

LUPIN MINES INCORPORATED
(A Wholly Owned Indirect Subsidiary of Mandalay Resources Corp.)

September 30, 2020

Richard Dwyer
Manager of Licensing
Nunavut Water Board
Box 119, Gjoa Haven, Nunavut
X0B 1J0
Via Email: Richard.dwyer@nwb-oen.ca, and licensing@nwb-oen.ca

RE: Water Licence 2AM-LUP2032 - Response to CIRNAC Response dated August 25, 2020 to Lupin Mines Incorporated Condition E 25-TM-Dome Design and Condition E-27 Exposed Tailings Preliminary Cover Design

Dear Mr. Dwyer,

Lupin Mines Incorporated (LMI) is writing to respond to the comments submitted by the Crown Indigenous Relations and Northern Affairs Canada (CIRNAC) on August 25, 2020.

1.0 INTRODUCTION

Following a lengthy public hearing review processes, the Nunavut Water Board (NWB) confirmed on issuance of the Type A Water Licence 2AM-LUP2032 (Licence), the terms and conditions necessary to protect the environment, conserve the water resources, and provide appropriate safeguards in respect of the remaining reclamation and closure activities as well as Long-Term Post Closure Monitoring program to be undertaken by LMI at the Lupin Mine site (NWB decision dated February 28, 2020).

The current licence confirms approval of Final Closure and Reclamation Plan (July 2018) which outlines the measures proposed by LMI to complete final remediation of the Lupin Mine Site and previous approval granted by the Board related to the Closure Plan for Tailing Containment Area (January 2005). Refer to Part B, Item 13 of Licence 2AM-LUP2032.

2.0 RESPONSES TO CIRNAC COMMENTS ON CONDITION 25 DOME DESIGN

2.1 CIRNAC COMMENT 1:

COMMENT 1: Review of the information provided in the Golder memo indicated some new information in terms of design details and related design data to support the assessment of the long-term stability and performance of the proposed concept. No additional discussions were provided in the body of memo to support the civil design basis of the runoff control features or to support the long stability of the 10% slope surfaces against erosion. CIRNAC review of the plans and sections observed that the 10% slopes, about 300m of top edge in the north portion of the "dome" is as much as 10m high and this extends out about 100m to the toe. The west and southwest side of the dome has a height of between 5m and 6m and thus extends out some 50+/- meters in these areas. There was an indication that a berm will be constructed on the top edge of the dome to direct "dome surface" runoff to drainage chutes (see below). However, no erosion control measures are included to ensure erosion protection and stability of these long 10% esker slopes.

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RECOMMENDATION 1: CIRNAC recommends that LMI include erosion control measures to ensure erosion protection and stability of these long 10% esker slopes.

LMI Response

The perimeter berm will prevent runoff from the top surface of the dome from “spilling over the edges”; rather all runoff from the top surface will be conducted down erosion protected drainage chutes to ground level. As a result, the only runoff that will flow over the 10% sloped edges will be runoff from precipitation that lands directly on those surfaces. About 49% of the annual precipitation will occur as snowfall. Snowmelt is expected to run off during the spring freshet during which time the dome slope will still be frozen. Runoff from rainfall during the summer season will occur as sheet flow.

The esker material which will form the cover is a well graded pit run gravelly sand material which typically comprises the following fractions: 38% gravel, 59% sand and 3% silt (Holubec, 2005)¹. Under incipient erosion conditions, these types of materials tend to “self armour” (i.e., fines are removed leaving behind a matrix of coarser material, which is more resistant to erosion).

The FCRP (Section 4.3.2.3) includes a provision for post-closure inspection of the cover. It is stated that “Annual visual inspections will be completed and documented, and maintenance activities will be undertaken if and as needed (e.g., regrading or the placement of additional granular material to repair erosion).” Light construction equipment will be left on site to carry out such repair work if required.

