



Water Resources Division
Nunavut Regional Office
Iqaluit, NU X0A 0H0

November 30, 2018

Richard Dwyer
Manager of Licensing
Nunavut Water Board
PO Box 119
Gjoa Haven, NU X0A 1J0

CIDM # 1235169

Re: 2AM-LUP1520 – Review of Golder Associates Ltd (Golder) November 19, 2018 Responses to CIRNAC's November 2, 2018 Comments on Lupin Mines, Progressive Reclamation Cost Estimate

Dear Mr. Dwyer

Thank-you for the email notice received on September 26, 2018, regarding the opportunity to comment on the Progressive Reclamation Cost Update – Lupin Mine Property.

Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) reviewed the documents provided by the Nunavut Water Board (NWB) under Part C on the Nunavut Water Board FTP site as it relates to 2AM-LUP1520. CIRNAC's comments are provided pursuant to its mandated responsibilities from the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Department of Indian Affairs and Northern Development Act*.

If you have any questions or require further information with respect to this matter, contact me at (867) 222-9278 or by email at ian.parsons@canada.ca.

Sincerely,

Original signed by

Ian Parsons
Manager, Water Resources



Memorandum

To: Richard Dwyer, Manager of Licensing, NWB

From: Ian Parsons, Manager, Water Resources CIRNAC, Nunavut Regional Office

Date: November 30, 2018

Re: **2AM-LUP1520 – Review of Golder’s November 19, 2018 Responses to CIRNAC’s November 2, 2018 Comments on Lupin Mines, Progressive Reclamation Cost Estimate**

Applicant: Lupin Mines Inc. (LMI)
Project: Lupin Mine Project
Region: Kitikmeot

Background

The Lupin Mine Site is situated in Nunavut’s Kitikmeot region, approximately 250 km West of Arviat, 285 km southeast of Kugluktuk, Nunavut, and about 400 km north of Yellowknife, Northwest Territories. The airstrip serving this Site is at 65° 46’00” N and 111° 14’41” W. The Site is on the western shore of Contwoyto Lake, approximately 60 km south of the Arctic Circle.

The mine property is currently owned by Mandalay Resources with the licensee of the site being Lupin Mines Inc. (LMI). The Lupin Mine was in operation from 1982 to 2005 with temporary suspensions of activities between January 1998 and April 2000, and between August 2003 and March 2004. The mine resumed production in March 2004 until February 2005. The site has remained in Care and Maintenance since 2005.

Currently LMI is looking for progressive reduction in security and implementing their final closure plan in the coming months.

CIRNAC worked with Arcadis Canada Inc. to review the documentation for the final Closure Plan (CP) and undertook a site investigation on July 5, 2018 for assessing and validating security requirements for the Lupin site. CIRNAC submitted comments to the NWB on November 2, 2018 regarding LMI’s Progress Reclamation Cost Update (PRCU) documentation. LMI submitted responses to the NWB on November 19, 2018.

The NWB has asked if CIRNAC’s comments/recommendations have been addressed by LMI’s November 19 submission by November 30, 2018.

Our comments are provided in Attachments 1 and 2 to this letter. For ease of reference we have also provided the Attachment B of the 2 November 2018 letter as supplemental information at the end of this letter.



Attachment 1 provides comments with respect to Golder's responses to CIRNAC's request as contained in Chapters 3 and 4 of the Golder report. Where Golder's responses are not fully responsive to our recommendation, or leave us with ongoing concerns, we have shaded our comments in gray.

Attachment 2 provides additional comments focused on the site closure liability and the estimate of progressive reclamation as presented by Golder in Chapter 5 and their report appendix information.



ATTACHMENT 1

2AM-LUP1520 – Review of Golder’s November 19, 2018 Responses to CIRNAC’s November 2, 2018 Comments on Lupin Mines, Progressive Reclamation Cost Estimate

SUMMARY COMMENTS ON GOLDER RESPONSES

Golder’s report of November 19, 2018, has provided responses to CIRNAC’s letter to the Nunavut Water Board dated November 2, 2018 which included Attachments A comments and recommendations on the Golder Progress Reclamation Cost Update (PRCU) cost estimate and Attachment B which included comments and recommendations pursuant to the July 4 and 5, 2018 meeting with LMI and Golder as part of the Lupin mine site visit.

