



**Mackenzie Valley Land and Water Board**  
**7th Floor - 4910 50th Avenue**  
**P.O. Box 2130**  
**YELLOWKNIFE NT X1A 2P6**  
**Phone (867) 669-0506**  
**FAX (867) 873-6610**

**APPLICATION FOR A NEW WATER LICENCE, AMENDMENT OF LICENCE, OR RENEWAL OF LICENCE.**

<b>Application/Licence No:</b> (amendment or renewal only)	
<b>1. Name and Mailing Address of Applicant</b>  Mr. Adrian Paradis Acting Manager, Giant Mine Remediation Project Aboriginal Affairs and Northern Development Canada Contaminants and Remediation Directorate 5103-48th Street, Waldron Building PO Box 1500 Yellowknife, NT X1A 2R3  Telephone: 867-669-2425  Fax: 867-669-2439	<b>2. Address of Head Office in Canada if Incorporate</b>  Same as applicant (Box 1)  Telephone: Same as applicant (Box 1)  Fax: Same as applicant (Box 1)

**3. Location of Undertaking (describe and attach a map, indicating watercourses and location of any proposed waste deposits).**

**Location of the Giant Mine Site:**  
The Giant Mine is an abandoned gold mine located approximately five kilometres (km) north of Yellowknife along Highway 4 (Ingraham Trail). The Giant Mine Site (the Site) is considered to include everything within the boundaries of the former lease that was in place during the operational period of the mine (i.e. Lease L-3668T, now designated as Reserve R662T). Two impacted areas immediately outside the lease area are also considered to be part of the site. They are the Giant Mine “Townsite”, which was removed from the surface lease in 1999, and an area of historic tailings deposition along the shore of North Yellowknife Bay.

**Geographic Coordinates of the Giant Mine Site (NAD83)**  
Minimum latitude - 62°28’54” N    Minimum longitude - 114°19’12” W  
Maximum latitude - 62°32’38” N    Maximum longitude - 114°22’34” W

**Location of the Giant Mine Roaster Complex:**  
The roaster complex is a group of industrial process buildings at the Giant Mine Site located south of the B1 Pit on the south side of Highway 4 (Figures 13 and 14 in the Roaster Complex Deconstruction Detailed Project Description provided under Tab XX in the application package).

**Geographic Coordinates of the Roaster Complex (NAD83)**  
Latitude - 62° 30' 7.099" N    Longitude - 114° 21' 27.534" W

**Location of the Underground Stabilization Work Area**  
The underground elements that will be stabilized include underground stopes, chambers and bulkheads that are clustered near the B1 and B2 open pits; on the west side of the Mill near Highway 4; and at the north end of the roaster complex as shown on Figures 3, 4a and 4b in the Underground Stabilization Detailed Project Description provided under Tab XX in the application package.

**Geographic Coordinates of the Underground Stopes and Chambers (NAD83)**  
Stope B2-12/13/14 - 62° 30' 17.894" N    114° 21' 27.277" W  
Stope B2-08 - 62° 30' 13.186" N    114° 21' 27.974" W

*Geographic coordinates for and maps of the Giant Mine Site including watercourses, waste management infrastructure and other project infrastructure are provided in the detailed project descriptions under Tabs XX and XX for each activity.*

4. Description of Undertaking (describe and attach plans)

The proposed undertaking includes two primary activities: (1) deconstruction of the roaster complex; and (2) stabilization of underground elements including arsenic trioxide and non-arsenic trioxide dust filled chambers and stopes, and bulkheads. Additional detail is provided below and in the separate detailed project descriptions provided under Tabs XX and XX in the application package.