2.2 CIRNAC Comment 2:

COMMENT 2: The plans and sections indicate that surface water runoff from the 1.6% surface slope, is expected to be drained off the dome, down the 10% slopes, via 6 runoff “drainage chutes”. Surface runoff is to be directed to these “chutes” by a small perimeter berm along the edge of the dome surface (0.5m high, 0.5m crest width, 2:1 slopes) constructed with the same esker material as the 1m dome cover surface. Given the importance of this berm in preventing overland sheet flow to the 10% slopes, CIRNAC is concerned with the long-term stability of the berm design as presented. No information was provided to support the designs of the top perimeter berm, the chutes, or the stilling basins. No drainage elevations were provided with respect to surface grading on the top of the dome edges, and no information is provided with respect to the drainage runoff flows leaving the “stilling basins” at the toe of the dome. No details were provided for the toe of the 10% slopes, nor for runoff from “stilling basins”, which in some locations could undercut the toe of the cover (see north central discharge). In the absence of these information we question the long-term erosion stability of the designs.

RECOMMENDATION 2: CIRNAC recommends that LMI provide the information stated above to demonstrate the long-term erosion stability of the designs.

LMI Response

The two drawings that were attached to the Technical Memo are Revision A drawings that are labelled “Not for Construction”. These Rev A drawings provide more detail than was required to meet commitment E-25. Additional design details will be provided on subsequent Rev 0 “Issued for Construction” drawings.

¹ Holubec Consulting, 2005. Lupin Operation – Closure Plan for Tailings Containment Area; January 2005.

It is intended that the alignment of the perimeter berms will be angled such that runoff striking the inner toe of the berms will have a gentle but positive drainage path to the nearest chute. Details of the alignment and the toe elevations will be provided in the Rev 0 drawings.

The typical cross-section and typical profile shown on Drawing 2, show the configuration and erosion protection design of the drainage chutes. Drawing 1 Rev A shows the number and location of the chutes. More details (i.e., set out points and invert elevations) will be provided later in the Rev 0 drawings.

It is intended that runoff discharging from the stilling basins will flow away from the dome, rather than tangentially along the toe. The same is true of the sheet runoff off the 10% sideslopes. For the most part, this will happen naturally because the “dome” is sited on the top of a natural hill. If, after the adjacent waste rock is excavated from the toe, there remain any areas where flow would otherwise occur tangentially along the toe of the dome, this flow will be redirected away from the toe of the cover using ditches and or swales as necessary. If there are any areas where this cannot practicably be done, then erosion protection will be placed against the affected toe area to prevent erosion.

LMI looks forward to further discussion in the development of the Post Closure Monitoring Plan in accordance with Part J, Item 13 and Schedule J of the water licence 2AM-LUP2032.

2.3 CIRNAC Comment 3:

COMMENT 3: The notes on the site plan included:

- Drawing Note 1 which states that “*subgrade under the dome area is to be prepared in accordance with the Water Licence and FCRP before waste rock or cover materials are placed*”. While CIRNAC agrees with the intent of this statement it is not clear how LMI will ensure compliance with this note is achieved if it these requirements are not specifically stated on the drawings.
- Drawing Note 2 provides a list of materials that are to be removed before waste rock is placed, but the drawing does not identify the locations of these materials. it is unclear how this will be achieved in the absence of specific references to the dome plan.
- Drawing Note 4 states that crown pillar and openings and mine shafts are to be filled before waste rock is placed on top. No details or specifications are provided with respect to these activities, and no reference is made to necessary approvals from the mines inspector.
- In addition to our specific concerns with the “dome” design concepts, CIRNAC is also concerned that the remedial requirements that need to be undertaken are not specifically identified or referenced on the plan provided. that LMI should provide specific cross reference to these works to ensure

RECOMMENDATION 3: CIRNAC recommends that all relevant requirements and works be specifically referenced.

LMI Response

Note 1 was deliberately stated in general terms in order to require the Contractor to comply with any relevant terms in the water licence and the FCRP.

The Phase I and II ESA (Morrow, 2006)² together with the ESA update (Golder, 2017)³ contain extensive information on the location, nature and estimated quantities of soil and rock requiring clean up. This information is publicly available on the NWB ftp site. Also, electronic copies of these reports have been made available to the Contractor along with a separate plan showing the known locations of planned clean up. LMI has also developed a protocol for the clean up activities, which uses a combination of field screening and confirmatory lab analysis techniques to establish the excavation limits. It should also be noted that, should contaminated soil or rock become evident at locations other than those shown in the existing documents, the affected soil and rock will be cleaned up according to the protocol.

Disposal of waste materials into the crown pillar openings and shafts has been described in the FCRP and approved under the water licence. WSCC Chief Inspector of Mines approval was granted on 29 June 2020.