In section 3 Golder replied to all comments and recommendations provided by CIRNAC in Attachment A. In general, the Golder responses in Section 3 provided additional clarification with respect to the issues raised. In some cases, however, the replies do not provide the expected level of detail or verification requested (see examples below).

In Section 4 Golder provided partial responses (5 of 11) to the comments and recommendations contained in Attachment B of CIRNAC’s letter. The Golder responses confirm CIRNAC’s concern that LMI is planning material changes to its approved Interim Closure and Reclamation Plan (ICRP) in regard to its management of PAG waste rock and the final embankment stabilization of the tailings containment system dams.

SPECIFIC COMMENTS ON GOLDER RESPONSES included in Chapter 3 of Golder Report

Chapter 3.1 of Golder Report

CIRNAC Recommendation 1 – Request for FCRP and Final Schedule and Timelines

Golder Response: Section 3.1 Golder provided link for FCRP.

CIRNAC comment: LMI has satisfied this recommendation.

Chapter 3.2 of Golder Report

CIRNAC Recommendation 2 - Verification of work completion to specification

Golder Response: In Section 3.2 Golder states Section 3.4 provides documentation of works completed / to be completed.

CIRNAC comment: Our comments on these items are provided below in the order as addressed by Golder.

Chapter 3.3 of Golder Report

CIRNAC Comments and Recommendations - LMI clarify if IARP and ICRP are same, or if not note the difference

Golder Response: Golder noted that both IARP and ICRP refer to the same document, the latest of which is dated October 2017.

CIRNAC comment: LMI has satisfied this recommendation



Chapter 3.4 of Golder Report

CIRNAC Comments and Recommendations - LMI identify differences between KP and FCRP cost estimate.

Golder Response: Golder states that FCRP cost estimate is not relevant as the FCRP is not yet approved.

CIRNAC Comment: CIRNAC believes that the KCRP is relevant as it represents LMI's plan for the site as submitted to the NWB. As such, LMI needs to identify differences between KP and FCRP cost estimate.

CIRNAC Recommended - LMI provide value of progressive reclamation reduction not including value of fuel.

Golder Response: answer provided.

CIRNAC comment: LMI has satisfied CIRNAC's request.

CIRNAC Recommended - Confirm when 2018 water treatment and discharge started at the site.

Golder Response: Golder revised date of lime treatment and discharge to be from August 21 to September 19, 2018.

CIRNAC comment: LMI has provided the dates requested, however at this time we have not seen information on water chemistry confirming compliance with water Licence discharge criteria].

CIRNAC Recommended - LMI should provide verification of information of the progressive reclamation work completed subsequent to the site visit

Golder Response: In response to this request, Golder has provided additional discussion under nine bullet items. Of these nine (9) items, supporting information is provided for two (2) of these items as noted below:

- field records of truck loads for esker materials hauled and placed for the Cell 5 cover, and
- quantity of treated water discharged

CIRNAC Comment: Additional verification information is required for the other 7 items.

CIRNAC Recommended - LMI be more specific with respect to and clarify what and how much work is planned to be performed in the Winter 2018-2019

Golder Response: Golder noted that work planned for winter 2018-19 comprises of "gutting" of removable building materials. The value of "gutting" is estimated at 15% of demolition value. Also provided in Appendix B of the Golder report is a response to provide the requested additional details. During CIRNAC's review of this additional information it is not clear as to what happens to the various items described in the appendix after they have been "removed" during the "gutting" action.

CIRNAC Comment: This partial satisfies CIRNAC's recommendation and are requesting clarification on what happens after equipment and materials are "removed" during the gutting process.



Chapter 4 of Golder 19 November 2018

In this chapter, Golder responded to CIRNAC Issues & Recommendation pursuant July 4, 2018 meeting in Yellowknife and July 5, 2018 site visit as provided in Attachment B of CIRNAC's letter of November 2, 2018.

