

2021-02-19 Gibraltar TRP update

From: Lachance, Luc ENV:EX <Luc.Lachance@gov.bc.ca>
To: Hill, Douglas J ENV:EX <Doug.Hill@gov.bc.ca>
Cc: Epps, Deb ENV:EX <Deb.Epps@gov.bc.ca>
Sent: February 19, 2021 8:39:35 AM PST

Good morning Doug,

I thought I should give you a brief update on the TRP in preparation for the meeting you have scheduled for next Monday. I have reviewed the file including the correspondences between Carol and GML from last December regarding the TRP and outstanding items. I revised the wording and reissued the draft letter that Carol had prepared and sent it to GML for comments. My review took into account comments from GML from last December and comments from ?Esdilagh from last July. I had a first call with Ben Pierce on Feb 11 to discuss the letter and had a follow up call with him this week on Feb 17. I have another scheduled call with Ben next week, on Feb 23, to further advance the discussion on the TRP and site water management plan. Here is the update:

- GML accepted to reissue a revised TRP taking into account the outstanding items listed. Based on my conversation with Ben, GML agrees with most of the comments but still has issue including shutting down the discharge following toxicity failure in their TRP. That said, they have indicated they would be discussing internally as they don't expect toxicity failure to be an issue in practice. One issue for me to explore is the potential contradiction between the permit and the TRP if this requirement is included an approved TRP.
- A revised draft TRP should be issued by the end of the day today, in preparation for my call next week with Ben.
- GML will also issue a draft letter responding to the my draft letter to provide context – they have some counter proposals and rationale to present.

Throughout this process, I have tried to contact ?Esdilagh and TNG to arrange a meeting to go over the final version of the TRP prior to making a decision and ideally prior to the upcoming TAC meeting scheduled next week, Feb 25. I was able to talk with Helga Harlander of TNG earlier this month to confirm who I should talk to at TNG. She confirmed that I should be talking directly to JP Laplante, stating that her role had changed recently. I attempted to reach JP by email, phone and cell phone but without success.

I am hoping I will be able to reach JP to discuss highlights of the TRP and maybe agree on next steps before the TAC meeting.

I left my contact information to JP by phone and email but please feel free to share them again with him or his rep.

Thank you, Luc

FYI - FW: April 21 2021 ?Esdilagh Response to Mines Act M-40 Permit Amendment Review

From: Dyas, Morgan EMLI:EX <Morgan.Dyas@gov.bc.ca>
To: Ramsay, Devon IRR:EX <Devon.Ramsay@gov.bc.ca>, Epps, Deb ENV:EX <Deb.Epps@gov.bc.ca>, Qureshi, Yasmeen EMLI:EX <Yasmeen.Qureshi@gov.bc.ca>, O'Sullivan, Susan FLNR:EX <Susan.OSullivan@gov.bc.ca>, Petersen, Nicole AG:EX <Nicole.Petersen@gov.bc.ca>, Yamelst, Brian H ENV:EX <Brian.Yamelst@gov.bc.ca>, Lachance, Luc ENV:EX <Luc.Lachance@gov.bc.ca>, McPherson, Alexis EMLI:EX <Alexis.McPherson@gov.bc.ca>, Stevens, Victoria EMLI:EX <Victoria.Stevens@gov.bc.ca>, Norlund, Kelsey EMLI:EX <Kelsey.Norlund@gov.bc.ca>, Grimson, Carla ENV:EX <Carla.Grimson@gov.bc.ca>, Martinka, Rusto ENV:EX <Rusto.Martinka@gov.bc.ca>
Sent: April 22, 2021 9:57:00 AM PDT
Attachments: image003.jpg, 2021 04 21 Esdilagh Mines Act Permit Letter.pdf, 2019 07 08 JPL-HH TNG Letter to EMPR re Outstanding Review of Gibraltar Closure Plan (1)[3].pdf, 2021 04 XX PERMIT M-40 Amalgamated Permit_DRAFT_Final SEA comments[3].docx

Hi all,

?Esdilagh has submitted comments on the Gibraltar Mines Act draft permit (see below and attached). This is an FYI, there is no need for action. MMO is working through the comments and will address them as necessary.

Please let me know if you have any questions.

Regards,
Morgan

From: Emoda Design <crystal@emodadesign.com>
Sent: April 21, 2021 4:53 PM
To: Dyas, Morgan EMLI:EX <Morgan.Dyas@gov.bc.ca>
Cc: Chad Stump <cstump@esdilagh.ca>; Jason Murray <JMurray@eyfordpartners.com>; Luke Doxtator <luke@tsilhqotin.ca>; Helga Harlander <helga@tsilhqotin.ca>; Rina Freed <rina.freed@seamining.ca>
Subject: April 21 2021 ?Esdilagh Response to Mines Act M-40 Permit Amendment Review

[EXTERNAL] This email came from an external source. Only open attachments or links that you are expecting from a known sender.

April 21, 2021

Hi Morgan:

As promised, please find attached ?Esdilagh's response to the Mines Act M-40 Permit Amendment Review of the proposed Gibraltar Mines Act Permit Application sent on behalf of Chad Stump, ?Esdilagh Councillor.

If you have any questions, please don't hesitate to give me a call.

Sincerely,

Crystal Verhaeghe
Emoda Design
(250) 305 – 9241

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Withheld pursuant to/removed as

s.16

**PROVINCE OF BRITISH COLUMBIA
MINISTRY OF ENERGY, MINES AND PETROLEUM RESOURCES**

PERMIT

APPROVING MINE PLAN AND RECLAMATION PROGRAM

(Issued pursuant to Section 10 of the *Mines Act* R.S.B.C. 1996, c. 293)

Permit: **M-40** Mine No: **0900004**

Issued to: **Gibraltar Mines Ltd.
P.O. Box 130
McLeese Lake, British Columbia
V0L 1P0**

for work located at the:

Gibraltar Mine

Issue Date

February 12, 1971

Permit

Authorizing Surface Work

This permit supersedes and amends all previous versions of Permit M-40 issued pursuant to Part 10 of the *Mines Act*. All previously approved works systems are hereby transferred under this permit.

Amended at Victoria, British Columbia this XXth day of April in the year 2021.

J. Lowell Constable, P.Eng.
Deputy Chief Permitting Officer

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PREAMBLE

The *Mines Act* Permit application, and applications for changes to approved works and conditions to Permit M-229, have been submitted to the Chief Permitting Officer, in accordance with Sections 10(1), 10(6), 10(7), and 11.1 of the *Mines Act* and Sections 10.1.2 and 10.1.18 of the Health, Safety and Reclamation Code for Mines in British Columbia (Code).

Where more than one version of information exists in the application, the most recent version shall be considered the approved version unless otherwise stated or determined by the Chief Permitting Officer.

1. Permit Authorizing Surface Works (Issued February 12, 1971)

- 1.1 Report VA1527-23 by Klohn of Klohn Leonoff Consultants Ltd. dated April 2, 1971

2. Permit Authorizing Surface Works (Issued January 3, 1980)

3. Approving for Crusher and Mine Water Impoundment on Granite Creek (Issued April 3, 1981)

Application Received: March 24, 1981

4. Approving modification of Tailings Impoundment System (Issued December 13, 1985)

- 4.1 Report VA1527-23, JobVA2513 by Klohn of Klohn Leonoff Consultants Ltd.
4.2 Report PB1527-01013, by Klohn of Klohn Leonoff Consultants Ltd., dated feb 25 1985

5. Approving Solvent Extraction Electrowinning Plant and Dump Leaching Process (Issued July 7, 1986)

6. Amendment to Reclamation Permit (Issued October 31, 1989)

- 6.1 Reclamation Plan Report dated April 22, 1986.

Referred: Cariboo Regional Reclamation Advisory Committee and Reclamation Advisory Committee

7. Approving Tailings Impoundment Northeast Fill Dam Design (Issued September 28, 1990)

- 7.1 Report File No. PB1527 by Klohn Leonoff, dated August 1990.

8. Amendment to Reclamation Permit (Issued January 7, 1994)

8.1 Letter request to amend reclamation security provisions, dated December 3, 1993.

Application Received: December 7, 1993

9. Amendment to Reclamation Permit (Issued August 17, 1994)

9.1 Letter request to amend reclamation security provisions, dated June 2, 1994.

Application Received: June 8, 1994

10. Amalgamation of Westmin Resources Ltd. and Gibraltar Mines Ltd. (Name Change) (Issued May 26, 1997)

11. Approval to Construct Tailings Dam to Elevation 3620 feet (Issued December 3, 1997)

11.1 Report entitled '*Tailings Impoundment 1996 Storage Capacity Review*', prepared by Klohn Crippen. Dated December 20, 1996.

11.2 Letter entitled '*re: Tailings impoundment Stability review, response to Ministry of Employment and Investment letter dated June 26, 1996*', prepared by Klohn Crippen. Dated April 11, 1997.

11.3 Report entitled '*Tailings dam Stability Review Volume I and II-Appendices*', prepared by Klohn-Crippen. Dated January 29, 1997.

Application Received: May 12, 1997

12. Approving Mine Transfer to Boliden Westmin Ltd. (Issued June 16, 1998)

13. Approving Name Change to Boliden Westmin (Canada) Ltd. (Issued January 13, 1999)
Application Received: May 12, 1997

14. Amended Permit (Issued July 21, 1999)

14.1 Letter from Taseko Mines on behalf of subsidiary Gibraltar Mines to transfer permit into the name of Gibraltar Mines Ltd., dated June 24, 1999.

14.2 Letter from Taseko Mines to Regional Manager accepting Gibraltar Closure Plan submitted October 1998.

14.3 Report entitled "*Decommissioning Plan for the Gibraltar mine Operation*" dated October 1, 1998.

14.4 Report entitled "*Response to Ministry of Energy and Mines Concerns with the Gibraltar Closure Report*" dated June 15, 1999.

Application Received: June 24, 1999

15. Amendment to Reclamation Permit M-40 Defer submission of Closure Plan (Issued January 9, 2002)

- 15.1 Letter from Gibraltar Mines deferring Closure Plan to December 31, 2002, dated July 11, 2001.

16. Amendment Reclamation Security (Issued January 22, 2002)

17. Amendment Reclamation Security (Issued December 31, 2002)

- 17.1 Application dated November 29, 2002.

Application Received: December 9, 2002

Referred: Cariboo Regional Reclamation Advisory Committee and Reclamation Advisory Committee

18. Approving Mine Restart, Four and Twelve Year Mine Plan (Issued June 1, 2004)

- 18.1 Application entitled "*Gibraltar Mines Ltd. Mine Restart, Four and Twelve Year Mine Plan*", dated May 11, 2004.

Application Received: May 18, 2004

19. Approving Redesign of Tailings Dam (Issued November 12, 2004)

- 19.1 Application entitled "*2004 Tailings Dam Re-Design Report*", dated September 1, 2004.

Application Received: September 10, 2004

20. Approving Reclamation Program (Issued November 12, 2004)

- 20.1 Report entitled "*Gibraltar Mine 2002 Decommissioning Plan*", dated February 26, 2003.

Application Received: March 10, 2003.

21. Approving Tailings Pond Level (Issued January 3, 2008)

- 21.1 Letter application entitled, “*Request for Amendment, Permit M-40 - Tailings Pond Operating Level*”, dated March 23, 2006.

Application Received: March 23, 2006

22. Approving Waste Rock Ditch Construction (Issued October 7, 2012)

- 22.1 Application entitled “*Proposing Change to 7South Ditch Alignment*”, dated August 3, 2012.

23. Approving Increase in Mill Throughput, 7 South Dump Expansion and TSF Deposition Plan (Issued February 8, 2013)

- 23.1 Report entitled “*Permit M-40 Gibraltar Mines Ltd – Notice of Departure*” dated May 6, 2011.
- 23.2 Application entitled “*Request for Increased Milling Rate – Permit M-40*”, dated July 11, 2012
- 23.3 Application entitled “*Gibraltar Tailings Facility, 2012 Long Term Tailings Deposition Plan*”, dated October 2012.
- 23.4 Report entitled “*#7 Waste Dump – Geotechnical Investigations and Waste Dump Stability Assessment*”, dated October 10, 2012.
- 23.5 Map depicting South Ditch realignment, dated August 2012.
- 23.6 Memorandum entitled “*Proposed Interceptor Ditch Liner Criteria_ Final*”, dated October 30, 2012.
- 23.7 Report entitled “*Review of Hydrogeological Information and Proposed Monitoring Well Installations for Gibraltar Mine*”, dated July 10, 2012.
- 23.8 Report entitled “*Addendum to May 6, 2011 Notice of Departure from Approval*”, dated February 20, 2012.

Application Received: May 17, 2011

Referred: Gibraltar Mine Development Review Committee (FLNRO), with meetings held on July 24, 2012, August 14, 2012, September 14, 2012, and November 21, 2012 in Williams Lake.

24. Approving Double Benching in Granite 4 East Pit. (Issued December 12, 2013)

- 24.1 Report titled, “*G4E 3250-3150 Double Bench Review-Final*” dated September 24, 2013.

Application Received: October 18, 2013

25. Approving Granite Pit Phase 5 Pushback. (Issued January 7, 2014)

25.1 Report entitled, "*Granite Pit Phase V Pushback Slope design*" dated August 16, 2013.

Application Received: August 30, 2013

26. Approving Deadline Extension for Site Wide Mitigation Plan and Liability Cost Estimate. (Issued December 29, 2014)

26.1 Letter entitled, "*Site Wide Mitigation Plan and Updated Liability Cost Estimate*", dated November 19, 2014

Application Received: December 9, 2002

27. Approving Deadline Extension for Site Wide Water Quality Model Update. (Issued May 14, 2015)

27.1 Letter from Taseko Mines requesting deadline extension.

28. Approving Deadline Extension Updated Liability Cost Estimate. (Issued October 27, 2015)

28.1 Letter entitled "*Request for Extension of Updated liability Cost Estimate*", prepared by Gibraltar Mines Ltd., dated October 21, 2015.

29. Approving Granite / Pollyanna Pit Pushback and Dump 7 Extension and Gibraltar Granite 6 Application Addendum (Issued March 10, 2017)

29.1 Application entitled, "*Granite/Pollyanna Pit Pushback and Dump 7 Extension*", dated September 2016.

29.2 Report entitled "*Gibraltar Granite 6 Application Addendum 20161020*", dated October 2016, filed on October 21, 2016.

Application Received: April 13, 2016

30. Approving 2017 Tailings Storage Facility Design Update (Issued February 4, 2019)

30.1 Report entitled "*Gibraltar Tailings Storage Facility – 2017 TSF Design Update*", dated September 2017.

Application Received: February 28, 2018

31. Approving East Saddle Dam Emergency Spillway (Issued April XX, 2021)

- 31.1 Report entitled "Gibraltar Mine Tailings Storage Facility – East Saddle Dam Emergency Spillway Detailed Design – Rev. 1", provided by Klohn Crippen Berger, dated March 16, 2020.
- 31.2 Report entitled "Gibraltar Mine Tailings Storage Facility – East Saddle Dam Emergency Spillway Detailed Design – Rev. 1 – Addendum 1 – Response to MEMPR Issue ID #2", provided by Klohn Crippen Berger, dated July 28, 2020.
- 31.3 Report entitled "ML/ARD Monitoring Plan", provided by SRK Consulting Inc., dated August 2019.
- 31.4 Report entitled "Gibraltar Mine Site Water Management Plan", provided by SRK Consulting Inc., dated August 2019.
- 31.5 Report entitled "Gibraltar Mine Surface Water and Groundwater Monitoring Plan", provided by SRK Consulting Inc., dated August 2019.
- 31.6 Report entitled "Gibraltar Mine Site-Wide Mitigation Plan", provided by SRK Consulting Inc., dated August 2019.

