



Water Resources Division
Resource Management Directorate
Nunavut Regional Office
918 Nunavut Drive
Iqaluit, NU, X0A 3H0

Your file - Votre référence
2AM-LUP2032
Our file - Notre référence
GCDocs#126730007

July 10, 2024

Richard Dwyer
Licensing Administrator
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU, X0B 1J0
Email: licensing@nwb-oen.ca

Re: Crown-Indigenous Relations and Northern Affairs Canada's Review of the 2021, 2022, and 2023 Annual Reports and Dam Safety Report for the Lupin Mine Project, Type A Water Licence No. 2AM-LUP2032

Dear Richard,

Thank you for the April 30, 2024, invitation to review the 2021, 2022, 2023 Annual Reports and Dam Safety Report, submitted by Lupin Mines Incorporated (LMI), a wholly owned, indirect subsidiary of Mandalay Resources Corporation, for Type A Water Licence No. 2AM-LUP2032.

Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) examined the Reports pursuant to its mandated responsibilities under the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Department of Crown Indigenous and Northern Affairs Act*. Please find CIRNAC comments and recommendations in the attached Technical Memorandum.

If there are any questions or concerns, please contact me at LeeAnn.Pugh@rcaanc-cirnac.gc.ca or (867) 975-4751 or Andrew Keim at (867) 975-4550 or Andrew.Keim@rcaanc-cirnac.gc.ca.

Sincerely,

Lee Ann Pugh

Lee Ann Pugh
Regional Water Coordinator



Technical Review Memorandum

Date: July 10, 2024

To: Richard Dwyer, Licensing Administrator, Nunavut Water Board

From: Lee Ann Pugh, Regional Water Coordinator, CIRNAC

Re: Crown-Indigenous Relations and Northern Affairs Canada's Review of the 2021, 2022, 2023 Annual Reports and Dam Safety Report for the Lupin Mine Project, Type A Water Licence No. 2AM-LUP2032

Region: ☒ Kitikmeot ☐ Kivalliq ☐ Qikiqtani

A. Background

Water Licence 2AM-LUP2032 authorizes Lupin Mines Incorporated (LMI, Applicant) to use water and deposit waste during activities and undertakings carried out in support of the Closure and Reclamation of the Lupin Mine site (the Project) for an undertaking categorized as Mining under Schedule 1 of the Regulations. The Project is located on the west shore of Contwoyto Lake, approximately 285 kilometers southeast of Kugluktuk, within the Kitikmeot Region, Nunavut.

Lupin Mine site was an underground gold mine in operation from 1982 to 2005 which had temporary suspensions of activities between January 1998 and April 2000, and between August 2023 and March 2024. The mine resumed production in March 2004 until February 2005. From 2005 until 2019 the site remained in care and maintenance.

In July 2018, LMI initiated a water licence amendment and renewal process and on February 29, 2020, the Nunavut Water Board (Board) issued an amended Type A Water Licence 2AM-LUP2032. In Q1 of 2020-2021, LMI initiated year one of the active closure phase, with post-closure phases occurring between 2022 and 2026.

2AM-LUP2032 Part B Item 2 states that LMI, *"shall file an Annual Report on the Appurtenant Undertaking with the Board no later than 31st March of the year following the calendar year being reported."* LMI has since provided to the Board outstanding reports from 2021 and 2022 with this years Annual Report for 2023. The following is a non-exhaustive summary of the activities LMI carried out each year.



Summary of Activities 2021

The Lupin Mine was in active closure phase in 2021. The Lupin Mine camp opened May 4th, 2021 to October 24, 2021 to facilitate the active closure of the mine. During this period activities included the following:

- Camp opening and closing, freshwater use, and deposit of sewage to the Sewage Lakes Disposal Facility, and incineration of general camp wastes;
- Annual geotechnical inspection of engineered facilities including the Tailings Containment Area (TCA);
- Collection/analyzing post-freshet water quality samples in accordance with 2AM-LUP2032;
- Treatment and discharge of waters;
- Drilling and blasting at the crown pillar;
- Construction of outfall structures and drainage channels;
- Completion of a tailings forensics identification program within the TCA;
- Routine Ph monitoring;
- Consolidation of potential acid generating (PAG) waste rock and cover at the mill site;
- Excavation of hydrocarbon-contaminated soil and disposal into underground workings and ongoing cleanup of contaminated soils in the mill area;
- Repairs/installation of thermistor strings and moisture meters in accordance with the approved monitoring plan;
- Consolidation of hazardous material and shipping offsite for disposal;
- Reclamation/backfill of the historical mine portal;
- Completion of K Dam re-sloping to the closure design of 2.1H:1V; and
- Cover of approximately half of exposed tailings at Cell N of clean esker material.

