Crown-Indigenous Relations and Northern Affairs Canada
Relations Couronne-Autochtones et Affaires du Nord Canada

Water Resources Division
Resource Management Directorate
Nunavut Regional Office
P.O. Box 100
Iqaluit, NU, X0A 0H0

Your file - Votre référence
2AM-LUP2032

November 17, 2020

Our file - Notre référence
CIDM# 1291238

Richard Dwyer
Manager of Licensing
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU, X0B 1J0

*sent via email: licensing@nwb-oen.ca*

**Re: Crown-Indigenous Relations and Northern Affairs Canada Review of the Final Closure and Reclamation Plan from Lupin Mines Incorporated for Type A Water Licence 2AM-LUP2032.**

Dear Mr. Dwyer,

Thank you for the October 13, 2020 invitation to review the Final Closure and Reclamation Plan for Water Licence 2AM-LUP2032. The Water Resources Division of Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) examined the application pursuant to CIRNAC's mandated responsibilities under the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Department of Crown-Indigenous Relations and Northern Affairs Act*. The result from CIRNAC review and recommendations are provided in the enclosed memorandum for consideration by the Nunavut Water Board.

If there are any questions or concerns, please contact me at (867) 975-4550 or godwin.okonkwo@canada.ca

Sincerely,

Godwin Okonkwo
Manager Water Resources

Canada

# Technical Review Memorandum

To: Richard Dwyer, Manager of Licensing, Nunavut Water Board

From: Godwin Okonkwo, Manager Water Resources, Crown-Indigenous Relations and Northern Affairs Canada

Date: November 17, 2020

Re: Crown-Indigenous Relations and Northern Affairs Canada Review of the Final Closure and Reclamation Plan for Lupin Mine Site for Type A Water Licence 2AM-LUP2032 by Lupin Mines Incorporated (LMI) in Nunavut.

Region: ☒ Kitikmeot ☐ Kivalliq ☐ Qikiqtani

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## A. BACKGROUND

The Lupin gold mine is located on the shores of Contwoyto Lake approximately 285 km southeast of Kugluktuk, in the Kitikmeot Region of Nunavut and is owned by Lupin Mines Incorporated (LMI), a subsidiary of Mandalay Resources Corporation. The Lupin gold mine is currently licensed under Nunavut Water Board (NWB) Water Licence No. 2AM-LUP2032, which was approved on 9 April 2020 by the Minister of Northern Affairs. The site had been in care and maintenance since 2005, and is presently undergoing final reclamation under the approved water licence.

Part I condition of the NWB Reasons for Decision document for Type A 2AM-LUP2032 water licence renewal application review requires LMI to submit an updated Final Closure and Reclamation Plan within 90 days following approval of the water licence by the Minister of Northern Affairs, to reflect the relevant comments and recommendations of intervening parties during the review of the water licence application.

On October 13, 2020, the NWB requested that parties review the Final Closure and Reclamation Plan submitted by LMI on September 28, 2020.

## B. DOCUMENTS REVIEWED

Documents reviewed by Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) and Arcadis Canada Inc. (on behalf of CIRNAC) include the following:

- **200928 2AM-LUP2032 Final Closure & Reclamation Plan-IMLE**
  The Main Body of the R1 FCRP dated August 2020, plus Appendices A to G.
  - Appendix A - List of Permits, Licences, and Authorizations Required for Project
  - Appendix B - Type A Water Licence Concordance
  - Appendix C - Glossary of Terms and Definitions
  - Appendix D - Detailed History of Closure Plan Development
  - Appendix E- Consultation Record
  - Appendix F - Environmental Studies/Reclamation Research/Engineering Studies and Design Reports
  - Appendix G - Financial Security