Application Received: November 8, 2019

32. Approving Gibraltar East Pit Phase I (Issued April XX, 2021)

- 32.1 Application entitled "2020 Permit Amendment Application – Technical Assessment Application – Technical Assessment Report – Approving Gibraltar East Pit Mining – Phase I", provided by Gibraltar Mines Ltd., dated November 2020.
- 32.2 Letter entitled "Gibraltar East Pit – Phase 1 Open Pit – Overall Stability Analysis", provided by BGC Inc., dated January 14, 2021.
- 32.3 Report entitled 'Gibraltar Source Term Development' prepared by SRK Consulting (Canada) Inc. (SRK), dated May 2018.
- 32.4 Memorandum entitled 'Groundwater Modelling for Granite Pit Water Storage in Support of Gibraltar Mine Permit Amendment' prepared by Hemmera, dated January 4, 2021.
- 32.5 Memorandum entitled 'Groundwater Modelling for Granite Pit Water Storage' prepared by Hemmera, dated October 5, 2020.
- 32.6 Letter entitled 'Gibraltar East Pit Mining – Dumping Over Mixed Waste Materials – FINAL' prepared by BGC Engineering Inc., dated October 6, 2020.
- 32.7 Report entitled 'Gibraltar Mine Water Quality Prediction Model 2020 Revision' prepared by SRK, dated January 2021.
- 32.8 Memorandum entitled 'Revised ML/ARD Monitoring Plan for Gibraltar East Pit Mining Phase 1 Project' prepared by SRK, dated March 2020.
- 32.9 Report entitled 'Revised ML/ARD Monitoring Plan, Gibraltar Mine' prepared by SRK, dated August 2019.
- 32.10 Memorandum entitled 'Gibraltar East Pit Phase 1 Mining Application – Water Management Plan Update Summary' prepared by SRK, dated October 9, 2021.

Commented [RF1]: There was not adequate time to review these documents provided (and some were not available).

Commented [RF2]: Incorrect date

- 32.11 Report entitled 'Revised Gibraltar Mine Site Wide Water Management Plan – 2020 Update' prepared by SRK, dated March 2021.
- 32.12 Report entitled 'Revised Gibraltar Mine Surface Water and Groundwater Monitoring Plan' prepared by SRK, dated January 2021.
- 32.13 Memorandum entitled 'ML/ARD Monitoring Plan for Gibraltar East Pit Mining Phase 1 Project' prepared by SRK, dated February 5, 2021.
- 32.14 Memorandum entitled 'Mitigating Excess Water in Gibraltar Mine's Tailings Storage Facility' prepared by SRK, dated February 5, 2021
- 32.15 Memorandum entitled 'Response to Gibraltar Mine Round 2 Information Requests' prepared by SRK, dated February 26, 2021
- 32.16 Report entitled "Gibraltar Mine Site-Wide Mitigation Plan", provided by SRK Consulting Inc., dated February 5, 2021.
- 32.17 Report entitled "Gibraltar Mines Waste Dump OTR Tires Potential Contaminants Assessment", provided by Sperling Hansen Associates, dated February 2021.

Commented [RF3]: I don't see this document in the sharepoint.
This document is requested.

Commented [RF4]: I don't see this document in the sharepoint.
This document is requested.

Application Received: October 26, 2020

This permit contains the requirements of the Ministry of Energy, Mines and Petroleum Resources. It also is compatible, to the extent possible, with the requirements of other provincial ministries. However, nothing in this permit limits the authority of other provincial ministries to set other conditions, or to act independently, under their respective permits and legislation.

The mine is located within the consultative territory of Xat'sull (Soda Creek) and ?Esdilagh (Alexandria) First Nations.

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- Standard Condition
- Carry-over Condition
- Five Year MP/RCP Review Condition
- Spillway Condition
- Gib East Condition

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CONDITIONS

The Chief Permitting Officer hereby approves the Mine Plan and Reclamation Program as submitted in the Application, subject to compliance with the following conditions:

A. General

1. Compliance with *Mines Act* and Code

The Permittee shall ensure that all work is in compliance with all sections and parts of the *Mines Act* and the Health, Safety and Reclamation Code for Mines in B.C. (Code), and the Permittee shall obey all orders issued by the Chief Inspector of Mines (Chief Inspector).

2. Departure from Approval

The Permittee shall notify the Chief Permitting Officer in writing of any intention to depart from the Mines Plan and Reclamation Program approved under this *Mines Act* permit (M-40) to any substantial degree and shall not proceed to implement the proposed changes without the written authorization of the Chief Permitting Officer.

3. Permit Approval

(a) The Permittee is authorized under this permit (M-40) for development, including surface disturbance and works, within the area encompassing approximately 4930 Ha, as outlined in Figure 1 (Permitted Mine Area), which includes management buffers around the approved disturbance. The Permittee is not approved for borrow sources located outside of the permitted mine area.

(b) The Permittee shall ensure that, on an average annual basis, the ore production rate does not exceed 85,000 short tonnes per day.

(c) The Permittee is authorized for the following additional activities under this permit (M-40):

(i) Leaching of Number 1 Oxide Dump, Number 3 Heap Leach Pad, and Number 4 Heap Leach Pad using the Copper Leach and Solvent Extraction and Electrowinning (SX/EW) circuit.

(ii) Operation of the Cariboo Regional District (CRD – Williams Lake) Landfill on the mine property.

Commented [RF5]: The permit lacks clarity on the amount of mining approved. There is no reference to the mine plan approved.

Commented [RF6]: Figure 1 is not available for review. This figure should be provided. Referring to only this figure for approval of the mine plan is too vague.

Commented [RF7]: This should be removed from the permit as it appears to have caused very high loadings/ acidity. Please remove this clause as it is no longer used and not planned not be used.

- (iii) Burial of tires and miscellaneous waste rubber and plastic within the GIB1 Dump footprint as outlined in Document 32.1 and Appendix G in Document 32.1. The Permittee shall ensure that the volume of buried waste is reported in the Annual Reclamation Report.

4. Permit

This Permit is not transferable or assignable.

5. Maintenance of Mine

The Permittee shall maintain mine facilities and infrastructure in a manner to meet design objectives, environmental protection requirements and reclamation requirements.

6. Sign-off by a Qualified Professional

Unless otherwise approved in writing by the Chief Permitting Officer or Chief Inspector, the Permittee shall ensure that all reports required to be submitted under this permit are signed by a qualified professional with applicable experience and registered in the province of British Columbia.

7. Responsibility to Reclaim

The Permittee shall assume responsibility for any outstanding reclamation associated with Exploration Permit MX-GEN-8 that exists within the permitted mine area for the Gibraltar Mine, defined in Figure 1, under the terms and conditions of this permit.

8. First Nations Information Sharing

Unless otherwise requested by the Chief Permitting Officer or Chief Inspector, the Permittee shall provide to the Xat'sull (Soda Creek) and ?Esdilagh (Alexandria) First Nations all material reports and plans required to be submitted under this permit, including annual monitoring reports, results of research programs, and the Reclamation and Closure Plan. The timing for provisions of these plans must be within 1 week of provision of such plans to the Chief Inspector. The provision of these plans must be made to the full list of recipients as specified by the Nations. The provision of these plans must also be made to active MRC/TAC members and those active within the past 3 years.

Commented [RF8]: How best to word this? Try to avoid just sending reports to the Chief and no one else.

9. Compliance Status Report

The Permittee shall track compliance status of all permit conditions and inspection orders in a form acceptable to the Chief Inspector. The Permittee shall maintain an up-to-date tracking table on site. The Permittee shall ensure that the tracking table is available at the mine site at

all times and to a Mines Inspector upon request. The Permittee shall prepare and submit an annual Compliance Status report to the Chief Inspector by March 31st and shall include a summary of outstanding non-compliance issues and an action plan, to the satisfaction of the Chief Inspector, for achieving compliance. On an annual basis, this tracking system must be provided to Xat'sull (Soda Creek) and ?Esdilagh (Alexandria) First Nations with the annual reporting.

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B. Geotechnical

1. General

- (a) The Permittee shall ensure that all geotechnical designs, specifications, work plans, monitoring requirements and reports required to be prepared under section (B) are:
 - (i) Signed and sealed by a Professional Engineer and are submitted to the satisfaction of the Chief Inspector; and
 - (ii) Maintained on site and submitted to any Inspector of Mines upon request.
- (b) The Permittee shall ensure construction is completed under the supervision of a Professional Engineer and that sufficient field reviews are conducted to ensure that facilities are built in general conformance with the design, accepted engineering practices, the Code, this Permit, and to the satisfaction of the Chief Inspector.
- (c) The Permittee shall ensure recommendations by a Professional Engineer, relating to health and safety, geotechnical stability, environmental protection are followed, unless a suitable alternative course of action is approved in writing by a Professional Engineer.
- (d) The Permittee shall submit an Advice of Geotechnical Incident form to the Chief Inspector for any geotechnical incident that is classified as a dangerous occurrence or any other incident as described in the current EMPR Advice of Geotechnical Incident form.

2. Open Pits

(a) Design

- (i) The Permittee shall ensure open pit development is conducted in accordance with the design and recommendations prepared by a Professional Engineer.
- (ii) The Permittee shall ensure that open pit designs include specific requirements for areas that intersect major faults.
- (iii) The Permittee shall ensure that an updated detailed design report for the Gibraltar East Pit southeast wall is submitted to the Chief Permitting Officer a minimum of 30 days prior to development of the south east wall below 3000 ft elevation. The Permittee shall ensure that the updated detailed design report incorporates, at a minimum, the following as outlined in Document 32.2:

- (a) Updated fault interpretation;
- (b) Confirmation of slope depressurization; and
- (c) Any proposed pit slope design modifications.

(b) Operations

- (i) The Permittee shall ensure that the pit slope design is reviewed annually by a registered Professional Engineer with experience in the design of pit slopes.
- (ii) The Permittee shall develop a design for controlled production blasting to minimize blast damage at and near the final pit walls and all interim pit walls employing multi-benching, and all interim pit walls that will be left in place for more than 12 months.
- (iii) The Permittee shall ensure that surface water is diverted away from the open pit slopes in accordance with good engineering practice.
- (iv) The Permittee shall map geological units as they are exposed in the open pits and the Permittee shall ensure that the geological mapping is reviewed by a Professional Engineer to confirm and refine the recommended open pit designs.
- (v) The Permittee shall carry out groundwater monitoring and depressurization of the open pit walls during mining and for final open pit wall stability as required by the pit design engineer.
- (vi) The Permittee shall ensure open pit walls are scaled during pit development and prior to wall access being lost.
- (vii) The Permittee shall ensure benches are cleaned of accumulated rock fall debris as needed and prior to bench access being lost.
- (viii) The Permittee shall develop and implement Safe Work Procedures (SWPs) to minimize exposure of workers working close to highwalls.
- (ix) The Permittee shall establish a safe set-back distance between the dump toe and the top of the bedrock slope in areas where waste rock forms the upper pit slopes.
- (x) The Permittee shall develop, document, and implement SWPs to minimize exposure of workers accessing areas within the wave run-up zone of pit lakes.

(c) Monitoring

- (i) The Permittee shall develop, document and implement a Slope Hazard Management Plan. The Permittee shall ensure that the Slope Hazard Management Plan includes, but is not limited to, the following:
 - (a) Be designed to verify acceptable performance, detect early signs of instability, and confirm design assumptions;
 - (b) Include details of instrumentation, monitoring frequency, trigger thresholds, and trigger response criteria; and,
 - (c) Be developed in consultation with the pit design engineer and approved by the pit design engineer.
- (ii) The Permittee shall ensure the Slope Hazard Management Plan is reviewed and updated annually, or as directed by the Chief Inspector.
- (iii) Inspection, monitoring, and instrumentation records shall be maintained by the Permittee on-site and be made available to an Inspector of Mines upon request.

(d) Reporting

The Permittee shall ensure an annual review and inspection of all open pits is undertaken and observations and recommendations made during the review and inspection are summarized in an annual pit slope performance report. The Permittee shall submit this report to the Chief Inspector by March 31st of the year following the review and inspection.

3. Waste Rock Dumps

(a) Design

- (i) The Permittee shall ensure waste rock dumps are developed in accordance with the design and recommendations prepared by a Professional Engineer.
- (ii) The Permittee is approved for the 7 Dump design to a maximum elevation of 4100 feet in the western portion and 4400 feet in the eastern portion.

(b) Operations

- (i) The Permittee shall ensure no weak, cohesive, materials or snow is dumped on the outside edge of the waste rock dump platforms unless approved by a Professional Engineer.

- (ii) The Permittee shall ensure waste rock dump platforms are constructed with a slope that promotes surface water drainage away from the waste rock dump face.
 - (iii) The Permittee shall ensure that a catch-bench of suitable width or a designed impact berm is established for boulder rollout protection in areas where waste rock dumps are to be constructed above active work areas or active roads.
 - (iv) The Permittee shall ensure Issued for Construction (IFC) drawings and specifications, prepared by a Professional Engineer, are submitted to the Chief Inspector a minimum of 60 days prior to commencing construction of all waste rock dumps.
 - (v) The Permittee shall ensure all waste rock placed on silty material is dumped short and pushed.
 - (vi) The Permittee shall monitor movement in the upper waste rock slopes or on dump slopes located adjacent to the open pit in accordance with the recommendations of a Professional Engineer.
 - (vii) The Permittee shall, if stability concerns develop or if unfavourable waste dump performance is experienced in areas where organic material is left in place, conduct an engineering assessment to review the requirement for removing the organic materials.
- (c) Monitoring
- (i) The Permittee shall document a Standard Operating Procedure (SOP) for all waste rock dumps.
 - (ii) The Permittee shall ensure that the waste rock dump SOP includes, but is not limited to, the following:
 - (a) Quantifiable Performance Objectives (QPOs) for instrumentation;
 - (b) Trigger Action Response Plans (TARPs) tied to the QPOs;
 - (c) Maximum advance rates in critical areas;
 - (d) Rock quality monitoring where required (i.e. bog crossing);
 - (e) Monitoring frequencies;
 - (f) Frequency of engineering review of data;
 - (g) Monitoring data storage procedures;
 - (h) Frequency of operational review and trigger threshold review;
 - (i) Frequency of third-party data auditing; and
 - (j) All other parameters recommended by the Professional Engineer.

(iii) The Permittee shall ensure that waste rock dump development and monitoring is in accordance with the SOP.

(iv) The Permittee shall ensure the waste rock dump SOP is reviewed annually and updated as required, or as directed by the Chief Inspector. The Permittee shall submit the waste rock dump SOP to the Chief Inspector when updates are made.

(d) Reporting

(i) The Permittee shall ensure quarterly reviews of 7 Dump are completed by a Professional Engineer until the lower (3930 ft) lift is complete or the dump is inactive, and annual reviews are completed by a Professional Engineer thereafter.

(ii) The Permittee shall ensure an annual review and inspection of all waste rock dumps is undertaken and observation and recommendations made during the review and inspection are summarized in an annual waste rock dump performance report. The Permittee shall submit an annual report to the Chief Inspector by March 31st of the year following the review and inspection.