The Technical Memo submitted on 8 June 2020 was intended to address the specific requirements Part E, Item 25 of water licence 2AM-LUP2032. Clean up activities began in 2020 and were undertaken following the cleanup protocol discussed above.

3.0 RESPONSES TO CIRNAC COMMENTS ON CONDITION 27 EXPOSED TAILINGS PRELIMINARY COVER DESIGN

3.1 CIRNAC COMMENT 4:

COMMENT 4: CIRNAC appreciates the information provided by this submission with respect to both the rationale and the design approach for the Cell 4 exposed tailings. In general, CIRNAC has no issues with this information or the plans sections and details provided. However, it is noted that Cell 4 exposed tailings are known exposed tailings. The Nunavut Water Board request was to provide details on how LMI would handle tailings that could potentially become exposed when drawing down the water levels in the ponds.

While it can be inferred that the approach to covering any newly exposed tailings that might result from drawing down Ponds 1 and 2 would be the same as that used for covering the Cell 4 tailings, no details or discussions have been presented on how such tailings covers would be placed and secured. It is important for LMI to indicate whether esker materials will be placed directly over the tailings or if a geotextile filter clothe be placed prior to placing esker materials over the tailings, and if the perimeters of the cover material will be stabilized with geotextile fabric and boulder materials? At this point in time, the Stantec's comment on how any potentially exposed tailings materials would be handled is that *"If other exposed tailings are found, outside of the identified Cell 4 area, specific design will be done according to specific site conditions. The general criteria above will apply, along with specific design feature(s) as needed once site condition and specifics are identified."*

RECOMMENDATION 4: CIRNAC recommends that LMI provides the necessary site specific design(s) for any such tailings area cover(s) for review before LMI can cover any exposed tailings.

LMI Response

LMI has provided, through the regulatory process Public Hearing Exhibit No. 6, a technical memorandum dated 9 January 2020 regarding, supporting information to the contingency contaminants management decision matrix and an additional technical memorandum in response to Commitment No.8 from the Technical Meeting/Pre-

² Morrow Environmental. 2006. Environmental Site Assessment, Lupin Mine Site, Nunavut Territory, January 2006.

³ Golder Associates. 2017. Updated Phase I and II Environmental Site Assessment, Lupin Mine, Nunavut; October 2017.

hearing Conference regarding, exposed contaminants at closure water levels. Refer to Appendix H-1 and H-10, respectively, of the recently submitted updated FCRP for additional copy. Moving forward, LMI is committed to compliance with our Type A Water Licence and approved closure plans.

4.0 CLOSURE

LMI has, as required under Part I, Item 2 of the current licence, presently working on “an update to the Final Closure and Reclamation Plan, to address relevant comments and recommendations provided by intervening parties and the Board during the review process for the Application”. This updated FCRP was submitted to the NWB on 28 September 2020.

As stated previously, LMI looks forward to working with CIRNAC on the development of a Post Closure Monitoring Plan (PCMP) in accordance with Schedule J of the Licence wherein LMI is required to in the development of the PCMP to consult with community members and organizations in Kugluktuk (i.e. KIA).

We trust our comments address CIRNAC comments, if you require any further information, please contact me at K.Lewis@mandalayresources.com or by telephone at (778)-386-7340.

Regards,

“Karyn Lewis”

Karyn Lewis
LMI Project Manager

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October 19, 2020

Richard Dwyer
Manager of Licensing
Nunavut Water Board
Box 119, Gjoa Haven, Nunavut
X0B 1J0
Via Email: Richard.dwyer@nwb-oen.ca, and licensing@nwb-oen.ca

RE: Water Licence 2AM-LUP2032 - Response to CIRNAC Response dated October 9, 2020 to Lupin Mines Incorporated Condition E 25-TM-Dome Design and Condition E-27 Exposed Tailings Preliminary Cover Design

Dear Mr. Dwyer,

Lupin Mines Incorporated (LMI) is writing to respond to the comments submitted by the Crown Indigenous Relations and Northern Affairs Canada (CIRNAC) on October 9, 2020.

