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.

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