4. Tailings Storage Facility

(a) Design

(i) The Permittee is authorized to construct the Tailings Storage Facility to the following elevations:

- (a) Cyclone Sand Dam to elevation 3620 ft;
- (b) North Earthfill Dam to elevation 3605 ft;
- (c) East Saddle Dam to elevation 3630 ft;
- (d) Step-back Embankment to elevation 3635 ft; and
- (e) Underflow tailings stack to elevation 3740 ft.

(ii) The Permittee shall ensure that a minimum freeboard is defined by the Tailings Storage Facility (TSF) Engineer of Record (EoR) and included in the QPOs.

- (iii) The Permittee shall ensure that the TSF EoR reviews and validates the Environmental Design Flood (EDF) magnitude and duration (Document 31.1) using up to date hydrological and hydrogeological information, prior to each installation of the East Saddle Dam spillway. The Permittee shall ensure that the review and validation is submitted to the Chief Inspector prior to commencing construction of each installation of the East Saddle Dam spillway.
- (iv) The Permittee shall ensure that the TSF Emergency Preparedness and Response Plan includes a plan to restore normal operating pond level, in the event of an exceedance of the Maximum Operating Water Level (MOWL).
- (v) The Permittee shall ensure a minimum 1500 ft setback is maintained between the supernatant pond and the crests of the Cyclone Sand and North Earthfill Dams.
- (vi) The Permittee shall submit to the Chief Inspector a detailed design of the North Earthfill Dam riprap channel prior to start of channel construction. The Permittee shall ensure the design includes, but is not limited to, optimization of the channel location and specifications for the filter layer between the riprap and sub-grade material, if a filter is required in the detailed design.
- (vii) The Permittee shall ensure that the TSF is constructed, operated, maintained and monitored in conformance with the design, the specifications, the Operation, Maintenance and Surveillance (OMS) manual, the Code, this Permit and accepted industry practice.
- (iii) The Permittee shall ensure that the Tailings Facility SOP includes, but is not limited to, the following:
- (a) Quantifiable Performance Objectives (QPOs) for instrumentation (trigger alarms recommended for alert levels and for exceedance levels);
 - (b) Trigger Action Response Plans (TARPs) tied to the QPOs;
 - (c) Frequency of engineering review of data;
 - (d) Monitoring data storage procedures;
 - (e) Frequency of operational review and trigger threshold review;
 - (f) Frequency of third-party data auditing; and
 - (g) All other parameters recommended by the Professional Engineer.
- (iv) The Permittee shall ensure that tailings facility development and monitoring is in accordance with the SOP.
- (v) The Permittee shall ensure the tailings facility SOP is reviewed annually and updated as required, or as directed by the Chief Inspector. The Permittee

Commented [RF9]: The current OMS was not available for review. Given the importance of this document for the TSF safety measures, additional time for review of the OMS is requested once the current OMS is provided. The TARP for the TSF, the ERPP and any other relevant TSF safety documents are also requested for review with this permit amendment.

Commented [RF10]: Similar language to the WR section of the permit is recommended to be considered for the Tailings facility section. Could the permit refer to the freeboard requirement specified by the TSF EoR?

shall submit the tailings facility SOP to the Chief Inspector when updates are made.

5. Surface Water Ponds, Ditches and Diversions

- (a) The Permittee shall not commence construction of surface water ponds, ditches or diversion channels that carry mine-influenced water until IFC drawings, signed by a Professional Engineer, are submitted to the Chief Inspector. This condition does not apply to temporary diversion channels required to facilitate construction.
- (b) The Permittee shall ensure that water surface ponds, ditches and diversion channels are designed to convey the design flood without overtopping and side slope failure, and with adequate armour or lining to prevent significant erosion.
- (c) The Permittee shall design all water surface ponds and ditches that impound or carry mine-influenced water with a minimum 0.3 m freeboard under the design flood. The Permittee shall choose the design flood with consideration of the consequence of failure and duty life of the structure but shall ensure no less than the 1:200 year peak flow event.
- (d) The Permittee shall submit an "As-Built" report to the Chief Inspector for all surface water ponds, ditches and diversion channels. The Permittee shall ensure that the report certifies that each facility has been constructed in accordance with the design and the applicable guidelines.
- (e) The Permittee shall submit an annual inspection report to the Chief Inspector for all surface water management structures. The Permittee shall submit the report by March 31st of the year following the inspection.

6. Soil, Overburden, Rock, and Ore Stockpiles

The Permittee shall ensure that all soil, overburden, rock and ore stockpiles are constructed in accordance with designs prepared by a Professional Engineer and are constructed and inspected to ensure stability and erosion control is maintained, unless exempt in writing by the Chief Permitting Officer.

7. Borrow Pits and Quarry Excavations

The Permittee shall ensure that borrow and quarry excavations are constructed in accordance with the designs prepared by a Professional Engineer and are constructed and inspected to ensure stability and erosion control is maintained.

8. Mine Site Roads

- (a) The Permittee shall ensure that all mine roads are constructed in accordance with designs prepared by a Professional Engineer, and are constructed and inspected to ensure stability and erosion control is maintained.
- (b) The Permittee shall ensure that cuts and fills in excess of 6 m height are designed by a Professional Engineer.
- (c) Where necessary to ensure geotechnical stability, the Permittee shall ensure that the footprint of fill slopes are stripped of organics and topsoil and/or have the fill toe "keyed-in" to original ground. For slopes exceeding a gradient of 15 degrees, the Permittee shall ensure that the prepared foundation of fill slopes in excess of 10 m height are inspected by a Professional Engineer prior to fill placement.
- (d) The Permittee shall ensure that "As-Built" drawings are prepared within three months of completion. The Permittee shall ensure that the "As-Built" drawings and records are filed on-site.

9. Mine Site, Plant, Shop, and Other Infrastructure

- (a) The Permittee shall ensure that all building foundation designs address bearing capacity, potential settlement, and any necessary foundation preparation or treatment. The Permittee shall ensure that "As-Built" designs are filed on site.
- (b) The Permittee shall ensure an inspection of the prepared excavation prior to the placement of permanent foundations is completed with a record of the inspection filed on-site and made available to any inspector of Mines upon request.

C. Protection of Land and Watercourses

1. Environmental Management System

- (a) The Permittee shall implement the Environmental Management System (EMS) consisting of Environmental Management Plans (EMPs) and SOPs. The Permittee shall ensure the EMS reference relevant policies and establish proactive procedures to provide direction for effective operational management and monitoring on-site.
- (b) The Permittee shall ensure the EMS is reviewed annually and revised as required. The Permittee shall make the EMS available at the mine site at all times and to an Inspector of Mines upon request. The Permittee shall include the findings of the annual EMS review in the Annual Reclamation Report.
- (c) The Permittee shall ensure that mine site employees and contractors are knowledgeable and accountable to act consistently with the requirements of the EMPs and SOPs that form the EMS.

Commented [RF11]: These documents are not available for review and are requested. Time for review of these documents is also requested.

Commented [RF12]: Most recent ARR is also requested.

2. Environmental Site Management

- (a) The Permittee shall ensure that a qualified Environmental Site Manager is assigned.
- (b) The Permittee shall ensure that the Environmental Site Manager has the authority to implement any necessary remedial actions to ensure maintenance of environmental standards and permit requirements. If suspension of construction or operations occurs due to environmental concerns, the Permittee shall immediately notify the Chief Inspector and First Nations listed within the permit.

3. Metal Leaching (ML) and Acid Rock Drainage (ARD)

(a) General

- (i) The Permittee shall ensure that all materials with the potential to generate metal leaching and acid rock drainage (ML/ARD) are placed in a manner that minimizes the production and release of metals and contaminants.
- (ii) The Permittee shall ensure that, unless otherwise approved, all plans for the prediction, and if necessary, the prevention, mitigation and management of ML/ARD are prepared in accordance with the *Guidelines for Metal Leaching and Acid Rock Drainage at Minesites in British Columbia* (1998).

- (iii) The Permittee shall not make changes to the criteria for ML/ARD definition, waste handling procedures, mitigation strategies, or materials monitoring program without the written approval of the Chief Inspector.
- (b) Definition of Potentially Acid Generating (PAG) and Metal Leaching (ML) Materials
 - (i) The Permittee shall calculate neutralization potential (NP) using total inorganic carbon.
 - (ii) The Permittee shall calculate waste rock acid potential (AP) using total sulphur.
 - (iii) The Permittee shall classify all waste rock as acid generating (AG) or PAG unless otherwise approved by the Chief Permitting Officer.
 - (iv) The Permittee shall classify all other waste materials and mine surfaces as potentially acid generating (PAG) if they have a NP/AP ratio of less than 2.0.
- (c) ML/ARD Operational Monitoring
 - (i) The Permittee shall update the ML/ARD Monitoring Plan (Document 32.13), including standard operating procedures (SOPs) as required. The Permittee shall submit the plan and SOPs to the satisfaction of the Chief Permitting Officer by June 30, 2021.
 - (ii) The Permittee shall implement the quality assurance / quality control (QA/QC) program included in the ML/ARD Monitoring Plan.
 - (iii) The Permittee shall ensure that all personnel involved in waste rock mining and handling and tailings segregation and handling are trained and kept up to date on the content and implementation of the ML/ARD Monitoring Plan.
- (d) ML/ARD Reporting

The Permittee shall ensure results of the ML/ARD analytical testwork, outlined in the ML/ARD Monitoring Plan (Document 32.13), are reported and assessed in the Annual Reclamation Report, any significant changes or trends discussed, and implications for materials handling identified.

4. Surface and Groundwater Management and Monitoring

(a) Water Management Plan

(i) The Permittee shall update the Site Wide Water Management Plan (Document 32.11). The Permittee shall track changes to quantity and quality of surface water, seepage, and groundwater on the mine site. The Permittee shall ensure that the program can provide early warning about the onset of ARD or an increase in contaminant loading. The Permittee shall submit the plan to the satisfaction of the Chief Permitting Officer by June 30, 2021.

Commented [RF13]: Refer to need to reconcile WB and WMP in code and report on this reconciliation on annual basis to chief inspector/ FNs. This permit condition does not fully address concerns with the site and water management plans. This is an ongoing problem that needs to be addressed with clearer conditions. Suggest more work/ discussion for this topic.

(ii) The Permittee shall not make any significant changes to the Site Wide Water Management Plan without the written approval of the Chief Permitting Officer.

(b) Water Monitoring Plan

(i) The Permittee shall implement the Surface Water and Groundwater Monitoring Plan (Document 32.12). The Permittee shall track changes to quantity and quality of surface water, seepage, and groundwater on the mine site. The Permittee shall ensure that the program can provide early warning about the onset of ARD or an increase in contaminant loading.

Commented [RF14]: Request more time to review and comment on this plan.

(ii) The Permittee shall not make any significant changes to the Surface Water and Groundwater Monitoring Plan without the written approval of the Chief Permitting Officer. Significant changes include removal of monitoring sites, or changes to monitored parameters.

(iii) The Permittee shall ensure that detection limits are sufficient to compare to water quality standards and permit requirements established by the British Columbia Ministry of Environment and Climate Change Strategy.

(iv) The Permittee shall ensure that an effective QA/QC program for the surface water, groundwater and seepage monitoring programs is included and implemented as part of the Water Monitoring and Management Plan. The Permittee shall ensure that this includes detection limits, performance criteria that define acceptable levels of precision and accuracy and reporting of any missed sampling events.

(v) The Permittee shall ensure that monitoring results of surface water, groundwater, and seepage quality and quantity are kept up to date in a dedicated database available for review by an Inspector of Mines upon request. The Permittee shall ensure that water quality monitoring results, including interpretation of results, are reported and assessed in the Annual Reclamation Report. The Permittee shall ensure that any significant changes or trends in water quality or quantity are discussed, and those that require additional evaluation and management are identified in the report.

(vi) The Permittee shall include a table comparing relevant monitoring and testwork data to source term concentrations used in water quality predictions in the Annual Reclamation Report. The Permittee shall ensure that the implications of the results to source term refinement, water quality mitigation and adaptive management are discussed in the report.

(vii) The Permittee shall include an assessment of the surface and groundwater quantity and quality in and around the ?Esdilagh First Nation's Indian Reserve #2 as part of the Annual Reclamation Report, including a discussion of any significant changes or trends. The Permittee shall provide a mitigation plan to augment flow in Granite Creek (within IR#12) to pre-mining levels, to reverse water quality trends, and to address exceedances by June 20, 2021.

Commented [RF15]: Include IR#12? Right beside the mine. IR#2 appears to be much further from the mine site than IR#12. Please review the correct IR is referred to here (should it be both?).

5. Model Validation and Updated Water Quality Predictions

(a) During operations, the Permittee shall refine the inputs and assumptions for water quality predictions based on site-specific performance information.

Commented [RF16]: What is the timing for this refinement and is reconciliation required? This permit clause does not appear meaningful as written.

(b) The Permittee shall update the source terms, water balance model, water quality model, and numerical groundwater model, every five years, beginning in 2022, as part of the Mine Plan and Reclamation Program update, or more frequently as necessary to inform mine planning and mitigation design and engineering.

Commented [RF17]: It is clear from the magnitude of problems at the site that more frequent updates are required. Annual or sub-annual updates are occurring and are required. 5-year updates are not reasonable until problems are resolved including discharge permitting for SO₄ and nitrate treatment.

(c) The Permittee shall provide a report evaluating the effectiveness of the proposed waste rock covers to decrease the net amount of contaminated waste rock seepage to surface water and groundwater over the life of mine. The Permittee shall submit the report, by March 31, 2022, to the satisfaction of the Chief Permitting Officer.

Commented [RF18]: This report is needed sooner to be meaningful in the closure update planned. Please revise to 6 months earlier. Note: this comment is made without prejudice to the concerns expressed with the permitting approach being proposed by EMLI

(d) The Permittee shall submit a report evaluating the long-term potential for the onset of acidic conditions in the unsaturated tailings within the TSF and provide an assessment of the potential impact to water quality in tailings porewater, tailings seepage, site surface water, and receiving environment surface water and groundwater over the life of mine. The Permittee shall submit the report, by March 31, 2022, to the satisfaction of the Chief Permitting Officer.

Commented [RF19]: Same comment as above. This is needed earlier to be useful for the closure plan update. Please revise to 6 months earlier

6. Site Wide Mitigation Plan

- (a) The Permittee shall implement the Site-Wide Mitigation Plan (Document 31.6). The Permittee shall not make any significant changes to the plan without the written approval of the Chief Permitting Officer.
- (b) The Permittee shall report on the annual results of the Site-Wide Mitigation Plan (Document 31.6), in the Annual Reclamation Report. The Permittee shall track, assess, and interpret the implementation progress and effectiveness of each mitigation measure and the activities undertaken to address identified data gaps.
- (c) The Permittee shall update the Site-Wide Mitigation Plan, beginning in 2022, as part of the Mine Plan and Reclamation Program update, or more frequently as necessary based on mine planning and mitigation design and engineering.

Commented [RF20]: This document was not located for review. More time is requested for commenting on this section.