Our comments on the Golder responses are as provided below. For ease of reference to the issues and recommendations, we have provided Attachment B as supplementary information at the end of this document

- Golder replied that issues and recommendations associated with **items 1 through 6** inclusive of Attachment B would be considered during the process of FCRP approval and water licence amendment and renewal.

We recommend that these items be considered and included as part of the FCRP as appropriate.

- With respect to **Item 7**, Golder notes that the Dam M earthwork work was carried out in 2016 as part of tension crack earthwork stabilization work on Dam M and made reference to a "2017 Lupin Mine Tailings Containment Area Geotechnical Inspection" report (Norwest 2017). No specific references to the contents of the report were provided in Golder's response.

Given this response, several comments/ questions arise:

- i. It is unclear without further review to assess the findings of the inspection report.
- ii. As the work was done to address issues in the existing structure, should this work not be classified as ongoing maintenance and repair as opposed to progressive reclamation?
- iii. If the latter, given that the work was done in 2016 has it not already been included in the 2018 reclamation reduction?

Golder further states in respect to Item 7, that *"at closure a dozer will be used to re-slope the existing materials used to construct the above described buttress to a minimum of 2:1, and up to 2.5:1 as directed by the EOR. The existing esker materials will be used for the re-slope in addition to the existing rip-rap."*

- iv. This is a fundamental change to the approved ICRP which specifically committed to a "major program of dam enhancement in which the sides of all dams will be brought to 2.5:1 slope by the addition of through the addition of quarried rip-rap."

- In response to **item 8**, Golder noted that CIRNAC was correct in stating that the FCRP plan has changed from the ICRP plan. Golder state that *"rip-rap salvaged from the higher elevations of the dams will be placed at the toe of the dams where they will be*



exposed to wave action, and only if the rip rap in those areas is deemed inadequate.” They go on to say that “the dams will be re-sloped as per the direction of the EOR and there are no plans to use rip rap as a general fill to flatten slopes”.

The responses provided by Golder in regard to Item 8 are troubling. The responses clearly indicate LMI is expecting to implement a fundamentally different approach toward final embankment than has been approved in the ICRP and its predecessors which committed to placement of additional clean rip rap to ensure 2:5:1 outer slopes on all embankments for final closure.

Reference is made to re-use of existing rip rap from the upper portion of the dams. As the dams were constructed of waste rock, much of which is now known to be PAG, this would mean that potentially PAG waste rock would be used in this regard.

Golder statement that placement of “rip rap will only occur in areas where the toe of dam will be exposed to wave action, and only if rip rap currently in those areas is deemed inadequate” casts uncertainty on the entire design basis of embankment stabilization and is inconsistent with the approved design concepts as provided in the ICRP. These statements suggest a design build field fit approach by the proponent which is substantially different than the ICRP commitments.

- In response to **item 9** Golder refers back to their item 7 and 8 responses, and states that unit costs for rip rap will be lower, as to the degree rip rap is needed, rip rap will be salvaged rather than quarried. Golder have nonetheless still used the existing unit cost of 15.20/m³ as carried in the security estimate.

We re-iterate our comment that this is a material change regarding existing commitments related to embankment stability and that the costs carried in the ICRP estimate were in fact for esker material placement not rip rap placement. We also note that final engineering designs should be provided for review to ensure that all applicable details are considered and included when placing rip-rap (e.g. will geotextile be placed to improve the performance of the rip rap cover over esker materials on the toe of slope if this alternative approach to stabilizing the Dam is accepted).

- **item 10** – Golder acknowledged the need to add cost for an engineered permanent portal plug.
- **item 11** – Golder confirmed CIRNAC observation that LMI’s waste rock management strategy as stated is different from that approved under the ICRP. Golder indicated that notwithstanding the changed approach, that the cost allowance for waste rock management remained unchanged.

Golder stated that the changed approach between the ICRP and FCRP will be discussed during the approvals process.



Golder did not respond to CIRNAC concerns that this new proposed approach will not prevent acid rock drainage generation and seepage from the waste rock. This is a material outstanding concern.



ATTACHMENT 2

The following additional comments are provided further to our review of the Golder Progressive Reclamation Cost Update (PRCU) document dated 19 November 2018, with respect to liability estimate provided in this latest document.