Summary of Activities 2022

The Lupin Mine entered into a temporary Care and Maintenance Phase in late June 2022 resulting in minimal onsite activities. The Lupin Mine camp was operational from April 9, 2022, to July 29, 2022. During this period, care and maintenance, and closure activities included the following:

- Camp opening and closing, utilizing freshwater, and deposit of sewage to the Sewage Lakes Disposal Facility, and incineration of general camp wastes;
- Minor repairs to buildings and equipment and mobile equipment;
- Annual geotechnical inspection of engineered facilities including the TCA;
- Dam Safety Review (DSR) of the TCA;
- A portion of the approved waste rock was collected and placed according to design;
- Commencement of the construction of the temporary fuel storage berm;
- Drilling and blasting at the crown pillar;



- Collecting and analyzing water quality samples collected during the post-freshet period (June 2022);
- Routine pH monitoring at 13 stations in the TCA;
- Minor repairs to internal dams at the TCA;
- Completion of the 1.0 m cover surface on previously exposed Cell N tailings; and
- In-situ water treatment and water transfers.

Summary of Activities 2023

The Lupin Mine was in temporary Care and Maintenance Phase throughout 2023 resulting in minimal on-site activities. The Lupin Mine camp opened on August 28, 2023 to September 25, 2023. During this period, care and maintenance and closure activities included the following:

- Camp opening and closure, usage of water, deposition of sewage & incineration of waste.
- Minor repairs to buildings, equipment & mobile equipment;
- New Temporary Fuel Farm constructed on September 23, 2023, to store fuel for completion of closure operations & decommissioning of main tank farms; and
- Annual geotechnical inspection of engineered facilities including the TCA.

CIRNAC provides the following comments and recommendations pertaining to the application package. A summary of the subjects of recommendations can be found in Table 1. Documents reviewed as part of this submission can be found in Table 2 of Section B. Detailed technical review comments can be found in Section C.

Table 1: Summary of Recommendations

Recommendation Number	Subject
R-01	Annual Inspection Reports
R-02	Temporary Fuel Farm
R-03	Dam Safety Review

B. DOCUMENTS REVIEWED AND REFERENCED

The following table (Table 2) provides a list of the documents reviewed under the submission and reference during the review.

Table 2: Documents Reviewed and Referenced

Document Title	Author, File, No., Rev., Date
2021 Annual Report	Mandalay Resources, 2024-04-30
2022 Annual Report	Mandalay Resources, 2024-04-30
2023 Annual Report	Mandalay Resources, 2024-04-30
2023 Dam Safety Review	Mandalay Resources, 2024-04-26



C. RESULTS OF REVIEW

1. Annual Inspection Reports

Comment:

Item 1(i) of the LMI 2023 Annual report states, *“Due to the shortened field season and suspension of work in 2023, recommendations from the 2022 annual inspection report still need to be addressed. It is expected that outstanding recommendations from the 2022 and 2023 annual inspection reports will be addressed as necessary. LMI commits to the following in 2024 and 2025:*

- 1. Reslope Dam M in accordance with the closure design.*
- 2. Design and execute remediation for the NW corner of Cell 4.*
- 3. Explore potential improvements for managing the acid seep(s) at Cell N.*
- 4. Assess onsite conditions and develop final spillway designs for Dam 1A, J Dam, and the two sewage lagoons.*
- 5. Assess the Cell 3/Dam L drainage swale erosion issue for potential to worsen over time and complete needed remediation.”*

Recommendation:

(R-01) CIRNAC recommends LMI provide an approximate timeframe for addressing the outstanding recommendations from the 2022 and 2023 Annual Inspection Reports to the Board.