7. Water Treatment

- (a) The Permittee shall submit a Closure Water Treatment Costing Estimate ~~by March 31, 2022~~ immediately, to the satisfaction of the Chief Permitting Officer. The report shall include a comprehensive assessment of the water treatment system or systems and associated pumping infrastructure proposed to mitigate water quality prior to discharge to the receiving environment during Closure. Additionally, the report ~~should~~ **must** include, but not be limited to, the following:
 - (i) An overview of the proposed water treatment system or systems and associated pumping infrastructure;
 - (ii) An assessment of the base-case and upper-case volumes of water, total acidity, and total loadings of any other constituents, requiring treatment on an annual basis based on the predicted results of the most recent water quality model;
 - (iii) An assessment of the annual volume and geochemical composition of the waste produced as a by-product of the water treatment system or systems;
 - (iv) The proposed disposal method of all waste by-products and, if being disposed within the mine area, an assessment of the potential impacts to water quality;
 - (v) An assessment of the capital costs associated with the design and construction of the proposed water treatment systems or systems and associated pumping infrastructure;

Commented [RF21]: This timing is problematic. This is an area of disagreement and requires further discussion. This should be estimated by EMLI as the Permittee has made it clear they have no intention of complying with this request (given their refusal for the last 10 years). EMLI is delaying the inevitable again. Also, we were told via emails the cost estimate for water treatment is expected this year, in April/March (2021). So why would this due in March 2022?

We have strong concerns with the ethics and legality of further delays to the cost estimate for water treatment for this mine. This requirement has appeared in numerous previous M-40 permits and has not been addressed by the mine over a 10 year period. Also, this should be required during this permit amalgamation as this was promised by EMPR during the previous 2017 mine review process. The 2017 process was unfortunately stalled when EMPR accepted that the company would not reply to IRs, and no action was taken with the exception of the promise made to TNG/Esilagh. There is a high likelihood this pattern of behavior will keep repeating itself. There is no trust built in a process that has repeated itself from 2012-2021. This approach does not follow the requirements of the Mines Act Code, that the security estimate much reflect the liabilities at the mine site. While some sites have unfunded liabilities, this site is worse as they have somehow managed to avoid costing the long-term water treatment all together and appear to be up-to-date with their closure funds. This is entirely up to EMLI to address to protect the rights, title and interest of Esilagh First Nation. To date, comments on this topic have not been addressed by EMLI in any sort of meaningful fashion.

See additional comments submitted on the closure water treatment cost estimate and context for concerns.

- (vi) An assessment of the annual maintenance requirements and associated costs; and
 - (vii) An assessment of the annual operating costs, including; delivered costs of electricity, natural gas, and treatment reagents, analytical testing, personnel and any other associated costs.
- (b) The Permittee shall submit an application for authorization to construct and operate a sulphate and nitrate water treatment facility to the Chief Permitting Officer by September 30, 2021. The Permittee shall ensure that the application includes, but is not limited to, the following information:
- (i) Detailed design of the proposed water treatment facility;
 - (ii) An overview of the proposed water treatment system or systems and associated pumping infrastructure;
 - (iii) An assessment of the base-case and upper-case volumes of water, concentrations of sulphate and nitrate, and concentrations of any other constituents requiring treatment during operations on an annual basis based on the predicted results of the most recent water quality model;
 - (iv) An assessment of the annual volume and geochemical composition of the waste produced as a by-product of the water treatment system or systems;
 - (v) The proposed disposal method of all waste by-products and, if being disposed within the mine area, an assessment of the potential impacts to water quality;
 - (vi) An assessment of the capital costs associated with the design and construction of the proposed water treatment systems or systems and associated pumping infrastructure;
 - (vii) An assessment of the annual maintenance requirements and associated costs;
 - (viii) An assessment of the annual operating costs, including; delivered costs of electricity, natural gas, and treatment reagents, analytical testing, personnel and any other associated costs; and
 - (ix) Schedules and triggers for construction, commissioning, operation, and closure of the water treatment system or systems and associated pumping infrastructure.
 - ~~(ix)~~(x) A Best Achievable Technology Assessment that conforms with the IDZ policy of the Province. (NTD: this should be re-worded to reflect most other permits and included in the EMA and MA permit– IDZ is not allowed without first assessing BAT).

Commented [RF22]: This clause is supported.

Commented [RF23]: This should be based on the premise of maintaining a certain amount of water on site and not accumulating additional water. I.e. 10 Mm3 in the TSF, amount of water within pits should be minimized to allow for contingency.

This clause should direct the company to engage meaningfully with FNs and consider discharge to other receivers in addition to the Fraser River. Clearly discharge to other receivers will be more popular than discharge to the Fraser River and perhaps less stringent discharge requirements could be approved with more support for discharge.

Commented [RF24]: This comment should require the schedule meet the requirements of the site and not wait for Granite pit to fill up and emergency conditions – the site needs contingency space and to fast-track this WT to avoid unforeseen problems/ errors.

How important is Granite pit WR backfill (80 M BCM). There are only 3 years of water volume space in this large pit – that will go by very fast in the time scale for water treatment.

8. Pre-Construction Ecosystems and Habitats Surveys

The Permittee shall ensure that pre-disturbance field surveys are conducted by a Qualified Professional prior to any new disturbance within the Permitted Mine Area (Figure 1) to document habitat types, specific habitat features (mineral licks, dens for furbearers, ungulate wallows, raptor nests, bat hibernacula and maternity roosts, wildlife movement

corridors), wetlands, rare plants and ecosystems, and other features of interest. The results shall be mapped and used to evaluate impacts, develop mitigation plans, and update management plans. The Permittee shall use the results to prepare the Construction Environmental Management Plans.

9. Construction Environmental Management Plan (CEMP)

The Permittee shall, at a minimum 60 days prior to the start of any new disturbance within the permitted mine area (Figure 1), submit a site-specific Construction Environmental Management Plan (CEMP) to the Chief Permitting Officer for each area of new construction. The Permittee shall ensure that the plan includes, but is not limited to, the following:

- (a) Findings of pre-disturbance archeological surveys;
- (b) Vegetation management, including buffer setbacks and invasive plant prevention;
- (c) Soil management, including salvage and stockpiling procedures for soil and large woody debris;
- (d) Wildlife sensitive periods, timing windows and buffer setbacks;
- (e) Fuel management and spill response;
- (f) Water management measures;
- (g) Construction schedule;
- (h) Incident response and reporting plans;
- (i) Site specific designs;
- (j) Site specific mitigations; and
- (k) Implementation and effectiveness monitoring program for construction management measures.

10. Fugitive Dust Management

- (a) The Permittee shall update and implement the Mine Dust Control Plan to the satisfaction of the Chief Inspector, designed to effectively control dust emissions from the Mine Facilities and access roads. The Permittee shall ensure that the plan is submitted by September 30, 2021, to the satisfaction of the Chief Inspector. The plan shall include, but not be limited to, the following:
 - (i) identification of dust sources and specific measures to mitigate dust for each source;
 - (ii) a site-specific event- and activity-based effectiveness monitoring program;
 - (iii) a Trigger Response Plan (TRP) that addresses specific environmental and site conditions that could result in generation of dust and includes proactive reporting out procedures in the event that dust control measures are ineffective or inoperable for any reason;

- (iv) contingency plans to address circumstances where prescribed dust control measures are ineffective or inoperable for any reason;
- (v) procedures intended to evaluate and mitigate potential effects of dust; and
- (vi) procedures to address and report out on public complaints.

(b) The Permittee shall ensure that the Mine Dust Control Plan is reviewed annually and updated as procedures are modified to reflect site-specific considerations. The Permittee shall report annual updates and monitoring results in the Annual Reclamation Report and ensure that substantive changes are provided to the Chief Permitting Officer prior to implementation.

(c) In the event that airborne dust from the site is reported to be a nuisance, the Permittee shall implement immediate remedial action to mitigate the airborne dust.

11. Sediment and Erosion Control

(a) The Permittee shall update and implement the Erosion and Sediment Control Plan. The Permittee shall submit the plan by September 30, 2021, to the satisfaction of the Chief Permitting Officer.

(b) The Permittee shall ensure that the Erosion and Sediment Control Plan is reviewed annually with updates reported in the Annual Reclamation Report and ensure that substantive changes are provided to the Chief Permitting Officer prior to implementation.

(c) The Permittee shall ensure inspections are conducted at stream crossings, contact and non-contact water management structures, snow dumps, and the tailings rock storage facility daily during rain events and the snowmelt period on the mine site. Where excessive sediment laden runoff is observed, the Permittee shall implement immediate remedial action.

(d) The Permittee shall appropriately characterize any significant releases of sediment-laden water, defined as an unauthorized discharge to the receiving environment, with respect to extent and loading, and report it to the Chief Inspector.

(e) The Permittee shall ensure the characterization of unauthorized discharges of sediment-laden run-off shall include, at a minimum, flow, total suspended solids, turbidity, pH, conductivity, temperature, dissolved oxygen, and total and dissolved metals, of both the effluent and the receiving water.

12. Soil Salvage and Stockpiling

- (a) The Permittee shall update and implement the Overburden and Stockpile Management Plan. The Permittee shall submit the plan by September 30, 2021, to the satisfaction of the Chief Permitting Officer.
- (b) The Permittee shall salvage and stockpile all topsoil, overburden, and organic material, including large woody debris, concurrent with an expansion of waste rock dumps, tailings impoundments, and any other mine facilities, for use in reclamation.
- (c) The Permittee shall ensure that a qualified monitors and directs sampling, soil salvage, segregation, and stockpiling activities on-site.
- (d) The Permittee shall ensure that materials salvaged for use in reclamation are segregated based on salvage origin and measured suitability for reclamation purposes. Prior to mixing with other sources and/or applying on-site, the Permittee shall characterize and evaluate the suitability for reclamation any materials with the potential to be contaminated.
- (e) The Permittee shall maintain an inventory of stockpiles of salvaged soil, overburden and organic matter including large woody debris specifying the locations, origins, and quantities of material. The Permittee shall report this information in the Annual Reclamation Report.
- (f) The Permittee shall protect stockpiles from erosion, degradation, and contamination through revegetation and/or other practices.
- (g) The Permittee shall ensure that stockpiles are clearly marked to ensure that they are protected during construction and mine operations.
- (h) The Permittee shall not use soil suitable for use in reclamation as fill.
- (i) The Permittee shall be exempt from condition C.12(b) if, through an assessment, it can be demonstrated to the Chief Permitting Officer areas within the expansion footprints are not safe to access to conduct salvaging activities. The Permittee shall ensure that the assessment is conducted by a qualified professional and provide rationale of areas deemed to be safe and unsafe for conducting soil salvage activities.
- (j) The Permittee shall not apply biosolids or other wastes as a soil amendment without the approval of the Chief Permitting Officer.

13. Vegetation Management

- (a) The Permittee shall update and implement the Vegetation Management Plan. The Permittee shall submit the plan by September 30, 2021, to the satisfaction of the Chief Permitting Officer.
- (b) The Permittee shall limit disturbance to vegetation to those areas approved by this permit.
- (c) The Permittee shall manage and control weeds that establish on the site and shall ensure that weeds do not migrate from the site to adjacent areas. The Permittee shall consider using non-toxic means for weed control. The Permittee shall ensure that all seed used on-site is certified weed free.
- (d) The Permittee shall avoid burning and/or disposal of woody debris suitable for use in reclamation.

14. Wildlife Protection

- (a) The Permittee shall update and implement a Wildlife Management Plan. The Permittee shall submit the plan by September 30, 2021, to the satisfaction of the Chief Permitting Officer.
- (b) Pursuant to Part 1.6.9 of the Code, the Permittee shall incorporate in the mine safety program a no hunting and shooting policy for the Permitted Mine Area (Figure 1).
- (c) The Permittee shall implement a policy of no fishing and hunting for all employees and contractors while on company business or while commuting to and from the mine.
- (d) The Permittee shall ensure that where wildlife exclusion fencing (e.g., electric fencing) is installed that it is maintained in effective working order at all times that people are present on site.

15. Archeological Resources

- (a) Prior to beginning any mechanized surface disturbance on undisturbed lands, the Permittee shall have completed an archaeological impact assessment for the area of the proposed works. The Permittee shall design and implement the impact assessment in consultation with Xat'sull (Soda Creek) and ?Esdilagh (Alexandria) First Nations. The Permittee shall provide a copy of the impact assessment to the Chief Inspector and to the Xat'sull (Soda Creek) and ?Esdilagh (Alexandria) First Nations.
- (b) The Permittee shall complete a Traditional Use Overview Study of the Permitted Mine Area (Figure 1). The Permittee shall ensure that this study is designed and implemented in consultation with Xat'sull (Soda Creek) and ?Esdilagh (Alexandria) First Nations. The Permittee shall provide a copy of the study and a report of the results

to the Chief Inspector and to the Xat'sull (Soda Creek) and ?Esdilagh (Alexandria) First Nations, by September 30, 2021.

- (c) Prior to beginning any mechanized surface disturbance on undisturbed lands, the Permittee shall conduct field surveys consistent with archaeological and cultural heritage resources management procedures consistent with the provisions of the BC Heritage Conservation Act.
- (d) The Permittee shall ensure that archaeological and heritage sites that are identified during field archaeological studies are clearly marked and avoided, where possible, during construction activity.
- (e) For those sites which cannot be avoided, the Permittee shall use a "Chance Find Recovery" process and shall notify the Chief Inspector, Xat'sull (Soda Creek) and ?Esdilagh (Alexandria) First Nations, and the Archaeology Branch of the Ministry of Forest, Lands and Natural Resource Operations.
- (f) The Permittee shall complete works consistent with archaeological and cultural heritage resources management procedures in accordance with the provisions of the BC Heritage Conservation Act to scientifically excavate, record and report all findings to the Chief Inspector. The Permittee shall ensure that this work is conducted in a manner that respects the cultural heritage policies of Xat'sull (Soda Creek) and ?Esdilagh (Alexandria) First Nations.

16. Ongoing Reclamation Research

- (a) The Permittee shall submit to the Chief Permitting Officer, by September 30, 2021, a Reclamation Research Program that includes details for achieving the research requirements outlined in this permit with a schedule for implementation and description for how results will be utilized and reported.
- (b) The Permittee shall ensure a detailed summary of all research being conducted under this section is provided in the Annual Reclamation Report and the Mine Plan and Reclamation Program update, including descriptions of activities, results, and outcomes.
- (c) The Permittee shall conduct research to inform closure water management strategies and identify post-closure maintenance and contingency requirements. The Permittee shall ensure the research includes soil cover systems proposed for closure.

- (d) The Permittee shall conduct research to determine the viability of revegetation with native plant species, including culturally important species.
- (e) The Permittee shall conduct research intended to develop an end land use plan for the post-closure landscape represented in the mine disturbance footprint that is based on pre-mining ecosystems and habitats. Where a discrepancy in the comparative areas represented by ecosystem types is identified, the Permittee shall develop mitigation options.
- (f) The Permittee shall conduct research intended to inform design of and to test potential mitigation options for restoring ecosystems and habitats identified in the End Land Use Plan
- (g) The Permittee shall establish test plots that will be used to evaluate the reclamation approaches and prescriptions applied to confirm that ecological trajectories consistent with the land use and capability targets are being achieved.
- (h) The Permittee shall conduct research to inform the development of a soil replacement plan that is designed to achieve land capability and end land use objectives. If a shortfall of soil volumes is anticipated, the Permittee shall develop contingency plans.
- (i) The Permittee shall conduct research to assess decompaction methodologies to ensure that the severity of compaction that exists prior to commencing reclamation activities is effectively addressed in a manner intended to achieve end land use objectives and erosion control.
- (j) The Permittee shall develop and implement a monitoring program designed to evaluate the success of revegetation, habitat restoration, soil development and erosion control. The Permittee shall include in this program ecosystem-specific sampling parameters and performance criteria, which the Permittee shall base on pre-mining ecosystem benchmarks.
- (k) The Permittee shall develop and implement a monitoring program for evaluating metal uptake in exposed terrestrial and aquatic ecosystems, which specifies sampling requirements and performance criteria. Where harmful levels are found, the Permittee shall take any corrective action necessary to mitigate to ensure levels are safe for plant and animal life.