1. **Underground Workings** – no issues with the security included

2. **Tailings Impoundment** – see comments below

- a. The placement of esker material at Dam M would be considered an operation and maintenance (OM) activity and not reclamation work as this work was required to address stability issues as identified by SRK and Norwest. Per Golder's and LMI's statements the current PRCU is based on the ICRP and not the FCRP and as such the security related to the placement of rip rap should remain in its entirety. If Norwest provides assurances and design details confirming the work completed to date will provide a stable long-term solution and incorporates them into the FCRP, then LMI could then claim for relief of the security associated with this reclamation work. At this time given we are only considering the ICRP we cannot accept the security relief being claimed by LMI.
- b. The volume of esker material placed to the end of the 2018 field work season is based on truck counts and not the in-situ volume of material placed and compacted. In order to confirm a metre of material has been placed and to get relief on security for the work done in this regard, the volume provided should be based on topographic survey quantities so as to confirm the proper cap has been placed and to avoid the potential for overstating the amount of work done to date.
- c. The claim for the removal of the tailings line should be based solely on the amount of piping removed to the end of September 2018. No credit should be given for forecasted work as this can be claimed for next year per the terms and conditions of the Water Licence. No advantage or protection to the Crown or KIA in the event that the work is not done by LMI.
- d. No concerns with the balance of the security amounts shown for the work completed to date.
- e. I have reservations releasing additional security for work forecasted to be completed in 2019. LMI can apply for the additional release of security next year once the work is completed. NWB are under no obligation to release security for reclamation work not done.

3. **Waste Rock Pile** – No issues with the security as discussed in the context of the 2017 security review by Knight Piesold, however it is unclear how the security required to mitigate the issues with PAG rock at the mine site has been included in the PRCU.

4. **Equipment and Buildings** – see comments below



- a. The removal of glycol, oils and other hazardous materials is forecasted to be completed in winter 2019 and as such LMI should not get security relief for work yet to be completed.
- b. Decommissioning of equipment and preparation of buildings for demolition work is scheduled for 2019. We recognize the dollar amounts presented by Golder/LMI are reasonable and reflective of the work to be done (except related to the demolition of the oil/fuel storage tanks) it is the timing of the security relief that is in question. There is no advantage to the Crown or the KIA to give LMI relief for work yet to be completed.
- c. Applying a 0.67 ratio for the decommissioning of the various tanks on site is not reasonable given that the work scheduled in 2019 is only related to the small tank assemblies. The 15 large ASTs will require substantially more effort to decommission and as such represent more than half the work related to this task. A ratio of 0.33 would be reflective of the work required to decommission the 26 smaller ASTs.

5. Chemicals – see comments below

- a. The additional security added in by LMI for the management of asbestos on site was not included in the original ICRP or the KP security estimate. As such given that LMI is planning to remove the asbestos in 2019 there is no point to adding this item in to the PCRU as the security estimate will need to be updated for the FCRP. We need to check if the FCRP has already been updated to address this issue.
- b. Hazardous waste removal is scheduled for 2019 however given that this work has yet to be completed it should not be included in the PCRU. There is no advantage to the Crown or the KIA in relieving LMI of their responsibilities in this regard. LMI can apply for the relief once the work has been executed.
- c. LMI is claiming that 500 m³ of hydrocarbon impacted soil has been successfully treated at the landfarm. No supporting documentation has been provided to confirm this amount. It is difficult to provide LMI will relief in this regard given the absence of information. Assuming the annual report may provide the necessary back-up.
- d. Credit for an environmental site assessment per Addendum No.2 is odd and not consistent with my understanding of this task. I don't know why LMI thinks they have relief for this security. I have not read Addendum No.2 so it is unclear to me if this is in fact a correct statement. Seem illogical that CIRNAC would accept this. Note that LMI did do some ARD work but this line item is not intended to cover additional work required by the proponent to address new issues that come to light.

