in Sudbury, Ontario have nearby residential areas plus a college (Figure 1). The pits are connected to the underground mining excavations, similar to some pits at the Giant Mine. The pits are inactive however they are being undercut by active underground mining. The pits are 2,713 m (8,900 ft) long and up to 488 m (1,600 ft) wide. The pits have steep unstable walls and are too hazardous to permit access for recreational activities. Security fencing is maintained on three sides of the pits and there is a single strand wire fence on the west side. The closure plan for the pits says there are "… several open pits and caved areas within the closure area. Underground mining beneath these pit areas has resulted in extensive cracking around the periphery of the pits, creating large areas of unstable ground. These areas will be fenced on closure due to an inability to stabilize the ground through backfilling or other means." This is a similar condition to the remediation plan for the Giant Mine except that there are no extensive surface cracks in the bedrock around the Giant pits.

[1] Section 14.2.6 Physical Monitoring and Inspections, page 14-43 and Table 14.2.1 Outline of Proposed Long-term Environmental Monitoring Program, page 14-15, of the Giant Mine Remediation Project Developers Assessment Report, October 2010

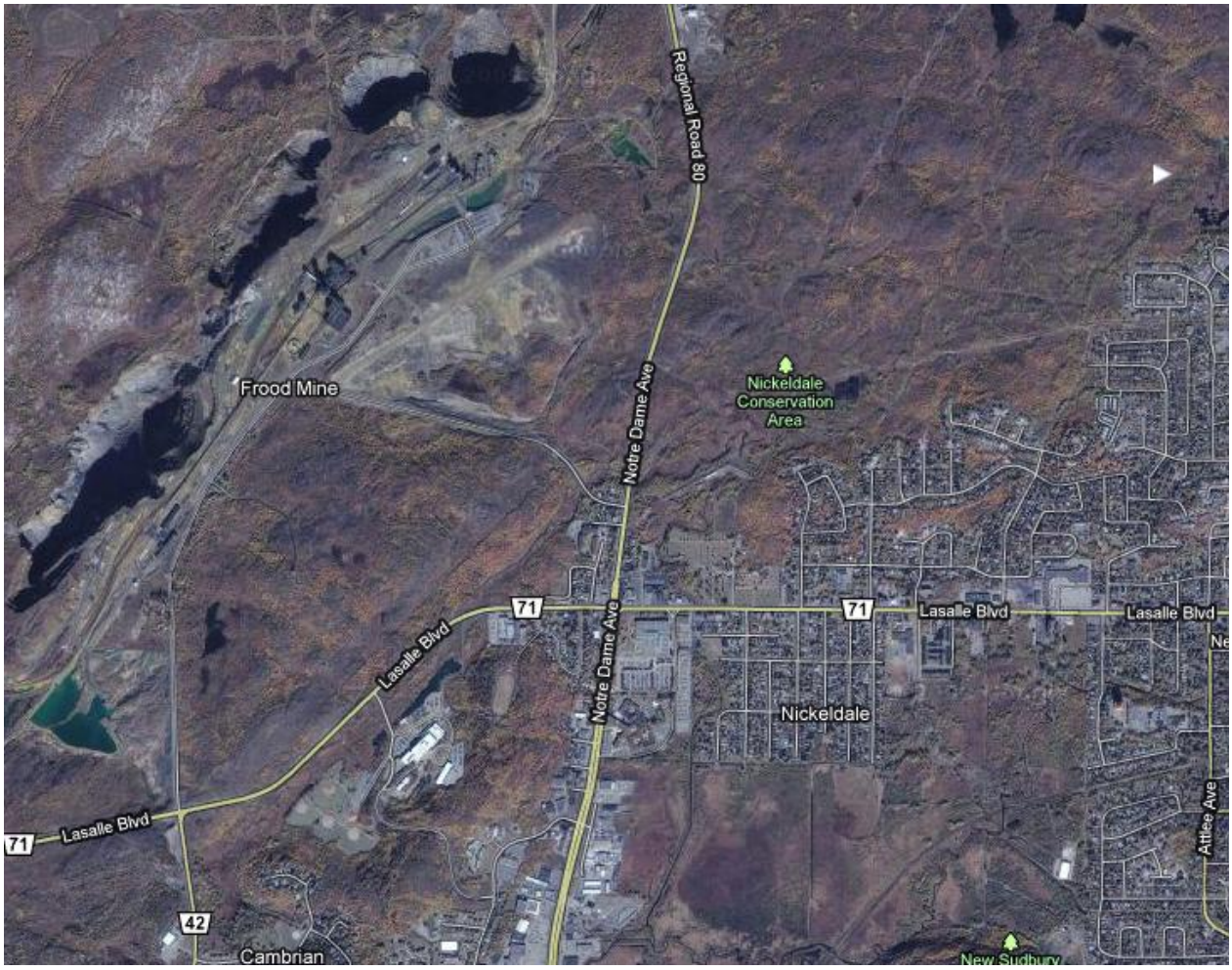

Figure 1. Open Pits at the Frood-Stobie Mining Complex in Sudbury, Ontario and nearby residential area