D. Reclamation and Closure Program

1. Reclamation Security

- (a) The Permittee shall cause to be deposited with the Minister of Finance, security in the amount of Fifty Million (\$36~~50~~0,000,000.00) dollars. The security will be held by the Minister of Finance for the proper performance of the approved program and all the conditions of this permit in a manner satisfactory to the Chief Inspector.
- (b) Notwithstanding the security posted as a condition of this Permit, the Permittee remains responsible for covering all closure and reclamation costs associated with reclamation, ongoing water treatment and environmental protection.

Commented [RF25]: The estimate of \$50M does not consider the water treatment costs for closure that are known. This is highly irregular and unacceptable. Further discussion is required. No substantive information on EMLI's rationale for this approach has been provided. This is very concerning.

Please see additional comments submitted.

2. Land Use

- (a) The Permittee shall ensure that the land surface is reclaimed with the intent of re-establishing average pre-mining capability to the following end land use objectives:
- (i) To satisfy livestock grazing, support wildlife habitat, and provide opportunities for traditional use of the land by the Xat'sull (Soda Creek) and ?Esdilagh (Alexandria) First Nations.
- (b) The Permittee shall ensure that borrow pits and quarries belonging to the mine development and operations, shall be reclaimed by the Permittee to the approved end land use once no longer required.
- (c) The Permittee may set aside pre-approved areas for industrial use.
- (d) The Permittee shall develop and implement an End Land Use Plan. The Permittee shall develop the plan considering conditions D.2(a) and D.2(b) for all disturbance areas within the Permitted Mine Area (Figure 1). The Permittee shall submit the plan by March 31, 2022, the satisfaction of the Chief Inspector. The Permittee shall ensure that the plan includes, but is not limited to, the following:
- (i) A description of pre-mining land and water capability and land and water use conditions;
- (ii) A description of predicted post-closure land and water capability and land and water use conditions, based on changes that are expected to occur due to mine development, and description of how opportunities to improve land capability were considered;

Commented [RF26]: Restoring water to Granite Creek that is below water quality guidelines is important for use of IR12 lands. People were forced off these lands because water was removed from Granite Creek by the mine components.

- (iii) Ecohydrological modelling, or other planning exercises, to reconcile or minimize differences between the pre-mining conditions and post-mining projections; and
- (iv) A description of end land use objectives and ecosystem targets, incorporating First Nations interests and terrestrial and aquatic species relevant to the site, including red- and blue-listed species.
- (e) The Permittee shall submit a workplan outlining the studies required to inform the development of the End Land Use Plan in condition D.2(d) by September 30, 2021, to the satisfaction of the Chief Permitting Officer.

3. Erosion Control

The Permittee shall achieve reduction of erosion through landform configuration, surface preparation, development of maintenance-free vegetation covers and the development of stable, self-sustaining, drainage control features and watercourses.

4. Re-vegetation

- (a) The Permittee shall ensure the land is revegetated to a self-sustaining state using appropriate and/or native plant species including culturally important native species.
- (b) Where it does not conflict with condition D.2(a), the Permittee shall improve wildlife capability of the mine site through the establishment of essential ecosystem elements (vegetative structure, large woody debris, rock piles, standing snags, etc.) for focus species identified in Document 29.1 and common prey species.

5. Growth Medium

- (a) The Permittee shall monitor soil replacement operations to ensure the minimum depths are achieved. Additionally, the Permittee shall develop a confirmation sampling plan that ensures quality of soil used for reclamation purposes will achieve end land use objectives. The Permittee shall report all results in the Annual Reclamation Report.
- (b) With the exception of areas where closure plans require compaction prior to placement of growth medium, in order to reduce infiltration and contact water, the Permittee shall ensure that areas to be reclaimed are decompacted to the minimum depth required to adequately address the severity of compaction prior to placement of soil and or vegetation, in a manner intended to achieve end land use objectives and erosion control.

6. Land Treatment Facility (Landfarm)

- (a) Prior to reclamation of the Land Treatment Facility, the Permittee shall develop and implement a monitoring program designed to assess soil contamination and inform remediation plans to ensure success of subsequent reclamation activities.
- (b) At least 3 months prior to decommissioning a landfarm, the Permittee shall develop and submit to the Chief Permitting Officer for approval a Closure Plan that addresses the remediation requirements.

7. Contaminated Sites Assessment

- (a) Prior to reclamation of the fuel and hydrocarbon dispensing and storage areas, Explosives Storage areas, and the temporary Ore Stockpiles, and or other areas where contamination may have occurred during mining operations, the Permittee shall develop monitoring programs designed to assess soil contamination and inform remediation plans to ensure success of subsequent reclamation activities.
- (b) At least 3 months prior to decommissioning contaminated areas, the Permittee shall develop and submit to the Chief Permitting Officer for approval a Closure Plan that addresses the remediation requirements.

8. Surface Water Management Ponds and Channels

- (c) The Permittee shall reclaim all surface water management ponds and water diversions to satisfy stability and erosion control requirements and the approved end land use once no longer required.
- (d) At least three months prior to decommissioning water treatment facilities, the Permittee shall develop and submit to the Chief Permitting Officer a Closure Plan that addresses all non-contact and contact water management features that will no longer be required.

9. Waste Rock Facility

- (a) The Permittee shall ensure that all waste rock dumps are reclaimed in a manner that minimizes the production of ML/ARD and mitigates its seepage from the minesite through recontouring, covering with a compact till, and sealing, unless proved through field scale trials that ML/ARD can be prevented by other means.

- (b) The Permittee shall ensure that all waste dump slopes and dump platforms, where it does not conflict with condition D.2(a), are revegetated in accordance with land use and capability objectives. If it can be demonstrated through an economic and technical rationale that it is impractical or impossible to revegetate portions of the waste dump slopes because aspect, elevation or because of physical constraints, then the Permittee may exempt selected portions of the waste dump from the revegetation requirements of this permit, with written approval of the Chief Permitting Officer.

10. Mine Roads

- (a) The Permittee shall ensure all mine roads are reclaimed in accordance with recommendations of a qualified professional, to satisfy the approved end land use objectives. The Permittee shall undertake all reasonable efforts to fully re-configure all mine roads to conform to adjacent landscape, where long-term stability is not compromised, unless permanent access is required.
- (b) Individual mine roads may be exempted from the requirement for total reclamation under condition D.10(a) if either:
- (i) The Permittee can demonstrate that an agency of the Crown has explicitly accepted responsibility for the operation, maintenance and ultimate deactivation and abandonment of the road; or
 - (ii) The Permittee can demonstrate that another private party has explicitly agreed to accept responsibility for the operation, maintenance and ultimate deactivation and abandonment of the road and has, in this regard, agreed to comply with all the terms and conditions, including bonding provisions, of this reclamation permit, and to comply with all other relevant provincial government (and federal government) regulatory requirements.

17. Temporary Shutdown

If the mine ceases operation, including for seasonal closure, within one month of closure, the Permittee shall submit a Care and Maintenance Manual which describes, documents, and tracks key aspects of the ongoing mitigation, monitoring, and maintenance requirements for the care and maintenance of the site. The Permittee shall ensure the Care and Maintenance Plan documents the outstanding reclamation activities and closure requirements for the site, and includes a trigger action response plan, which will be implemented to activate reclamation and closure activities based on monitoring results and site conditions. The Permittee shall update the Care and Maintenance Plan as required and submit updates to the Chief Permitting Officer. The water management plan, dam building mitigation and discharge plan including water treatment must be conceptualized by Sept. 1, 2021 for C&M

Commented [RF27]: Use of this term here is confusing. After operations cease, then plan is due within 1 month? Or what is this requirement? Could wording be clarified? Is this a new standard permit as most permits do not have this requirement in 1 month.

periods and the return of operations. Planning must consider C&M periods of various durations to cover the key risks associated with changes to the mine operations plan.

18. Mine Plan and Reclamation Program Update

On or before March 31, 2022 or with the next mine plan submitted (whichever comes first), and every five years thereafter, the Permittee shall develop and submit an updated Mine Plan and Reclamation Program. The Permittee shall ensure the plan includes, but not be limited to, the following:

- (a) The current status of the mine plan and reclamation obligations considering the site wide end land use evaluation;
- (b) Detailed mine plan for the next 5 years, and conceptually thereafter till the end of mine life, documenting any changes from the previous update;
- (c) Life of mine closure plan and end land use plan including the following:
 - (i) Terrain model with a landscape analysis of aspect and drainage;
 - (ii) End land use maps that clearly delineate wildlife corridors, grazing areas, industrial land use;
 - (iii) Information on the cover system over the TSF, based on the results of the cover research program;
 - (iv) Document and characterize all known and potential impacts of the CRD landfill operation on the mine footprint. Strategies to effectively minimize impacts shall be identified;
 - (v) Integration of reclamation research findings;
 - (vi) Monitoring programs;
 - (vii) Description of site preparation;
 - (viii) Use of native seed and plants with a planting schedules;
 - (ix) Integration of sediment and erosion control strategies;
 - (x) Road deactivation including access control for hunting and predation; and
 - (xi) Description of *Contaminated Sites Regulation* standards for reclaimed wildland and how it will apply to the site.
- (d) A compilation and interpretation of all monitoring including ML/ARD prediction, water quality and quantity, modelling predictions, soil, vegetation, wildlife and progressive reclamation programs;
- (e) A compilation of ongoing maintenance activities;
- (f) A compilation and interpretation of research programs;
- (g) A compilation of ongoing contingency/remediation plans;
- (h) Identification of impacts of the CRD landfill operation on mine and any proposed mitigations if required;
- (i) A traditional use study; and
- (j) A breakdown of outstanding liabilities and associated costs for the approved mine plan and Closure Plan.

Commented [RF28]: Waiting until C&M starts is too late for this site. This site may go bust quickly if it goes into C&M and it will be very difficult for the Province to manage the site in C&M with no plans in place. This is a key risk of this site that has not been considered.

Commented [RF29]: This should not be de-coupled from the applications for mining.

Commented [RF30]: This same clause has appeared in numerous M-40 permits and yet has not produced the requested information. How is this time any different? Is there any stronger wording that could be used here? The permittee has found a successful tactic to avoid doing this and EMLI needs to do more to sort out this ongoing problem.

19. Closure Plan

Twelve months prior to final closure, the Permittee shall develop and submit a Closure Plan including, but not limited to, the following:

- (a) The current status of the mine plan and reclamation obligations based on the approved end land use;
- (b) A compilation and interpretation of all monitoring for life of mine, including ML/ARD prediction, water quality and quantity, modelling predictions, soil, vegetation and progressive reclamation programs;
- (c) Detailed closure objectives and criteria for each mine component;
- (d) Detailed closure and maintenance activities;
- (e) A compilation and interpretation of any research program used to inform closure planning strategies;
- (f) Details for ongoing requirements for maintenance of structures;
- (g) Detailed contingency/remediation plans;
- (h) Detailed schedule for completion of reclamation/closure works;
- (i) Identification of impacts of the CRD landfill operation on mine;
- (j) Details for post closure monitoring;
- (k) Closure Management Manual that details plans for monitoring and maintenance activities for post closure; and
- (l) A breakdown of outstanding liabilities and associated costs including activities detailed for remediation and post closure.

Figure 1 – Permitted Mine Area

DRAFT

Re: For Review: Gibraltar East Pit Phase 1 - Revised Mines Act Draft Permit

From: Rina Freed <rina.freed@seamining.ca>
To: Dyas, Morgan EMLI:EX <Morgan.Dyas@gov.bc.ca>
Cc: Yamelst, Brian H ENV:EX <Brian.Yamelst@gov.bc.ca>, Grimson, Carla ENV:EX <Carla.Grimson@gov.bc.ca>, Martinka, Rusto ENV:EX <Rusto.Martinka@gov.bc.ca>, McPherson, Alexis EMLI:EX <Alexis.McPherson@gov.bc.ca>, Stevens, Victoria EMLI:EX <Victoria.Stevens@gov.bc.ca>, Edna Boston <nrmanager@xatsull.com>, XT:Boston, Edna FLNR:IN <nrcordinator@xatsull.com>, Helga Harlander <helga@tsilhqotin.ca>, Stuart, Jen A EMLI:EX <Jen.Stuart@gov.bc.ca>, Lachance, Luc ENV:EX <Luc.Lachance@gov.bc.ca>, Copping, Peter FLNR:EX <Peter.Copping@gov.bc.ca>, Dodd, Nikki EMLI:EX <Nikki.Dodd@gov.bc.ca>, Shaw, Sean MEM:EX <Sean.Shaw@gov.bc.ca>, Norlund, Kelsey EMLI:EX <Kelsey.Norlund@gov.bc.ca>, Crystal Verhaeghe <crystal@emodadesign.com>, Patrick Littlejohn <patrick.littlejohn@seamining.ca>, Constable, Lowell EMPR:EX <Lowell.Constable@gov.bc.ca>, XT:Verhaeghe, Crystal IRR:IN <crystal@emodadesign.com>, Constable, Lowell EMLI:EX <Lowell.Constable@gov.bc.ca>, Shaw, Sean EMLI:EX <Sean.Shaw@gov.bc.ca>, XT:Harlander, Helga IRR:IN <helga@tsilhqotin.ca>, Yamelst, Brian H ENV:EX <Brian.Yamelst@gov.bc.ca>
Sent: April 25, 2021 9:27:36 AM PDT
Attachments: 2021 04 XX Amd M-40 Spillway and Gib E Phase I_DRAFT_Final.docx, 2019 07 08 JPL-HH TNG Letter to EMPR re Outstanding Review of Gibraltar Closure Plan (1)[3].pdf, 2021 04 21 Esdilahg Mines Act Permit Letter.pdf, image001.png, 2021 04 XX PERMIT M-40 Amalgamated Permit_DRAFT_Final SEA comments[3].docx

[EXTERNAL] This email came from an external source. Only open attachments or links that you are expecting from a known sender.

Hi Morgan,

Over the weekend, I have more closely read over emails and plans coming up and have some questions. We were rushed last week with the deadline for comments on the Mines Act Permit and have only now had a moment to catch up. This email is to follow up on technical and process-related questions in my role with Esdilahg on this review.

1. I did not initially notice there were two M-40 Mines Act permits circulated, and I apologize for my oversight in this regard. We felt a lot of pressure to meet the deadline (April 20th) for the comments on the M-40 draft permit and the review was rushed. Esdilahg submitted comments on the draft amalgamated permit (as I did not notice there were two versions sent until today). **Question:** Do we need to revise and re-submit comments to refer to the second draft permit version submitted on the Gib East Phase I and TSF Spillway draft permit? **If so, please let us know soon.** I have attached both the permits to help others follow this question. I have also included the comments submitted in case these were not accessible to the MRC members.

2. Why was the initial amalgamated permit sent to the MRC revised and sent out again as a revised M-40 MA permit - i.e. without the standard conditions and carry-over conditions? In your email you refer to the standard conditions in the draft amalgamated permit being discussed with GML. What is the process being followed for the draft amalgamated permit and standard conditions and schedule? How is Esdilahg/ the MRC involved in discussions on standard conditions?