1.0 INTRODUCTION

Following a lengthy public hearing review processes, the Nunavut Water Board (NWB) confirmed on issuance of the Type A Water Licence 2AM-LUP2032 (Licence), the terms and conditions necessary to protect the environment, conserve the water resources, and provide appropriate safeguards in respect of the remaining reclamation and closure activities as well as Long-Term Post Closure Monitoring program to be undertaken by LMI at the Lupin Mine site (NWB decision dated February 28, 2020).

The current licence confirms approval of Final Closure and Reclamation Plan (July 2018) which outlines the measures proposed by LMI to complete final remediation of the Lupin Mine Site and previous approval granted by the Board related to the Closure Plan for Tailing Containment Area (January 2005). Refer to Part B, Item 13 of Licence 2AM-LUP2032.

2.0 RESPONSES TO CIRNAC COMMENTS ON CONDITION 25 DOME DESIGN

2.1 CIRNAC COMMENT 1:

Lack of Erosion Controls on 10% slopes of esker cover - LMI's September 30, 2020 reply indicates that the nature of the cover material is such that it will seal armour as surface erosion removes fines and annual inspections and equipment will be on site to monitor and repair if erosion is an issue.

It is unclear as to what assumptions have been made with respect to the anticipated design flows during both the freshet and summer storm events. CIRNAC does not agree with LMI's indication that during the freshet the dome cover will remain frozen (ponding of water on top of the dome would result in thawing of the upper portions of the esker cover) and thus protect the esker cover from scour and/or erosion. Furthermore, the gradation of the esker material may be such that the fine-grained sands and silts could be easily removed during intense precipitation events, thus resulting in esker covers being compromised. There was also no information

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provided to confirm that the riprap to be used in the chutes is sufficiently sized to remain stable during the high intensity runoff events.

LMI's also references the FCRP (Section 4.3.2.3) in the response that indicates that annual inspections will identify areas of mitigation work and these maintenance activities can be done using light construction equipment has not been accounted for in the security estimate for the mine site. The cost of mobilizing equipment to complete the necessary repair work would be expensive and needs to be accounted for in the security if the current dome construction design plan is accepted. CIRNAC is not confident that the design provided is sufficient for a long-term walk away solution.

CIRNAC Recommendation: CIRNAC recommends that interested parties are provided the opportunity to review the recently submitted FCRP, and that the cost of this potential post-closure work is considered in the reclamation security.

LMI RESPONSE

The NWB has provided the updated FCRP for interested parties to review and provide comments. As noted in the current security estimate, equipment will remain at site for various repairs as required until post closure monitoring is complete. Demobilization of this equipment is also included in the current security estimate.

2.2 CIRNAC COMMENT 2:

Lack of information to demonstrate stability of designs LMI's September 30, 2020 reply indicates that additional design details will be provided in their "Subsequent Issued for Construction Drawings" and provided additional comments on the intent of the designs. CIRNAC anticipates the opportunity to review the "Subsequent Issued for Construction Drawings" from LMI to confirm if it addresses CIRNAC's questions. More detailed topographic information is also required to ensure that water runoff is not allowed to migrate tangentially along the toe of the dome embankment. This work should be done in advance of the dome construction work so it is clear to all parties involved as to the work required to properly install the esker dome cap.

CIRNAC Recommendation: CIRNAC recommends that the 'Subsequent Issued for Construction Drawings' be provided by LMI for review in advance of the dome construction work.

LMI RESPONSE

LMI will provide the NWB with construction drawings as required under water licence 2AM-LUP2032.

2.3 CIRNAC COMMENT 3:

Notes on the design plan and lack of specific information on related underlying works LMI's September 30, 2020 reply indicates that the intent of the 8 June 2020 Technical memo was to address the specific requirements of Part E Item 25 of the Water Licence 2AM-LUP2032. LMI notes that clean-up work began in 2020 and were undertaken in accordance with their clean-up protocol (as summarized below).

LMI's reply states that "Note 1 is deliberately stated in general terms in order to require the Contractor to comply with any relevant terms in the water licence and the PCR". LMI further states that the relevant background documents are publicly available and contain extensive information on location and nature of various aspects of soil and rock requiring cleanup; that LMI has developed a protocol for cleanup activities

(field screening and laboratory testing) to establish excavation limits; and that disposal of the materials into the crown pillar and openings and shafts has been described in the FCRP; and that WSCC Chief Inspector of Mines Approval was granted 29 June 2020. CIRNAC suggests that it is challenging to expect the general contractor responsible for the construction of the esker dome cover to read both the requirements of the NWB and FCRP in sufficient detail to ensure that all engineering aspects of the work are appropriately addressed. LMI should ensure that there is a sufficient level of detail provided on the Issued for Construction drawings that will provide clarity to all program stakeholders to fully understand the work to be done, and ensure inspectors have the means by which to ensure the work is being executed in accordance with the design documents.