- **Appendix H - Technical Memos in Response to Information Requests, Technical Comments, Commitments from PHC/TM or Exhibits during the Application Review Process (2019)**
  - 200928 2AM-LUP2032 FCRP AppH_01 Decision Matrix Memo_RevC-IMLE
  - 200928 2AM-LUP2032 FCRP AppH_02 Climate Model Rev0 -IMLE
  - 200928 2AM-LUP2032 FCRP AppH_03 TCA Dam Stability Review Rev0 -IMLE
  - 200928 2AM-LUP2032 FCRP AppH_04.1 APEC 2006-IMLE
  - 200928 2AM-LUP2032 FCRP AppH_04.2 Investigation Locations 2006-IMLE
  - 200928 2AM-LUP2032 FCRP AppH_04.3 PCOC Tables 2006-IMLE
  - 200928 2AM-LUP2032 FCRP AppH_04.4 APEC 2017-IMLE
  - 200928 2AM-LUP2032 FCRP AppH_04.5 Current ARD 2017-IMLE
  - 200928 2AM-LUP2032 FCRP AppH_05 Surface_WQ_Model_15Oct2019-IMLE
  - 200928 2AM-LUP2032 FCRP AppH_06 Rev0 Coupled Seepage-Thermal Modelling_15 Oct2019-IMLE
    200928 2AM-LUP2032 FCRP AppH_07 TCA Waste Rock Review_081419_Rev0-IMLE
  - 200928 2AM-LUP2032 FCRP AppH_08 Conceptual Design of Waste Rock Cover Rev0 -IMLE
  - 200928 2AM-LUP2032 FCRP AppH_09 TCACover Rev0-IMLE
  - 200928 2AM-LUP2032 FCRP AppH_10 Decision Matrix Rev0 -IMLE
  - 200928 2AM-LUP2032 FCRP AppH_11 Geophysics Rev0 -IMLE
  - 200928 2AM-LUP2032 FCRP AppH-12 Risk Assessment on 2 TCA Dams Rev0 –IMLE

- In addition to the review of LMI's *Commitment Submissions* noted above, CIRNAC also reviewed the NWB ftp site for LMI and reviewed the files dated 2020 associated the LMI's commitment submissions including the following.

- 200715 2AM-LUP2032- LMI Response Drawings 129500081TCA Closure Drawings_Signed_20200706-IMLE: Re-submission of Tailings Containment Area Closure Drawing package with "*Approved by Alvin Tong, dated 6 July 2020*"
- 200720 2AM-LUP2032 - KIA Reply to LMI Response E25,E26,E27-IMLE
- 200805 2AM-LUP2032 LMI Response to KitIA comments - Final-IMLE
- 200812 2AM-LUP2032 KitIA Response to LMI Comments-IMLE (12 August 2020)
- 200805 2AM-LUP2032 LMI Response Drawing 005 - Outflow_RevB_20200609b_Signed Stamped-IMLE
- Resubmission of Stantec Dwg 005 Outflow RevB with "*Approved by Alvin Tong, dated 4 Aug 2020*".

## C. RESULTS OF THE REVIEW

### 1. INTEGRATION OF COMMENTS RESPONSES TO THE FRCP

**Comment 1**

The R1 version of the FCRP has had editorial updates made throughout the document. In addition, various sections have been updated to provide comments and specific references and responses to questions from CIRNAC and other parties, as per commitments made to the NWB at the technical meeting and/or the public hearing.

The material R1 additions to the FCRP relate to references made to, and the inclusion of the Technical Memoranda provided by LMI in its various responses and commitments. CIRNAC has reviewed these documents previously and provided comments on them. While in some cases, LMI's responses have addressed CIRNAC's concerns, in other cases additional information was (is required) to address issues raised by CIRNAC with respect to these Technical Memoranda. CIRNAC also notes that the R1 FCRP does not include any references to the NWB Conditions 25, 26, 27 that resulted from the Public Hearing of January 2020 Type A 2AM-LUP2032 issued on 28 February 2020 and approved on 9 April 2020.

**Recommendation 1**

CIRNAC recommends that:

I. LMI create a disposition table listing all issues raised by the Intervenors at the technical and management meetings, along with LMI commitments, responses and technical memos, plus intervenor review comments on LMI's submission and remaining concerns raised by Intervenors with respect to the LMI responses provided to date.