3. For the meeting coming up Tuesday (April 27) titled "Gibraltar Draft Permit Consensus Seeking Meeting" with Esdlih and TNG, it is not clear why technical staff such as Sean Shaw and Kelsey Norland are not included in the meeting invite (and presumably not attending). **We would like to request that these technical staff attend (and others) from both EMLI and ENV attend if possible.** It is not clear how we can "seek consensus" on our key issues without technical staff present (i.e. review of the cost estimate for water treatment). Note: I noticed Sean and Kelsey are included in the emails sent out for the EMA permit

but not the emails sent out for the EMLI permit, perhaps this is an error. Also, are there any meetings of the MRC planned? I haven't seen any meeting of the MRC since joining this group, and wonder about plans to meet given the importance of this file and significant concerns raised.

4. For the meeting Tuesday (seeking consensus), we would also like to know if Lowell Constable will attend for the technical discussions and for seeking consensus at this meeting. We have experience participating in similar "consensus seeking" meetings on a number of files. In our experience, SDMs attend at times to help explain their thinking and their direction to staff, as well as to hear technical perspectives and technical information from groups such as ourselves. This would be appreciated as this process is very rushed and we would like to explain our technical assessment and comments in a meeting. Also, we are having a hard time understanding this complex permitting process even after asking questions to MMO/ EML staff.

5. The MRC report was expected to be circulated last week (week of April 19). We have not seen the draft MRC report and request this be sent soon as it appears it is overdue. We request that we have sufficient time to review the MRC report given we do not have it as expected. We had planned to begin review of the MRC report today (over the weekend) and we may not be able to turn it around during the week due to previous work commitments. Please include at least one weekend in the response timeline.

Best regards,
Rina

Rina Freed, Ph.D., P.Eng
Principal, Source Environmental Associates Inc.
604-809-5193
www.seamining.ca

I am grateful to live on the unceded traditional territories of the Skwxwú7mesh (Squamish), Səl̓ilwətaɬ (Tsleil-Waututh) and xʷməθkwəyəm (Musqueam) Nations

On Wed, Apr 14, 2021 at 8:46 AM Dyas, Morgan EMLI:EX <Morgan.Dyas@gov.bc.ca> wrote:

Hello Gibraltar MRC,

The Chief Permitting Officer has requested the draft Mines Act permit be revised. The revised draft permit is attached.

This revised draft permit represents the conditions identified by EMLI that are required for the TSF Spillway and Gibraltar East Pit Phase I amendment applications reviewed for the M-40 permit, in place of the draft amalgamated permit.

EMLI will continue discussions with GML on the standard conditions included in the amalgamated permit next week.

Where relevant, specific conditions have been labelled to identify their origin, which are as follows:

Pink – Spillway application

Yellow – Gib E application

Grey – 5 Yr MP/RCP review

As you will note, a number of the geotechnical, geoscience and reclamation conditions are meant to supersede/replace conditions included in the March 2017 amendment. This is to both augment the conditions based on the Spillway and Gib East reviews as well as to update the language to be in line with current EMLI practise. These superseded conditions are verbatim from those included in the amalgamated permit.

We have extended the review deadline for MRC comments to **Tuesday, April 20th**. The draft EMA permit will be shared with GML and the MRC this week.

Regards,

Morgan

From: Dyas, Morgan EMLI:EX

Sent: April 8, 2021 8:50 AM

To: Yamelst, Brian H ENV:EX <Brian.Yamelst@gov.bc.ca>; Grimson, Carla ENV:EX <Carla.Grimson@gov.bc.ca>; Martinka, Rusto ENV:EX <Rusto.Martinka@gov.bc.ca>; McPherson, Alexis EMLI:EX <Alexis.McPherson@gov.bc.ca>; Stevens, Victoria EMLI:EX <Victoria.Stevens@gov.bc.ca>; Edna Boston <nrmanager@xatsull.com>; XT:Boston, Edna FLNR:IN <nrcoordinator@xatsull.com>; Helga Harlander <helga@tsilhqotin.ca>

Cc: Stuart, Jen A EMPR:EX <Jen.Stuart@gov.bc.ca>; Lachance, Luc ENV:EX <Luc.Lachance@gov.bc.ca>; Copping, Peter FLNR:EX <Peter.Copping@gov.bc.ca>; 'Dodd, Nikki EMPR:EX (Nikki.Dodd@gov.bc.ca)' <Nikki.Dodd@gov.bc.ca>

Subject: For Review: Gibraltar East Pit Phase 1 - Mines Act Draft Permit

Good Morning Gibraltar MRC,

Please find attached the draft Mines Act Draft Permit for the Gibraltar East Pit Phase 1 application for your review and comment. Please return any comments you have to me by next Thursday, April 15th.

Regards,

Morgan Dyas

A/Senior Project Lead

Major Mines Office/ Mines Competitiveness and Authorizations Division

Phone: 778-698-7266



PROVINCE OF BRITISH COLUMBIA
MINISTRY OF ENERGY, MINES AND PETROLEUM RESOURCES

PERMIT

**APPROVING MINE PLAN
AND RECLAMATION PROGRAM**

(Issued pursuant to Section 10 of the *Mines Act* R.S.B.C. 1996, c. 293)

Permit: **M-40**

Mine: **0900004**

Issued to: **Gibraltar Mines Ltd.
P.O. Box 130
McLeese Lake, British Columbia
V0L 1P0**

for work located at the:

Gibraltar Mine

This permit contains the following sub-sections:

Issue Date

Permit

July 21, 1999

Approving Work System

November 12, 2004

Approving Reclamation Program

Amendments

As listed on page 2.

Issued at Victoria, British Columbia this XXth day of April in the year 2021.

J. Lowell Constable, P.Eng.
Deputy Chief Permitting Officer

Amendments

February 12, 1971	Permit Authorizing Surface Work
January 3, 1980	Permit Authorizing Surface Work
April 3, 1981	Approval for Crusher and Mine Water Impoundment on Granite Creek
December 13, 1985	Approval for Modification of the Tailings Impoundment System (Saddle Dam)
July 7, 1986	Approval for Solvent Extraction Electrowinning Plant and Dump Leaching Process
October 31, 1989	Approving Reclamation Security Change
September 28, 1990	Approving Tailings Impoundment Northeast Fill Dam Design
January 7, 1994	Amending Reclamation Security
August 17, 1994	Amending Reclamation Security
May 26, 1997	Approving Change of Name
December 3, 1997	Approval to Construct Tailings Dam to Elevation 3620 Feet
July 21, 1999	Amended Permit Approving Reclamation Program
January 9, 2002	Deferring Submission of Closure Plan
January 22, 2002	Amending Reclamation Security
December 31, 2002	Amending Reclamation Security
June 1, 2004	Approving Mine Restart, Four and Twelve Year Mine Plan
November 12, 2004	Amended Permit Approving Reclamation Program
November 12 2004	Approving Redesign of Tailings Dam
January 3, 2008	Approving Tailings Pond Operating Level
October 7, 2012	Approving Amend Notification to Commence Waste Rock Drainage Ditch Construction
February 12, 2013	Approving Increase in Mill Throughput, 7 South Dump Expansion and TSF Deposition Plan

Amendments (continued)

March 6, 2013	Approving Changes to the Alignment of the 7 Dump Collection Ditch
December 12, 2013	Approving Double Benching in Granite 4 East Pit
January 7, 2014	Approving Granite Pit Phase 5 Pushback
December 29, 2014	Approving the Deadline Extension for Site Mitigation
May 14, 2015	Approving Deadline Extension of Site Wide Water Quality Model Update
October 27, 2015	Approving Deadline Extension of Updated Liability Cost Estimate
March 10, 2017	Approving Granite/Pollyanna Pit Pushback and Dump 7 Extension
February 4, 2019	Approving 2017 TSF Design Update
April XX, 2021	Approving Emergency Spillway and Gibraltar East Pit Phase I

PERMIT AMENDMENT

APPROVING EMERGENCY SPILLWAY AND GIBRALTAR EAST PIT PHASE I

Permit: **M-40**

Mine No: **0900004**

Issued to: **Gibraltar Mines Ltd.
P.O. Box 130
McLeese Lake, British Columbia
V0L 1P0**

for work located at the:

Gibraltar Mine

Amended at Victoria, British Columbia this **XXth** day of April in the year 2021.

J. Lowell Constable, P.Eng.
Deputy Chief Permitting Officer

PREAMBLE

An application for amendment of permit M-40, entitled “*Gibraltar Mine Tailings Storage Facility – East Saddle Dam Emergency Spillway Detailed Design – Rev. 1*”, dated March 16, 2020, was submitted to the Chief Permitting Officer in accordance with Section 10(6) of the of the *Mines Act* (Document 1). A series of reports and additional information filed with the Chief Permitting Officer also forms part of the application as follows:

- Report entitled ‘*Gibraltar Mine Tailings Storage Facility – East Saddle Dam Emergency Spillway Detailed Design – Rev. 1 – Addendum 1 – Response to MEMPR Issue ID #2*’, provided by Klohn Crippen Berger, dated July 28, 2020. (Document 2)
- Report entitled ‘*ML/ARD Monitoring Plan*’, provided SRK Consulting Inc., dated August 2019. (Document 3)
- Report entitled ‘*Gibraltar Mine Site Water Management Plan*’, provided by SRK Consulting Inc., dated August 2019. (Document 4)
- Report entitled ‘*Gibraltar Mine Surface Water and Groundwater Monitoring Plan*’, provided by SRK Consulting Inc., dated August 2019. (Document 5)
- Report entitled ‘*Gibraltar Mine Site-Wide Mitigation Plan*’, provided by SRK Consulting Inc., dated August 2019. (Document 6)

An application for amendment of permit M-40, entitled “*2020 Permit Amendment Application – Technical Assessment Application – Technical Assessment Report – Approving Gibraltar East Pit Mining – Phase I*”, dated November 20, 2020, was submitted to the Chief Permitting Officer in accordance with Section 10(6) of the of the *Mines Act* (Document 7). A series of reports and additional information filed with the Chief Permitting Officer also forms part of the application as follows:

- Letter entitled ‘*Gibraltar East Pit – Phase I Open Pit – Overall Stability Analysis*’, provided by BGC Inc., dated January 14, 2021. (Document 8)
- Report entitled ‘*Gibraltar Source Term Development*’ prepared by SRK Consulting (Canada) Inc. (SRK), dated May 2018. (Document 9)
- Memorandum entitled ‘*Groundwater Modelling for Granite Pit Water Storage in Support of Gibraltar Mine Permit Amendment*’ prepared by Hemmera, dated January 4, 2021. (Document 10)
- Memorandum entitled ‘*Groundwater Modelling for Granite Pit Water Storage*’ prepared by Hemmera, dated October 5, 2020. (Document 11)
- Letter entitled ‘*Gibraltar East Pit Mining – Dumping Over Mixed Waste Materials – FINAL*’ prepared by BGC Engineering Inc., dated October 6, 2020. (Document 12)
- Report entitled ‘*Gibraltar Mine Water Quality Prediction Model 2020 Revision*’ prepared by SRK, dated January 2021. (Document 13)
- Memorandum entitled ‘*Revised ML/ARD Monitoring Plan for Gibraltar East Pit Mining Phase I Project*’ prepared by SRK, dated March 2020. (Document 14)

- Report entitled '*Revised ML/ARD Monitoring Plan, Gibraltar Mine*' prepared by SRK, dated August 2019. (Document 15)
- Memorandum entitled '*Gibraltar East Pit Phase 1 Mining Application – Water Management Plan Update Summary*' prepared by SRK, dated October 9, 2021. (Document 16)
- Report entitled '*Revised Gibraltar Mine Site Wide Water Management Plan – 2020 Update*' prepared by SRK, dated March 2021. (Document 17)
- Report entitled '*Revised Gibraltar Mine Surface Water and Groundwater Monitoring Plan*' prepared by SRK, dated January 2021. (Document 18)
- Memorandum entitled '*ML/ARD Monitoring Plan for Gibraltar East Pit Mining Phase 1 Project*' prepared by SRK, dated February 5, 2021. (Document 19)
- Memorandum entitled '*Mitigating Excess Water in Gibraltar Mine's Tailings Storage Facility*' prepared by SRK, dated February 5, 2021. (Document 20)
- Memorandum entitled '*Response to Gibraltar Mine Round 2 Information Requests*' prepared by SRK, dated February 26, 2021. (Document 21)
- Report entitled '*Gibraltar Mine Site-Wide Mitigation Plan*', provided by SRK Consulting Inc., dated February 5, 2021. (Document 22)
- Report entitled '*Gibraltar Mines Waste Dump OTR Tires Potential Contaminants Assessment*', provided by Sperling Hansen Associates, dated February 2021. (Document 23)

Where more than one version of information exists in the application, the most recent version shall be considered the approved version unless otherwise stated or determined by the Chief Permitting Officer.

This permit contains the requirements of the Ministry of Energy, Mines and Petroleum Resources. It also is compatible, to the extent possible, with the requirements of other provincial ministries. However, nothing in this permit limits the authority of other provincial ministries to set other conditions, or to act independently, under their respective permits and legislation.

The mine is located within the consultative territory of Xat'sull (Soda Creek) and ?Esdilagh (Alexandria) First Nations.

CONDITIONS

The Chief Permitting Officer hereby approves the additional works as submitted in the applications and additional information (Documents 1 to 23), subject to compliance with the following conditions:

A. General

1. Compliance with *Mines Act* and Code

The Permittee shall ensure that all work is in compliance with all sections and parts of the *Mines Act* and the Health, Safety and Reclamation Code for Mines in B.C. (Code), and the Permittee shall obey all orders issued by the Chief Inspector of Mines (Chief Inspector).

2. Departure from Approval

The Permittee shall notify the Chief Permitting Officer in writing of any intention to depart from the Mines Plan and Reclamation Program approved under this *Mines Act* permit (M-40) to any substantial degree and shall not proceed to implement the proposed changes without the written authorization of the Chief Permitting Officer.

3. Permit Approval

- (a) The Permittee is authorized under this permit (M-40) for development, including surface disturbance and works as outlined in Document 1 and Document 7, within the area encompassing approximately 4,930 Ha, as outlined in Figure 1 (Permitted Mine Area), which includes management buffers around the approved disturbance. The Permittee is not approved for borrow sources located outside of the permitted mine area.
- (b) The Permittee is authorized for the following additional activities under this permit (M-40):
 - (i) Burial of tires and miscellaneous waste rubber and plastic within the GIB1 Dump footprint as outlined in Document 7 and Appendix G in Document 7. The Permittee shall ensure that the volume of buried waste is reported in the Annual Reclamation Report.

4. Permit

This Permit is not transferable or assignable.

5. Maintenance of Mine

The Permittee shall maintain mine facilities and infrastructure in a manner to meet design objectives, environmental protection requirements and reclamation requirements.

6. Sign-off by a Qualified Professional

Unless otherwise approved in writing by the Chief Permitting Officer or Chief Inspector, the Permittee shall ensure that all reports required to be submitted under this permit are signed by a qualified professional with applicable experience and registered in the province of British Columbia.

7. Responsibility to Reclaim

The Permittee shall assume responsibility for any outstanding reclamation associated with Exploration Permit MX-GEN-8 that exists within the permitted mine area for the Gibraltar Mine, defined in Figure 1, under the terms and conditions of this permit.

8. First Nations Information Sharing

Unless otherwise requested by the Chief Permitting Officer or Chief Inspector, the Permittee shall provide to the Xat'sull (Soda Creek) and ?Esdilagh (Alexandria) First Nations all material reports and plans required to be submitted under this permit, including annual monitoring reports, results of research programs, and the Reclamation and Closure Plan.