Roaster Complex Deconstruction

Recent inspections of the roaster complex have revealed deteriorating structural elements and building envelopes. Due to the deteriorating condition of the buildings, there is the potential for significant impacts to the environment and injury to humans through falling cladding, partial building collapse, and arsenic and asbestos exposure to humans and wildlife. To address the human health and safety and environmental risks associated with the roaster complex, the proposed roaster complex deconstruction work includes:

- removal of the hazardous materials from the roaster complex
- decontamination and safe deconstruction of the roaster complex structures
- on-site storage of the non-hazardous wastes, asbestos wastes, and wastes contaminated with arsenic trioxide
- off-site disposal of all non-arsenic trioxide containing hazardous wastes and leachable lead paint

Underground Stabilization

Many of the underground elements are showing signs of failure including the formation of a sinkhole at the surface. The proposed underground stabilization work will mitigate the potential for failure of the underground stopes and chambers and migration of arsenic trioxide stored underground through the following actions:

- Reinforcing and constructing new bulkheads
- Backfilling underground voids in arsenic filled chambers with lightly cemented tailings paste or cementitious foam concrete
- Backfilling non-arsenic filled chambers and stopes (i.e. empty chambers) that, if fail, could impact either arsenic-filled chambers or Baker Creek. Empty chambers will be backfilled using one or a combination of the following materials: lightly cemented tailings paste or cementitious foam concrete, waste rock and/or other materials such as quarried rock.

5. Type of Undertaking

1. Industrial	_____	5. Agriculture	_____
2. Mining and Milling	_____	6. Conservation	_____
3. Municipal	_____	7. Recreation	_____
4. Power	_____	8. Miscellaneous	X

6. Water Use

To obtain water	X	Flood control	_____
To cross a watercourse	_____	To divert water	_____
To modify the bed or bank of a watercourse	_____	To alter the flow of, or store water	_____
Other (describe):_____			

7. Quantity of water involved (litres per second, litres per day or cubic meters per year), including both quantity to be used and quantity to be returned to source.

Recycled water and fresh water is required for both the roaster complex deconstruction and the underground stabilization programs as summarized below. Additional details on water use are provided in the detailed project descriptions under Tabs XX and XX in the application package.

Recycled Water Use

Both proposed activities will primarily use treated minewater recycled from the Polishing Pond at a combined rate of less than 300 m³ per day (300,000 litres per day) for the purposes listed below.

Recycled water uses for Roaster Complex Deconstruction:

- Decontamination of building materials
- Dust control

All recycled water used for the roaster complex deconstruction, except that lost to evaporation, will be captured, treated in the existing effluent treatment plant and ultimately returned to the Polishing Pond.

#### Recycled water uses for Underground Stabilization

- Manufacture of tailings paste and cementitious foam
- Dust control

Very little bleed water from the tailings paste or the cementitious foam is expected because the engineering specifications require the backfill materials to be relatively dry; therefore, very little recycled water will be returned to the Polishing Pond as part of the underground stabilization work. If any water is generated, it will be captured by the existing underground water management system, directed to the surface for treatment in the existing effluent treatment plant, and returned to the Polishing Pond.

#### Fresh Water Use

Fresh water for both roaster complex deconstruction and underground stabilization will be obtained from on-site tanks filled with trucked water from the City of Yellowknife for domestic purposes only (drinking water, toilet use, washing and showers). The combined rate of domestic water use will certainly be less than 100 m<sup>3</sup> per day (>100,000 litres per day) with a maximum rate of approximately 30 m<sup>3</sup> per day (30,000 litres per day). Important to note is that this maximum daily rate will be most often less than 30 m<sup>3</sup> per day because the proposed work is seasonal and is dependent on the number of workers at the site each day, which will vary.

None of the fresh water used in the proposed activities will be returned to the source as it will be considered waste water after use. The waste waters generated will be managed according to the specific waste management plans prepared for each activity as provided under Tab **XX** in the application package.

### **8. Waste deposited (quantity, quality, treatment and disposal)**

A Waste Management Plan for the proposed activities is to be developed in accordance with the Board's *Guidelines for Developing a Waste Management Plan* (accessible at [www.mvlwb.com](http://www.mvlwb.com)) and submitted as an attachment to the application form. A template for this Plan is provided in the Guidelines. Applications for a municipal licence do not need to include a Waste Management Plan as this information is required under the Operation and Maintenance Plan.