II. LMI update the R1 FCRP to include information related to Conditions 25, 26, and 27 of the approved Water Licence 2AM-LUP2032.

### 2. SCHEDULE UPDATES

**Comment 2**

The FCRP Rev 1 (August 2020) includes Table 14 which provides a schedule that was prepared on March 2019. This schedule needs to be updated to remove items that are no longer valid (e.g., includes line items that refer to work to be done under Care and Maintenance) and include all activities agreed to by LMI including such items/activities as follows:

- Construction of water management structures related to "dome";

- Stabilization and erosion protection of tailings dams (M, K, etc.);
- Removal for placement in tailings cells, or cover in place, existing or future exposed tailings (after dewatering); and,
- Construction of water management features (drainage swales and discharge structures) in tailings cells.

In addition to the above, the March 2019 schedule does not reflect the actual works carried out in 2019 or 2020. It would be helpful if LMI can provide a more detailed and updated schedule that includes all actions to be undertaken, links with LMI's RECLAIM estimate and milestones, and illustrates actual verses planned progress as well as any proposed future schedule revisions. This update to the FCRP will provide a better understanding of the state of the closure works and scheduled revisions/adjustments LMI may be proposing going forward.

**Recommendation 2**

CIRNAC recommends that LMI provide a more detailed and updated schedule for the reclamation works consistent with the work completed as reflected in the Security Reduction requests of 2020. The updated schedule should include the original 2019 proposed project schedule timelines as shown in the R1 FCRP, the actual work carried out to the end of 2020, and any proposed revisions to the schedule going forward. The schedule should be updated to include line items for all activities committed to by LMI.

## 3. REMOVAL OF CONTAMINATED MATERIALS FROM MILL SITE AREA PRIOR TO CONSOLIDATING WASTE ROCK AND CONSTRUCTION DOME COVER

**Comment 3**

The R1 FCRP states that approximately 16,000 $m^3$ heavily arsenic impacted soils and 35,200 $m^3$ of PHC impacted soils (S4.3.2.3, p 4-6) exist on site that will require active management and disposal.

On page 4-9 in regard to arsenic impacted soils LMI states;

*"The heavily arsenic impacted shallow material will be ex-situ remediated using conventional techniques (i.e., excavators, haul trucks, and dozers) and will be excavated and disposed of within the shafts or open crown pillars for isolation."*

On the same page in regard to the PHC impacted soils LMI states that;

*"35,200 m3 of PHC impacted soil has been identified at 13 historical maintenance, fueling, and fuel storage locations across the Site (Golder 2017a). These locations include: the STF and Powerhouse, the Mill and Office Emergency Tanks, the Main Tank Farm Loaders, the Main Tank Farm Bedding Sand, the Emergency Powerhouse, the South Burn Pit, the Landfill, the RTL Shop, the North Burn Pit, the Incinerator, Cold Storage #1, the Former Airstrip Fuelling Area, and the former Ball Field. This material*

*will be ex-situ remediated using conventional techniques (i.e., excavators, haul trucks, and dozers) and disposed of in the shafts or open crown pillars.*"

No drawings were provided in the R1 FCRP document identifying the location and extent of the areas with heavily impacted arsenic or PHCs requiring excavation. In the absence of a drawing providing this information it is difficult to confirm that all of these impacted materials have been removed from these locations before consolidating the waste rock at the mill site.

**Recommendation 3**

CIRNAC recommends that LMI provide a detailed site plan that identifies the location and estimated extent of heavily impacted arsenic soils, and PHC impacted soils that are expected to be excavated and placed underground. CIRNAC also requests that LMI clarify how it will confirm that these materials have been removed prior to waste rock re-grading and cover placement.