9. Compliance Status Report

The Permittee shall track compliance status of all permit conditions and inspection orders in a form acceptable to the Chief Inspector. The Permittee shall maintain an up-to-date tracking table on site. The Permittee shall ensure that the tracking table is available at the mine site at all times and to a Mines Inspector upon request. The Permittee shall prepare and submit an annual Compliance Status report to the Chief Inspector by March 31st and shall include a summary of outstanding non-compliance issues and an action plan, to the satisfaction of the Chief Inspector, for achieving compliance.

B. Geotechnical

1. General

Permit condition B.1 of the March 10, 2017, M-40 Mines Act permit amendment, is hereby replaced with the following conditions:

- (a) The Permittee shall ensure that all geotechnical designs, specifications, work plans, monitoring requirements and reports required to be prepared under section (B) are:
 - (i) Signed and sealed by a Professional Engineer and are submitted to the satisfaction of the Chief Inspector; and
 - (ii) Maintained on site and submitted to any Inspector of Mines upon request.
- (b) The Permittee shall ensure construction is completed under the supervision of a Professional Engineer and that sufficient field reviews are conducted to ensure that facilities are built in general conformance with the design, accepted engineering practices, the Code, this Permit, and to the satisfaction of the Chief Inspector.
- (c) The Permittee shall ensure recommendations by a Professional Engineer, relating to health and safety, geotechnical stability, or environmental protection, are followed, unless a suitable alternative course of action is approved in writing by a Professional Engineer.
- (d) The Permittee shall submit an Advice of Geotechnical Incident form to the Chief Inspector for any geotechnical incident that is classified as a dangerous occurrence or any other incident as described in the current EMPR Advice of Geotechnical Incident form.

2. Open Pits

Permit condition B.2 of the March 10, 2017, M-40 *Mines Act* permit amendment, is hereby replaced with the following conditions:

- (a) Design
 - (i) The Permittee shall ensure open pit development is conducted in accordance with the design and recommendations prepared by a Professional Engineer.
 - (ii) The Permittee shall ensure that open pit designs include specific requirements for areas that intersect major faults.

(iii) The Permittee shall ensure that an updated detailed design report for the Gibraltar East Pit southeast wall is submitted to the Chief Permitting Officer a minimum of 30 days prior to development of the south east wall below 3000 ft elevation. The Permittee shall ensure that the updated detailed design report incorporates, at a minimum, the following as outlined in Document 8:

- (a) Updated fault interpretation;
- (b) Confirmation of slope depressurization; and
- (c) Any proposed pit slope design modifications.

(b) Operations

- (i) The Permittee shall ensure that the pit slope design is reviewed annually by a registered Professional Engineer with experience in the design of pit slopes.
- (ii) The Permittee shall develop a design for controlled production blasting to minimize blast damage at and near the final pit walls and all interim pit walls employing multi-benching, and all interim pit walls that will be left in place for more than 12 months.
- (iii) The Permittee shall ensure that surface water is diverted away from the open pit slopes in accordance with good engineering practice.
- (iv) The Permittee shall map geological units as they are exposed in the open pits and the Permittee shall ensure that the geological mapping is reviewed by a Professional Engineer to confirm and refine the recommended open pit designs.
- (v) The Permittee shall carry out groundwater monitoring and depressurization of the open pit walls during mining and for final open pit wall stability as required by the pit design engineer.
- (vi) The Permittee shall ensure open pit walls are scaled during pit development and prior to wall access being lost.
- (vii) The Permittee shall ensure benches are cleaned of accumulated rock fall debris as needed and prior to bench access being lost.
- (viii) The Permittee shall develop and implement Safe Work Procedures (SWPs) to minimize exposure of workers working close to highwalls.
- (ix) The Permittee shall establish a safe set-back distance between the dump toe and the top of the bedrock slope in areas where waste rock forms the upper pit slopes.

- (x) The Permittee shall develop, document, and implement SWPs to minimize exposure of workers accessing areas within the wave run-up zone of pit lakes.

(c) Monitoring

- (i) The Permittee shall develop, document and implement a Slope Hazard Management Plan. The Permittee shall ensure that the Slope Hazard Management Plan includes, but is not limited to, the following:
 - (a) Be designed to verify acceptable performance, detect early signs of instability, and confirm design assumptions;
 - (b) Include details of instrumentation, monitoring frequency, trigger thresholds, and trigger response criteria; and,
 - (c) Be developed in consultation with the pit design engineer and approved by the pit design engineer.
- (ii) The Permittee shall ensure the Slope Hazard Management Plan is reviewed and updated annually, or as directed by the Chief Inspector.
- (iii) Inspection, monitoring, and instrumentation records shall be maintained by the Permittee on-site and be made available to an Inspector of Mines upon request.

(d) Reporting

The Permittee shall ensure an annual review and inspection of all open pits is undertaken and observations and recommendations made during the review and inspection are summarized in an annual pit slope performance report. The Permittee shall submit this report to the Chief Inspector by March 31st of the year following the review and inspection.

3. Waste Rock Dumps

Permit condition B.3 of the March 10, 2017, M-40 *Mines Act* permit amendment, is hereby replaced with the following conditions:

(a) Design

- (i) The Permittee shall ensure waste rock dumps are developed in accordance with the design and recommendations prepared by a Professional Engineer.
- (ii) The Permittee is approved for the 7 Dump design to a maximum elevation of 4100 feet in the western portion and 4400 feet in the eastern portion.

(b) Operations

- (i) The Permittee shall ensure no weak, cohesive, materials or snow is dumped on the outside edge of the waste rock dump platforms unless approved by a Professional Engineer.
- (ii) The Permittee shall ensure waste rock dump platforms are constructed with a slope that promotes surface water drainage away from the waste rock dump face.
- (iii) The Permittee shall ensure that a catch-bench of suitable width or a designed impact berm is established for boulder rollout protection in areas where waste rock dumps are to be constructed above active work areas or active roads.
- (iv) The Permittee shall ensure Issued for Construction (IFC) drawings and specifications, prepared by a Professional Engineer, are submitted to the Chief Inspector a minimum of 60 days prior to commencing construction of all waste rock dumps.
- (v) The Permittee shall ensure all waste rock placed on silty material is dumped short and pushed.
- (vi) The Permittee shall monitor movement in the upper waste rock slopes or on dump slopes located adjacent to the open pit in accordance with the recommendations of a Professional Engineer.
- (vii) The Permittee shall, if stability concerns develop or if unfavourable waste dump performance is experienced in areas where organic material is left in place, conduct an engineering assessment to review the requirement for removing the organic materials.

(c) Monitoring

- (i) The Permittee shall document a Standard Operating Procedure (SOP) for all waste rock dumps.
- (ii) The Permittee shall ensure that the waste rock dump SOP includes, but is not limited to, the following:
 - (a) Quantifiable Performance Objectives (QPOs) for instrumentation;
 - (b) Trigger Action Response Plans (TARPs) tied to the QPOs;
 - (c) Maximum advance rates in critical areas;
 - (d) Rock quality monitoring where required (i.e. bog crossing);

- (e) Monitoring frequencies;
 - (f) Frequency of engineering review of data;
 - (g) Monitoring data storage procedures;
 - (h) Frequency of operational review and trigger threshold review;
 - (i) Frequency of third-party data auditing; and
 - (j) All other parameters recommended by the Professional Engineer.
 - (iii) The Permittee shall ensure that waste rock dump development and monitoring is in accordance with the SOP.
 - (iv) The Permittee shall ensure the waste rock dump SOP is reviewed annually and updated as required, or as directed by the Chief Inspector. The Permittee shall submit the waste rock dump SOP to the Chief Inspector when updates are made.
- (d) Reporting
- (i) The Permittee shall ensure quarterly reviews of 7 Dump are completed by a Professional Engineer until the lower (3930 ft) lift is complete or the dump is inactive, and annual reviews are completed by a Professional Engineer thereafter.
 - (ii) The Permittee shall ensure an annual review and inspection of all waste rock dumps is undertaken and observation and recommendations made during the review and inspection are summarized in an annual waste rock dump performance report. The Permittee shall submit an annual report to the Chief Inspector by March 31st of the year following the review and inspection.

4. Tailings Storage Facility

- (a) Design
- (i) The Permittee is authorized to construct the Tailings Storage Facility to the following elevations:
 - (a) Cyclone Sand Dam to elevation 3620 ft;
 - (b) North Earthfill Dam to elevation 3605 ft;
 - (c) East Saddle Dam to elevation 3630 ft;
 - (d) Step-back Embankment to elevation 3635 ft; and
 - (e) Underflow tailings stack to elevation 3740 ft.
 - (ii) The Permittee shall ensure that a minimum freeboard is defined by the Tailings Storage Facility (TSF) Engineer of Record (EoR) and included in the QPOs.

- (iii) The Permittee shall ensure that the TSF EoR reviews and validates the Environmental Design Flood (EDF) magnitude and duration (Document 1) using up to date hydrological and hydrogeological information, prior to each installation of the East Saddle Dam spillway. The Permittee shall ensure that the review and validation is submitted to the Chief Inspector prior to commencing construction of each installation of the East Saddle Dam spillway.
- (iv) The Permittee shall ensure that the TSF Emergency Preparedness and Response Plan includes a plan to restore normal operating pond level, in the event of an exceedance of the Maximum Operating Water Level (MOWL).
- (v) The Permittee shall ensure a minimum 1500 ft setback is maintained between the supernatant pond and the crests of the Cyclone Sand and North Earthfill Dams.
- (vi) The Permittee shall submit to the Chief Inspector a detailed design of the North Earthfill Dam riprap channel prior to start of channel construction. The Permittee shall ensure the design includes, but is not limited to, optimization of the channel location and specifications for the filter layer between the riprap and sub-grade material, if a filter is required in the detailed design.
- (vii) The Permittee shall ensure that the TSF is constructed, operated, maintained and monitored in conformance with the design, the specifications, the Operation, Maintenance and Surveillance (OMS) manual, the Code, this Permit and accepted industry practice.

C. Protection of Land and Watercourses

1. Metal Leaching (ML) and Acid Rock Drainage (ARD)

Permit condition C.1 of the March 10, 2017, M-40 *Mines Act* permit amendment, is hereby replaced with the following conditions:

(a) General

- (i) The Permittee shall ensure that all materials with the potential to generate metal leaching and acid rock drainage (ML/ARD) are placed in a manner that minimizes the production and release of metals and contaminants.
- (ii) The Permittee shall ensure that, unless otherwise approved, all plans for the prediction, and if necessary, the prevention, mitigation and management of ML/ARD are prepared in accordance with the *Guidelines for Metal Leaching and Acid Rock Drainage at Minesites in British Columbia* (1998).
- (iii) The Permittee shall not make changes to the criteria for ML/ARD definition, waste handling procedures, mitigation strategies, or materials monitoring program without the written approval of the Chief Inspector.

(b) Definition of Potentially Acid Generating (PAG) and Metal Leaching (ML) Materials

- (i) The Permittee shall calculate neutralization potential (NP) using total inorganic carbon.
- (ii) The Permittee shall calculate waste rock acid potential (AP) using total sulphur.
- (iii) The Permittee shall classify all waste rock as acid generating (AG) or PAG unless otherwise approved by the Chief Permitting Officer.
- (iv) The Permittee shall classify all other waste materials and mine surfaces as potentially acid generating (PAG) if they have a NP/AP ratio of less than 2.0.

(c) ML/ARD Operational Monitoring

- (i) The Permittee shall update the ML/ARD Monitoring Plan (Document 19), including standard operating procedures (SOPs) as required. The Permittee shall submit the plan and SOPs to the satisfaction of the Chief Permitting Officer by June 30, 2021.

- (ii) The Permittee shall implement the quality assurance / quality control (QA/QC) program included in the ML/ARD Monitoring Plan.
- (iii) The Permittee shall ensure that all personnel involved in waste rock mining and handling and tailings segregation and handling are trained and kept up to date on the content and implementation of the ML/ARD Monitoring Plan.

(d) ML/ARD Reporting

The Permittee shall ensure results of the ML/ARD analytical testwork, outlined in the ML/ARD Monitoring Plan (Document 19), are reported and assessed in the Annual Reclamation Report, any significant changes or trends discussed, and implications for materials handling identified.

2. Surface and Groundwater Management and Monitoring

Permit conditions C.7 and C.9 of the March 10, 2017, M-40 *Mines Act* permit amendment, are hereby replaced with the following conditions:

(a) Water Management Plan

- (i) The Permittee shall update the Site Wide Water Management Plan (Document 17). The Permittee shall track changes to quantity and quality of surface water, seepage, and groundwater on the mine site. The Permittee shall ensure that the program can provide early warning about the onset of ARD or an increase in contaminant loading. The Permittee shall submit the plan to the satisfaction of the Chief Permitting Officer by June 30, 2021.
- (ii) The Permittee shall not make any significant changes to the Site Wide Water Management Plan without the written approval of the Chief Permitting Officer.

(b) Water Monitoring Plan

- (i) The Permittee shall implement the Surface Water and Groundwater Monitoring Plan (Document 18). The Permittee shall track changes to quantity and quality of surface water, seepage, and groundwater on the mine site. The Permittee shall ensure that the program can provide early warning about the onset of ARD or an increase in contaminant loading.
- (ii) The Permittee shall not make any significant changes to the Surface Water and Groundwater Monitoring Plan without the written approval of the Chief Permitting Officer. Significant changes include removal of monitoring sites, or changes to monitored parameters.

- (iii) The Permittee shall ensure that detection limits are sufficient to compare to water quality standards and permit requirements established by the British Columbia Ministry of Environment and Climate Change Strategy.
- (iv) The Permittee shall ensure that an effective QA/QC program for the surface water, groundwater and seepage monitoring programs is included and implemented as part of the Water Monitoring and Management Plan. The Permittee shall ensure that this includes detection limits, performance criteria that define acceptable levels of precision and accuracy and reporting of any missed sampling events.
- (v) The Permittee shall ensure that monitoring results of surface water, groundwater, and seepage quality and quantity are kept up to date in a dedicated database available for review by an Inspector of Mines upon request. The Permittee shall ensure that water quality monitoring results, including interpretation of results, are reported and assessed in the Annual Reclamation Report. The Permittee shall ensure that any significant changes or trends in water quality or quantity are discussed, and those that require additional evaluation and management are identified in the report.
- (vi) The Permittee shall include a table comparing relevant monitoring and testwork data to source term concentrations used in water quality predictions in the Annual Reclamation Report. The Permittee shall ensure that the implications of the results to source term refinement, water quality mitigation and adaptive management are discussed in the report.
- (vii) The Permittee shall include an assessment of the surface and groundwater quantity and quality in and around the ?Esdilagh First Nation's Indian Reserve #2 as part of the Annual Reclamation Report, including a discussion of any significant changes or trends.

3. Model Validation and Updated Water Quality Predictions

Permit conditions C.2, C.3, C.4, C.5, and C.6 of the March 10, 2017, M-40 *Mines Act* permit amendment, are hereby replaced with the following conditions:

- (a) During operations, the Permittee shall refine the inputs and assumptions for water quality predictions based on site-specific performance information.

- (b) The Permittee shall update the source terms, water balance model, water quality model, and numerical groundwater model, every five years, beginning in 2022, as part of the Mine Plan and Reclamation Program update, or more frequently as necessary to inform mine planning and mitigation design and engineering.
- (c) The Permittee shall provide a report evaluating the effectiveness of the proposed waste rock covers to decrease the net amount of contaminated waste rock seepage to surface water and groundwater over the life of mine. The Permittee shall submit the report, by March 31, 2022, to the satisfaction of the Chief Permitting Officer.
- (d) The Permittee shall submit a report evaluating the long-term potential for the onset of acidic conditions in the unsaturated tailings within the TSF and provide an assessment of the potential impact to water quality in tailings porewater, tailings seepage, site surface water, and receiving environment surface water and groundwater over the life of mine. The Permittee shall submit the report, by March 31, 2022, to the satisfaction of the Chief Permitting Officer.