In addition, applicants are referred to the Board's *Water and Effluent Quality Management Policy* (accessible at [www.mvlwb.com](http://www.mvlwb.com)) to understand the Board's approach to managing the deposit of waste into the receiving environment through enforceable terms and conditions set in water licences.

**Roaster Complex Deconstruction** - A number of hazardous and non-hazardous waste streams will be generated by the proposed deconstruction works and these are described in the Roaster Complex Deconstruction Waste Management Plan provided under Tab **XX** in the application package.

**Underground Stabilization** – Other than waste rock generated by the underground mine development needed to access certain bulkheads, very little waste material is expected to be generated as part of this program. Further detail is described in the Underground Stabilization Waste Management Plan provided under Tab **XX** in the application package.

### **9. Other persons or properties affected by this Undertaking (give name, mailing address and location). Attach a list if necessary.**

No persons live at or adjacent to the Giant Mine roaster complex and no real estate properties overlap or are adjacent to the Giant Mine roaster complex area or the underground stabilization area. However, the Giant Mine site is within the boundaries of the City of Yellowknife and is situated on Commissioner's Land administered by the Government of the Northwest Territories' (GNWT) Department of Municipal and Community Affairs (MACA). MACA established Reserve R662T in favour of Aboriginal Affairs and Northern Development Canada (AANDC) that covers the former lease area (L-3668T) of Giant Mine to allow for the implementation of the Remediation Project. The greater Giant Mine Remediation Project (water licence application MV2007L8-0031) is currently subject to environmental assessment EA0809-001.

In addition, the Giant Mine site falls within the Akaitcho Dene asserted territory and is in the near vicinity of the Yellowknives Dene First Nation (YKDFN) communities of N'dilo and Dettah. Giant Mine is also within the traditional land use area of the Tlicho, known as Mowhi Gogha De Niitlee, and it falls within the provisions of the Tlicho Agreement.

### **10. Predicted environmental impacts of Undertaking and proposed mitigation.**

As part of the response to this section, a spill contingency plan for the proposed activities is to be developed in accordance with INAC's *Guidelines for Spill Contingency Planning, April 2007*. (accessible at <http://www.ainc-inac.gc.ca/ai/scr/nt/pdf/SCP-EUD-eng.pdf>). This plan is to be submitted as an attachment to the application form.

#### Predicted Environmental Impacts

The fundamental objective of the Giant Mine Remediation Project is to improve the environment and prevent adverse effects that would otherwise occur if no remediation activities were undertaken. The proposed deconstruction of the roaster and underground stabilization work will ultimately prevent emergencies from occurring at the Site that could endanger human health and safety and the environment by addressing

significant risks associated with: (a) deterioration of the roaster complex buildings which are highly contaminated with arsenic trioxide dust; and (b) weakened or thin crown pillars that could lead to failure of an underground element and release of arsenic trioxide deeper into the mine workings or to the environment.

Although in the long term, carrying out the proposed activities are beneficial, the implementation of the proposed deconstruction and stabilization activities may result in short term and local effects to the environment (including biophysical, cultural, social and economic aspects). A detailed discussion of the predicted effects of the two proposed activities is provided in their respective detailed project descriptions located under Tabs **XX** and **XX** in the application package.

#### **Spill Contingency Planning**

The current Emergency and Spill Response Plan (ESRP) prepared by the primary contractor on site, Deton'Cho/Nuna Joint Venture, is included in the application package under Tab **XX**. In addition, specific preventative and emergency response procedures related to arsenic trioxide are provided under Tab **XX**.

While the ESRP and associated procedures are comprehensive in nature, the proposed work requires specialized expertise. Therefore, the contractors will be required to prepare specific emergency and spill contingency plans (one plan for the roaster complex deconstruction and one plan for the underground stabilization work) that aligns with but expands on as necessary the documents prepared by the Deton'Cho/Nuna Joint Venture. These contract specific plans will be provided to the MLVWB upon their completion, anticipated to be in the spring 2013. All applicable legislation and guidelines will be taken into consideration when the specific emergency and spill contingency plan is prepared.