CIRNAC has not seen the referenced approval document granted by the WSCC Chief Inspector of Mines approving the disposal of waste rock in the crown pillar opening. Furthermore, it is incumbent on LMI to provide more than a conceptual plan on how this material will be placed into the crown pillar opening and shafts.

CIRNAC Recommendation: CIRNAC recommends the following;

- i. The recently submitted FCRP be provided for review by interested parties.
- ii. LMI to ensure that there is a sufficient level of details provided on the Issued for Construction drawings that will provide clarity to all program stakeholders to fully understand the work to be done, and inspectors have the means by which to ensure the work is being executed in accordance with the design documents.

LMI RESPONSE:

The NWB has provided the updated FCRP for interested parties to review and provide comments. LMI will provide the NWB with construction drawings as required under water licence 2AM-LUP2032. Please find below, the WSCC Chief Inspector of Mines approval documentation.

3.0 RESPONSES TO CIRNAC COMMENTS ON CONDITION 27 EXPOSED TAILINGS PRELIMINARY COVER DESIGN

3.1 CIRNAC COMMENT 4:

LMI's September 30, 2020 reply referred to the previously provided "decision matrix" and supporting information provided in response to Commitment No. 8 from the Technical Meeting/Pre-Hearing Conference and also referred to Appendix H-1 and H-10 of the recently submitted FCRP (28 September 2020). CIRNAC has not reviewed the referenced FCRP document. CIRNAC's design request emanated from review of LMI's previous submissions.

CIRNAC Recommendation: CIRNAC recommends that the recently submitted FCRP be provided for review by interested parties.

LMI RESPONSE:

The NWB has provided the updated FCRP for interested parties to review and provide comments.

4.0 CLOSURE

LMI has, as required under Part I, Item 2 of the current licence, presently working on “an update to the Final Closure and Reclamation Plan, to address relevant comments and recommendations provided by intervening parties and the Board during the review process for the Application”. This updated FCRP was submitted to the NWB on 28 September 2020 and is currently out for review by interested parties.

As stated previously, LMI looks forward to working with CIRNAC on the development of a Post Closure Monitoring Plan (PCMP) in accordance with Schedule J of the Licence wherein LMI is required to in the development of the PCMP to consult with community members and organizations in Kugluktuk (i.e. KIA).

We trust our comments address CIRNAC comments, if you require any further information, please contact me at K.Lewis@mandalayresources.com or by telephone at (778)-386-7340.

Regards,

“Karyn Lewis”

Karyn Lewis
LMI Project Manager

2020-06-29

Gord Peckford
Mine Manager
Lupin Mine Remediation Project
Nahanni Construction Ltd
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Yellowknife, NT X1A 2P6

lupinmanager@NahanniNCL.com

Dear Mr. Peckford:

Approval - Lupin Mine Remediation Project Drilling and Blasting Plan

This is in response to your Lupin Mine Remediation Project submittal received via email requesting approval of the Drilling and Blasting Plan.

Pursuant to the applicable Nunavut *Mine Health and Safety Act and Regulations*, various emails, teleconferences and review of the following documents:

- 2020-06-25 Drilling and Blasting Plan Approval;
- West Zone Crown Pillar Blast Locations - Plan view;
- 180727 2AM-LUP1520 5_0_Final_Cre_Reclamation_Plan Ver.0-IMLE 123;
- Site safety plan Lupin Mine June10, 2020;
- M8277C Break-Away Drill and Blast-Lupin Mine Closure-West Zone Pilla.._; and
- Email addressing WSCC questions dated June 18, 2020 10:47 AM MST,

The documentation is deemed acceptable and found to be in compliance with the applicable Nunavut *Mine Health and Safety Act and Regulations*.

Sincerely,

Cary Ingram
CRSP
Chief Inspector of Mines

cc: Jared Buchko

jared@nahannincl.com