2. Temporary Fuel Farm

Comment:

Item 1(i) of the 2023 Annual report states, *“A Temporary Fuel Farm (TFF) was constructed in September 2023 to store fuel for closure operations to allow the future decommissioning and cleanup of the existing Main Tank Farm. The TFF is a rectangular impoundment lined with a single piece HAZGUARD liner which will host 6 -3.7 m by 6.1 m high tanks. It was designed by WSP and WSP inspected the construction. An as-built report will be submitted in 2024, after a survey of the TFF is completed. The TFF has not yet been put to use.”*

CIRNAC notes that the as-built report has yet to be provided to the Board for review nor details of when the survey is to be completed.



Recommendation:

(R-02) CIRNAC recommends that LMI provide:

- a. An approximate date as to when the survey of the TFF will be completed and submitted to the Board for review.
- b. An approximate date as to when the as-built report of the TFF will be completed and submitted to the Board for review.
- c. An approximate date for the decommissioning and cleanup of the existing Main Tank Farm to the Board.
- d. An approximate date as to when the Updated Reclamation and Closure Plan will be submitted to the Board which includes the TFF.

3. Dam Safety Review

Comment:

Since 2021, dam safety reviews for the Lupin Mine Tailings Containment Area (TCA) were conducted annually for LMI and a summary provided in each applicable Annual Report. The 2023 Dam Safety Review was carried out by SLR Consulting (Canada) Ltd., and provided by LMI to the Board for review on June 17th, 2024. The main observation and recommendation with respect to dam safety is the construction of an emergency spillway to mitigate the risk of overtopping.

Section 11.0 of the review states, *“Overall, the TCA appears to have been operated and maintained well over the years despite changes in ownership, staff, and consultants who have worked at this site. During operations, the mine was proactive with regard to progressive reclamation and long term monitoring to support the closure plan. Currently, as a site that is regularly monitored and maintained, it is our view that the systems and staff in place are well equipped to manage the TCA and continue in a state of active closure. However, looking ahead towards passive closure, we believe there remain some risks and uncertainties that will require technical judgement to implement.”*

CIRNAC is concerned that if left unattended, the TCA will fail resulting in adverse environmental effects.

Recommendation:

(R-03) CIRNAC recommends LMI provide:

- a. An update on the timeline for continued active reclamation activities on site;
- b. A management plan with timelines to address the concerns and recommendations provided in the 2023 Dam Safety Report;



- c. Details on the assessment of the onsite conditions of the dam, including the final spillway designs for Dam 1A, and J Dam;
- d. A timeline as to when the ten (10) recommendations provided by SLR Consulting (Canada) Ltd. will be addressed. SLR Consulting's recommendations included:
 - i. Assess the liquefaction potential for the tailings. As there is potential for the frozen deposited tailings to thaw and it is known that at least M Dam is founded on tailings, the liquefaction potential should be assessed to understand whether the tailings could flow in a dam breach scenario.
 - ii. Perform a dam stability analysis of M Dam considering thawed conditions and verify whether the dam is underlain by tailings. If tailings are present under the dam, consider an Undrained Strength Analysis of thawed tailings.
 - iii. Conduct a dam breach analysis for the TCA. Presently the highest consequence would be a perimeter dam breach releasing contact water into the downstream environment. In the long-term and depending on the findings of the liquefaction potential assessment, a dam breach could release liquefiable tailings into the downstream environment.
 - iv. Construct a temporary emergency spillway to reduce the risk of dam overtopping before the closure spillway is constructed. The closure spillway could use parts of the temporary emergency spillway (e.g., the outlet channel). Parts of the closure spillway would be constructed now with the spillway invert lowered to the closure elevation at a later date.
 - v. Design erosion resistant slopes or drainage features for the dams to ensure long term physical stability of the TCA.
 - vi. Adopt large magnitude events (in exceedance of those required according to the HPC) for seismic and flood design criteria for closure.
 - vii. Perform a formal risk assessment for the TCA and document with a risk register. This risk assessment must recognize both the physical and interconnected geochemical risks and cover the transition from active closure to passive closure.
 - viii. Update or develop a new OMS Manual for the TCA that reflects the current status of the site and is updated regularly as site conditions change and the site transitions to a state of passive closure.
 - ix. Update the Emergency Response Plan to provide clarity and direction for dam safety emergencies.
 - x. Develop a dam safety corporate policy and identify a responsible tailings facility engineer and accountable executive;
- e. Provide an update on the status of work with respect to the dam in its 2024 Annual Report.