### **11. Contractors and sub-contractors (names, addresses and functions). Attach a list if necessary.**

The personnel directly involved in the proposed roaster complex deconstruction will include a combination of contractors, staff from the Contaminants and Remediation Directorate (CARD) under AANDC, staff from Public Works and Government Services Canada (PWGSC), and staff from the GNWT.

Separate contractors managed by PWGSC will be responsible for carrying out the proposed deconstruction and underground stabilization activities but contracts have not yet been awarded. When the bidding process is complete, the MVLWB and the AANDC Inspector will be provided with the names of the contractors.

### **12. Studies undertaken to date. Attach a list if necessary.**

AANDC, 2011. *Site Stabilization Plan for the Giant Mine Remediation Project*. Aboriginal Affairs and Northern Development Canada. October 14, 2011.

AECOM, 2011a. *Failure Mode Effects Criticality Analysis (FMECA) – Giant Mine Remediation*. Prepared for Mackenzie Valley Environmental Impact Review Board, Information Request 12 Response. June 2011.

AECOM, 2011b. *Giant Mine – Structural Condition of the Roaster Complex*. Document Number 305-Demo Debris-15-LET-0003-Rev0\_20110913. Prepared for Public Works and Government Services Canada. September 12, 2011.

AECOM, 2012. *Recommendation to Proceed with Site Stabilization Plan at the Giant Mine*. Document Number 320-Eng Support-20-LET-0001-Rev2\_20120305. Prepared for Public Works and Government Services Canada. March.

Golder Associates, 2011a. *Opinion on the Stability of Arsenic Stope B2-12/13/14 and Surface Access Controls*. Prepared for Public Works and Government Services Canada. Technical Memorandum. May 26, 2011.

Golder Associates, 2011b. *Investigation, Mitigation, and Monitoring of Known High Risk Underground Openings, Giant Mine Remediation Project*. Prepared for Public Works and Government Services Canada. Technical Memorandum. December 20, 2011.

Golder Associates, 2012a. *Public Access Controls Above Arsenic Stope B2-08, Giant Mine Remediation Project*. Prepared for Public Works and Government Services Canada. Technical Memorandum. February 1, 2012.

Golder Associates, 2012b. *Public Access Controls Above Non-Arsenic Stope 2-01 Complex Near A2 Open-pit, Giant Mine Remediation Project*. Prepared for Public Works and Government Services Canada. Technical Memorandum. February 1, 2012.

Robertson GeoConsultants Inc., 2010. *Independent Experts Panel Risk Assessment of Roaster Complex, Baker Creek, and Bulkheads Related to Arsenic Trioxide Migration*. Prepared for Contaminated Sites Program, Indian and Northern Affairs Canada. April.

### **13. Proposed time schedule.**

- Roaster complex deconstruction will take approximately two to three years to complete, with on-the-ground work expected to start in May 2013. The work will be seasonal (early spring to late fall) as the personal protective equipment requires warmer temperatures for proper functioning.
- Underground stabilization will take approximately four years to complete, with on-the-ground work expected to begin in June 2013. The work will be seasonal (early spring to late fall) as the successful delivery of the backfill materials requires warmer temperatures.

As indicated above, four years is required to complete both activities but unexpected delays may occur. Therefore, a water license term of five years is requested.

Since the preferred on-the-ground start date is May 2013, license issuance no later than March 2013 will allow the selected contractor to incorporate any license conditions in the early stages of their work planning.

Start date:    March 2013                      Completion date:    March 2018 (5 years)

Name (print): Adrian Paradis      Signature:\_\_\_\_\_

Title (print):    Acting Manager, Giant Mine Remediation Project    Date:\_\_\_\_\_

***Please make all cheques payable to “Receiver General of Canada”***

***FOR OFFICE USE ONLY***

Application Fee Amount:	\$_____	Receipt No:	_____
Water Use Deposit Amount:	\$_____	Receipt No:	_____