## 4. CROWN PILLAR STABILIZATION AND DISPOSAL OF MATERIALS UNDERGROUND

**Comment 4**

Discussion of closure of the underground and placement of material into the underground is found in the Executive Summary 5a) and Section 4.3.2.4 Underground Workings, and in Figures 6, 13, and 14. Review of these sections notes that on page 4-14 LMI states the Preferred Reclamation activities will;

*"modify the previous plan for the West Zone disposal as shown on Figure 14. The modified plan would address the void areas and increase the storage capacity. Instead of developing additional drop raises in the remaining crown pillar for disposal, the new plan would be to blast down the remaining crown pillar, creating an open slope trench approximately 260 m in length and approximately 72 m deep".*

Consistent with these statements, on page 4-15 Synthesis of Preferred Activities into a Reclamation Plan, LMI states that

*"The remaining West Zone crown pillar will be collapsed to provide additional disposal capacity and to prevent future post-closure stability problems. The main haulage shaft, fresh air raise, and the exhaust raise will be completely backfilled to prevent access. Site materials and equipment, waste rock, and hydrocarbon contaminated soils will be disposed of in these areas".*

Upon review of the R1 FCRP Figures 6, 13, and 14, CIRNAC identified the following:

- Figure 6 notes that it provides a Site Plan showing the West Zone and provides some notes on open depths and a "ramp" in the areas referred to as WZ Crown Pillar Pit and WZ Underground Disposal Key Cross Section Locations (5).

- Figure 13 shows a section through the West Zone with Kinross's proposed disposal via two large surface openings and three drop raises.
- Figure 14 shows the same cross section as Figure 13 with the crown pillar removed (and shown as Debris at the base of the 87 Level) and capped with 3 m of cover material.

CIRNAC appreciates the intent of these activities, but it is unclear from review of the R1 FCRP how LMI intends to carry out the work. No discussion was provided with respect to how the main haulage shaft, the fresh air raise or exhaust raise will be filled, or how the West Zone (WZ) open stope would be filled and how long term surface subsidence based on fill material consolidation will be avoided. CIRNAC also notes that on page 4-15 LMI states that;

"*Capping material required to cover the West Zone newly opened and backfilled stope will require approximately 3,300 $m^3$ of waste rock fill to prepare a 1.5 m thick mound over the backfill material in the stope with 3:1 side slopes. The waste rock fill will be covered with an additional 1.0 m of esker.*"

This statement conflicts with the Figure 14 note that states that 3 m of cap material on the over fill materials.

While CIRNAC has seen the approval LMI received from the Mines Inspector it is not clear what was submitted to the Mines Inspector for approval.

**Recommendation 4**

CIRNAC recommends that LMI provide more detailed discussions and plans related to the following:

- How surface openings and the open stope will be filled.
- How long-term subsidence of fill materials will be avoided.
- The information provided to the Mines Inspector with respect to final closure of surface openings.

## 5. LONG TERM STABILITY OF DOME COVER AND EROSION STOPES

**Comment 5**

Since the development of the draft FCRP, CIRNAC has expressed concerns regarding the long-term effectiveness and erosion stability of the proposed dome cover and water management systems. Prior to the Public Hearing of January 2020, LMI replied through a series of discussions and the Technical Memos included in Appendix H-8 (Technical Memorandum in Appendix H-8 regarding Conceptual Design for the Waste Rock "Dome" at Lupin Mine for response to TM/PHC Commitment No.5 (Golder, 2019d).

Pursuant to the Public Hearing, in response to Condition 25 of the Water Licence, Golder provided a Technical Memorandum dated 8 June 2020 that included a brief discussion on the "Dome" Design Objective and two "Not for Construction" drawings; one provided a Plan View drawing of the proposed dome, and the other provided two cross sections through the proposed "dome" along with typical details of the proposed drainage chutes, and the crest perimeter berm.

CIRNAC appreciated LMI's submission of the additional information in the Technical Memorandum and subsequently provided review comments to the NWB for LMI consideration. CIRNAC notes that the 8 June 2020 memo and drawings from LMI were not included in the R1 FCRP document.