6. Mobilization – see comments below

- a. LMI has claimed for reduction of approximately 550k for mobilization. In their document LMI outlines the viable equipment on site as of July 2018. We are not sure what the mobilization costs relate to and would suggest that LMI provide additional information as to what the mobilization reductions costs relate



to and provide some documentation confirming that the equipment operational for intended remedial works of 2019 onward.

- b. Claim for mobilization in 2019 should not be included in the PCRU as the work has not been done. As previously noted, there is no advantage to the Crown or KIA to accept this claim.

(As an aside, it is not clear how the work related to the movement of equipment from Ulu plays out in the Lupin security as the Ulu site has its own security. I am assuming the two securities remain separate.)

- 7. **Post-Closure Water Treatment** – The volume of water being claimed is supported by documentation provided. However, it is possible this is more likely part of the annual care and maintenance requirements and not part of the year 1-10 post closure water treatment. This should be clarified.
- 8. **Other Indirect Costs** – The amount claimed for these tasks should be recalculated based on the updated PRCU amounts. Given the dialogue noted above we would expect the dollar amounts claimed by LMI to be reduced.



SUPPLEMENTAL INFORMATION

(Attachment B of 2 November 2018 CIRNAC letter to NWB)

For ease of reference with respect to Golder's responses of 19 November 2018, CIRNAC's Attachment B of its 2 November 2018 letter to NWB noting Issues and Recommendation pursuant to the 4 July 2018 meeting and 5 July 2018 site visit are provided herewith below.

Number	ISSUE	RECOMMENDATION / Question
1	Figures do not show final proposed conditions.	Add contours and bathymetry to show final elevations and water levels.
2	Figures do not provide final proposed cross-sections (e.g. dams, spillways, plans site, etc.).	Create and add figures as appropriate.
3	Existing water levels not known or readily apparent.	Add simple staff gauges in each water body.
4	Final water level control not known	Run invert elevation profile from Cell 4 pond through connecting drainage ditch and pond 1 and 2.
5	Waste rock dams may be PAG and exposed waste rock may remain if cover placement not carried up slope or thickened at these locations.	Need to ensure potential PAG waste rock is managed in an appropriate manner.
6	Not clear if ARD assessment of waste rock included materials in dams and roads	Confirm if ARD assessment included sampling dam waste rock materials.
7	Major earthwork stabilization addition at M Dam was carried out through the placement of esker materials, not rip-rap. Esker materials do not appear to be at 2:1 slope and are slumping.	Add rip rap cover to outer shell.
8	<p>The ICRP in section 6.5.3 page 41 states that <i>"a major program of dam enhancement is planned during the closure activities. The sides of all dams will be brought to at least 2.5H:1V slope by the addition of quarried riprap"</i>. Section 6.10 notes that <i>"a riprap quarry will be developed to provide the coarse (non-PAG) broken rock needed to enhance dam stability and provide additional armour for the faces of the embankments ..."</i>.</p> <p>Field comments during the site visit stated that there were no plans to quarry rock. This is a material change of design and will reduce the long terms stability and erosion resistance of the embankments. See also issue 9 below.</p>	<p>This is a material change to the ICRP that should likely not be accepted. If proceeding with this course of action it is likely that some form or long-term maintenance will be required.</p>
9	In ICRP closure costing LMI noted that Rip Rap costs should use actual costs as incurred in M Dam work. However, based on field observation, M Dam work as noted above was carried out using esker materials not rip rap	Review and adjust closure cost to reflect cost of rip rap placement.



	materials and do not appear to be at 2.5:1 slope.	
10	Temporary Portal plug exists on site. Draft final closure plan does not include for an engineered plug for the portal.	Need to include for engineered design and construction of permanent portal plug.
11	The ICRP in section 6.4, indicated that waste rock will either be excavated and placed underground/or in the TCA; or left in place, contoured and covered. The final draft closure plan presents a material change in waste rock management as it is now proposed to consolidate most of the waste rock in place at the mill site and cover with esker materials.	PAG waste rock should be placed U/G as much as possible. We are concerned that the proposed cover will only act as an intrusion barrier and not prevent flushing of acidic seeps. The proponent needs to demonstrate how placement of an esker cover over contoured waste rock will mitigate surface drainage of acidic water.