**Recommendation 5**

CIRNAC recommends that the R1 FCRP be updated to include:

- The contents of the 8 June 2020 Golder Technical Memorandum responding to Condition 25 requirements.
- CIRNAC concerns on the "dome" design related to long term erosion, as expressed in CIRNAC comments on the Condition 25 Submissions as dated 25 August 2020.
- Any further design details that LMI may have generated since June 2020 with respect to the "dome" design.

## 6. TCA – EMBARKEMENT STABILIZATION AND EROSION

**Comment 6**

Condition 26 is a Licence condition generated with respect to addressing the concerns expressed and the request for additional information by Intervenors to clarify the nature and extent of long term stabilization and closure works at the TCA, and in particular as related to K and M dam repairs and long term stability and erosion control.

By way of a Technical Memorandum from Stantec dated 8 June 2020, LMI provided a substantial information package that included design notes, specifications, and a series of drawings (plans, sections, profiles, and details) related to the proposed closure works for the TCA area. Specifically, the package included 15 drawings: 1 Design Specification drawing, 4 Cell 5 drawings; 4 Cell 3 drawings; 3 M Dam drawings; and 3 K Dam drawings.

CIRNAC notes that the 8 June 2020 memo and drawings were not included in the R1 FCRP document.

**Recommendation 6**

CIRNAC recommends that the R1 FCRP be updated to include:

- The contents of the 8 June 2020 Stantec Technical Memorandum responding to Condition 26 requirements.
- Any further revisions or details that LMI may have generated since June 2020 with respect to the closure works at the TCA.

## 7. TCA – N DAM AND POTENTIALLY EXPOSED TAILINGS

### Comment 7

Figure 11 of the R1 FCRP shows that a tailings cover is to be placed in the area contained by the N Dam. No other reference is made to work at the N Dam or covering of the N Dam tailings in the R1 FCRP document.

Appendix H-03 TCA Dam Stability Review Rev 0 dated 14 November 2020, includes modeled cross sections of the N Dam (Fig 30, 31, and 32) as part of the geotechnical stability analysis. Given that the downstream embankment of the N Dam was mostly underwater in 2019 it is unclear how the profile was generated.

LMI's provision of additional TCA details in the 8 June 2020 Stantec Technical Memorandum and drawing package addresses the N Dam tailings cover in Drawing 002 Cell 5 Closure, Plan View – in which Note 3 states that topographic and bathymetric surveys were not available due to ponded water, that dewatering is required before cover placement, and that the contractor is to adjust cover placement to ensure a 1 m cover thickness. The drawings do not clearly indicate water flow management in this area, e.g., will there be an outlet from this area, and if so where and how it will be constructed.

### Recommendation 7

CIRNAC recommends that LMI provide additional information with respect to the contour information used in the N Dam Safety analysis as well as on the final contour elevations and associated water management for the N Dam containment area.

## 8. FINANCIAL SECURITY – SECTION 7

### Comment 8

In regard to Financial Security, Section 7 has been significantly altered to remove discussion of former liability estimate and other related information. The R1 FCRP makes reference to LMI's January 2020 RECLAIM estimate of $23,463,049; the release framework and milestones; states that $6,549,072 was released to LMI in April 2020, and that the new letter of credit approved 9 June 2020 is in the amount of $19,558,231. CIRNAC appreciates inclusion of this current detail, and observed no discussion on the

difference in security held and LMI's RECLAIM estimate value less the released amount ($2,644,254). This may lead to confusion when parties review the RECLAIM model to evaluate reduction of security and the amount of security still being held.

**Recommendation 8**

CIRNAC recommends that LMI provide a brief discussion on the difference in security held and LMI's RECLAIM estimate value less the released amount.

## D. REFERENCES

*Nunavut Waters and Nunavut Surface Rights Tribunal Act* (2016)

*Department of Crown-Indigenous Relations and Northern Affairs Act* (2020)

Nunavut Water Board, February 2020: Amended and Renewed Type "A Water Licence No: 2AM-LUP2032, Reasons for Decision, Including Record of Proceedings. P 62-63