4. Site Wide Mitigation Plan

Permit condition C.8 of the March 10, 2017, M-40 *Mines Act* permit amendment, is hereby replaced with the following conditions:

- (a) The Permittee shall implement the Site-Wide Mitigation Plan (Document 22). The Permittee shall not make any significant changes to the plan without the written approval of the Chief Permitting Officer.
- (b) The Permittee shall report on the annual results of the Site-Wide Mitigation Plan (Document 31.6) in the Annual Reclamation Report. The Permittee shall track, assess, and interpret the implementation progress and effectiveness of each mitigation measure and the activities undertaken to address identified data gaps.
- (c) The Permittee shall update the Site-Wide Mitigation Plan, beginning in 2022, as part of the Mine Plan and Reclamation Program update, or more frequently as necessary based on mine planning and mitigation design and engineering.

5. Water Treatment

- (a) The Permittee shall submit a Closure Water Treatment Costing Estimate by March 31, 2022, to the satisfaction of the Chief Permitting Officer. The report shall include a comprehensive assessment of the water treatment system or systems and associated pumping infrastructure proposed to mitigate water quality prior to discharge to the receiving environment during Closure. Additionally, the report should include, but not be limited to, the following:
 - (i) An overview of the proposed water treatment system or systems and associated pumping infrastructure;
 - (ii) An assessment of the base-case and upper-case volumes of water, total acidity, and total loadings of any other constituents, requiring treatment on an annual basis based on the predicted results of the most recent water quality model;
 - (iii) An assessment of the annual volume and geochemical composition of the waste produced as a by-product of the water treatment system or systems;
 - (iv) The proposed disposal method of all waste by-products and, if being disposed within the mine area, an assessment of the potential impacts to water quality;
 - (v) An assessment of the capital costs associated with the design and construction of the proposed water treatment systems or systems and associated pumping infrastructure;
 - (vi) An assessment of the annual maintenance requirements and associated costs; and
 - (vii) An assessment of the annual operating costs, including; delivered costs of electricity, natural gas, and treatment reagents, analytical testing, personnel and any other associated costs.
- (b) The Permittee shall submit an application for authorization to construct and operate a sulphate and nitrate water treatment facility to the Chief Permitting Officer by September 30, 2021. The Permittee shall ensure that the application includes, but is not limited to, the following information:
 - (i) Detailed design of the proposed water treatment facility;
 - (ii) An overview of the proposed water treatment system or systems and associated pumping infrastructure;

- (iii) An assessment of the base-case and upper-case volumes of water, concentrations of sulphate and nitrate, and concentrations of any other constituents requiring treatment during operations on an annual basis based on the predicted results of the most recent water quality model;
- (iv) An assessment of the annual volume and geochemical composition of the waste produced as a by-product of the water treatment system or systems;
- (v) The proposed disposal method of all waste by-products and, if being disposed within the mine area, an assessment of the potential impacts to water quality;
- (vi) An assessment of the capital costs associated with the design and construction of the proposed water treatment systems or systems and associated pumping infrastructure;
- (vii) An assessment of the annual maintenance requirements and associated costs;
- (viii) An assessment of the annual operating costs, including: delivered costs of electricity, natural gas, and treatment reagents, analytical testing, personnel and any other associated costs; and
- (ix) Schedules and triggers for construction, commissioning, operation, and closure of the water treatment system or systems and associated pumping infrastructure.

6. Construction Environmental Management Plan (CEMP)

Permit condition C.12 of the March 10, 2017, M-40 *Mines Act* permit amendment, is hereby replaced with the following condition:

The Permittee shall, at a minimum 60 days prior to the start of any new disturbance within the permitted mine area (Figure 1), submit a site-specific Construction Environmental Management Plan (CEMP) to the Chief Permitting Officer for each area of new construction. The Permittee shall ensure that the plan includes, but is not limited to, the following:

- (a) Findings of pre-disturbance archeological surveys;
- (b) Vegetation management, including buffer setbacks and invasive plant prevention;
- (c) Soil management, including salvage and stockpiling procedures for soil and large woody debris;
- (d) Wildlife sensitive periods, timing windows and buffer setbacks;
- (e) Fuel management and spill response;
- (f) Water management measures;
- (g) Construction schedule;
- (h) Incident response and reporting plans;
- (i) Site specific designs;

- (j) Site specific mitigations; and
- (k) Implementation and effectiveness monitoring program for construction management measures.

7.

Ongoing Reclamation Research

- (a) The Permittee shall submit to the Chief Permitting Officer, by March 30, 2022, a Reclamation Research Program that includes details for achieving the research requirements outlined in this permit with a schedule for implementation and description for how results will be utilized and reported.
- (b) The Permittee shall ensure a detailed summary of all research being conducted under this section is provided in the Annual Reclamation Report and the Mine Plan and Reclamation Program update, including descriptions of activities, results, and outcomes.
- (c) The Permittee shall conduct research to inform closure water management strategies and identify post-closure maintenance and contingency requirements. The Permittee shall ensure the research includes soil cover systems proposed for closure.
- (d) The Permittee shall conduct research to determine the viability of revegetation with native plant species, including culturally important species.
- (e) The Permittee shall conduct research intended to develop an end land use plan for the post-closure landscape represented in the mine disturbance footprint that is based on pre-mining ecosystems and habitats. Where a discrepancy in the comparative areas represented by ecosystem types is identified, the Permittee shall develop mitigation options.
- (f) The Permittee shall conduct research intended to inform design of and to test potential mitigation options for restoring ecosystems and habitats identified in the End Land Use Plan
- (g) The Permittee shall establish test plots that will be used to evaluate the reclamation approaches and prescriptions applied to confirm that ecological trajectories consistent with the land use and capability targets are being achieved.
- (h) The Permittee shall conduct research to inform the development of a soil replacement plan that is designed to achieve land capability and end land use objectives. If a shortfall of soil volumes is anticipated, the Permittee shall develop contingency plans.

- (i) The Permittee shall conduct research to assess decompaction methodologies to ensure that the severity of compaction that exists prior to commencing reclamation activities is effectively addressed in a manner intended to achieve end land use objectives and erosion control.
- (j) The Permittee shall develop and implement a monitoring program designed to evaluate the success of revegetation, habitat restoration, soil development and erosion control. The Permittee shall include in this program ecosystem-specific sampling parameters and performance criteria, which the Permittee shall base on pre-mining ecosystem benchmarks.
- (k) The Permittee shall develop and implement a monitoring program for evaluating metal uptake in exposed terrestrial and aquatic ecosystems, which specifies sampling requirements and performance criteria. Where harmful levels are found, the Permittee shall take any corrective action necessary to mitigate to ensure levels are safe for plant and animal life.

8. Archeological Resources

Permit condition C.15 of the March 10, 2017, M-40 *Mines Act* permit amendment, is hereby replaced with the following conditions:

- (a) Prior to beginning any mechanized surface disturbance on undisturbed lands, the Permittee shall have completed an archaeological impact assessment for the area of the proposed works. The Permittee shall design and implement the impact assessment in consultation with Xat'sull (Soda Creek) and ?Esdilagh (Alexandria) First Nations. The Permittee shall provide a copy of the impact assessment to the Chief Inspector and to the Xat'sull (Soda Creek) and ?Esdilagh (Alexandria) First Nations.
- (b) The Permittee shall complete a Traditional Use Overview Study of the Permitted Mine Area (Figure 1). The Permittee shall ensure that this study is designed and implemented in consultation with Xat'sull (Soda Creek) and ?Esdilagh (Alexandria) First Nations. The Permittee shall provide a copy of the study and a report of the results to the Chief Inspector and to the Xat'sull (Soda Creek) and ?Esdilagh (Alexandria) First Nations, by September 30, 2021.
- (c) Prior to beginning any mechanized surface disturbance on undisturbed lands, the Permittee shall conduct field surveys consistent with archaeological and cultural heritage resources management procedures consistent with the provisions of the BC Heritage Conservation Act.
- (d) The Permittee shall ensure that archaeological and heritage sites that are identified during field archaeological studies are clearly marked and avoided, where possible, during construction activity.

(e) For those sites which cannot be avoided, the Permittee shall use a “Chance Find Recovery” process and shall notify the Chief Inspector, Xat’sull (Soda Creek) and ?Esdilagh (Alexandria) First Nations, and the Archaeology Branch of the Ministry of Forest, Lands and Natural Resource Operations.

(f) The Permittee shall complete works consistent with archaeological and cultural heritage resources management procedures in accordance with the provisions of the BC Heritage Conservation Act to scientifically excavate, record and report all findings to the Chief Inspector. The Permittee shall ensure that this work is conducted in a manner that respects the cultural heritage policies of Xat’sull (Soda Creek) and ?Esdilagh (Alexandria) First Nations.

D. Reclamation and Closure Program

1. Reclamation Security

(a) The Permittee shall cause to be deposited with the Minister of Finance, security in the amount of Fifty Million (\$50,000,000.00) dollars. The security will be held by the Minister of Finance for the proper performance of the approved program and all the conditions of this permit in a manner satisfactory to the Chief Inspector.

(b) Notwithstanding the security posted as a condition of this Permit, the Permittee remains responsible for covering all closure and reclamation costs associated with reclamation and environmental protection.

2. Land Use

(a) The Permittee shall ensure that the land surface is reclaimed with the intent of re-establishing average pre-mining capability to the following end land use objectives:

(i) To satisfy livestock grazing, support wildlife habitat, and provide opportunities for traditional use of the land by the Xat’sull (Soda Creek) and ?Esdilagh (Alexandria) First Nations.

(b) The Permittee shall ensure that borrow pits and quarries belonging to the mine development and operations, shall be reclaimed by the Permittee to the approved end land use once no longer required.

(c) The Permittee may set aside pre-approved areas for industrial use.

- (d) The Permittee shall develop and implement an End Land Use Plan. The Permittee shall develop the plan considering conditions D.2(a) and D.2(b) for all disturbance areas within the Permitted Mine Area (Figure 1). The Permittee shall submit the plan by March 31, 2022, to the satisfaction of the Chief Inspector. The Permittee shall ensure that the plan includes, but is not limited to, the following:
 - (i) A description of pre-mining land and water capability and land and water use conditions;
 - (ii) A description of predicted post-closure land and water capability and land and water use conditions, based on changes that are expected to occur due to mine development, and description of how opportunities to improve land capability were considered;
 - (iii) Ecohydrological modelling, or other planning exercises, to reconcile or minimize differences between the pre-mining conditions and post-mining projections; and
 - (iv) A description of end land use objectives and ecosystem targets, incorporating First Nations interests and terrestrial and aquatic species relevant to the site, including red- and blue-listed species.
- (e) The Permittee shall submit a workplan outlining the studies required to inform the development of the End Land Use Plan in condition D.2(d) by March 31, 2022, to the satisfaction of the Chief Permitting Officer.

3. Waste Rock Dumps

- (a) The Permittee shall ensure that all waste rock dumps are reclaimed in a manner that minimizes the production of ML/ARD and mitigates its seepage from the minesite through recontouring, covering with a compact till, and sealing, unless proved through field scale trials that ML/ARD can be prevented by other means.
- (b) The Permittee shall ensure that all waste dump slopes and dump platforms, where it does not conflict with condition D.2(a), are revegetated in accordance with land use and capability objectives. If it can be demonstrated through an economic and technical rationale that it is impractical or impossible to revegetate portions of the waste dump slopes because aspect, elevation or because of physical constraints, then the Permittee may exempt selected portions of the waste dump from the revegetation requirements of this permit, with written approval of the Chief Permitting Officer.

4. Mine Plan and Reclamation Program Update

On or before March 31, 2022, and every five years thereafter, the Permittee shall develop and submit an updated Mine Plan and Reclamation Program. The Permittee shall ensure the plan includes, but not be limited to, the following:

- (a) The current status of the mine plan and reclamation obligations considering the site wide end land use evaluation;
- (b) Detailed mine plan for the next 5 years, and conceptually thereafter till the end of mine life, documenting any changes from the previous update;
- (c) Life of mine closure plan and end land use plan including the following:
 - (i) Terrain model with a landscape analysis of aspect and drainage;
 - (ii) End land use maps that clearly delineate wildlife corridors, grazing areas, industrial land use;
 - (iii) Information on the cover system over the TSF, based on the results of the cover research program;
 - (iv) Document and characterize all known and potential impacts of the CRD landfill operation on the mine footprint. Strategies to effectively minimize impacts shall be identified;
 - (v) Integration of reclamation research findings;
 - (vi) Monitoring programs;
 - (vii) Description of site preparation;
 - (viii) Use of native seed and plants with a planting schedules;
 - (ix) Integration of sediment and erosion control strategies;
 - (x) Road deactivation including access control for hunting and predation; and
 - (xi) Description of *Contaminated Sites Regulation* standards for reclaimed wildland and how it will apply to the site.
- (d) A compilation and interpretation of all monitoring including ML/ARD prediction, water quality and quantity, modelling predictions, soil, vegetation, wildlife and progressive reclamation programs;
- (e) A compilation of ongoing maintenance activities;
- (f) A compilation and interpretation of research programs;
- (g) A compilation of ongoing contingency/remediation plans;
- (h) Identification of impacts of the CRD landfill operation on mine and any proposed mitigations if required;
- (i) A traditional use study; and
- (j) A breakdown of outstanding liabilities and associated costs for the approved mine plan and Closure Plan.

5. Closure Plan

Twelve months prior to final closure, the Permittee shall develop and submit a Closure Plan including, but not limited to, the following:

- (a) The current status of the mine plan and reclamation obligations based on the approved end land use;
- (b) A compilation and interpretation of all monitoring for life of mine, including ML/ARD prediction, water quality and quantity, modelling predictions, soil, vegetation and progressive reclamation programs;
- (c) Detailed closure objectives and criteria for each mine component;
- (d) Detailed closure and maintenance activities;
- (e) A compilation and interpretation of any research program used to inform closure planning strategies;
- (f) Details for ongoing requirements for maintenance of structures;
- (g) Detailed contingency/remediation plans;
- (h) Detailed schedule for completion of reclamation/closure works;
- (i) Identification of impacts of the CRD landfill operation on mine;
- (j) Details for post closure monitoring;
- (k) Closure Management Manual that details plans for monitoring and maintenance activities for post closure; and
- (l) A breakdown of outstanding liabilities and associated costs including activities detailed for remediation and post closure.

All other terms and conditions under M-40 remain.

Figure 1 – Permitted Mine Area

Gibraltar - Eslidagh comment on Granite Creek

From: Shaw, Sean EMLI:EX <Sean.Shaw@gov.bc.ca>
To: Lachance, Luc ENV:EX <Luc.Lachance@gov.bc.ca>, Yamelst, Brian H ENV:EX <Brian.Yamelst@gov.bc.ca>
Cc: Stuart, Jen A EMLI:EX <Jen.Stuart@gov.bc.ca>, Norlund, Kelsey EMLI:EX <Kelsey.Norlund@gov.bc.ca>, Dyas, Morgan EMLI:EX <Morgan.Dyas@gov.bc.ca>
Sent: April 28, 2021 11:14:13 AM PDT
Attachments: image003.png, 2019 07 08 JPL-HH TNG Letter to EMPR re Outstanding Review of Gibraltar Closure Plan (1)[3].pdf

Luc, Brian,

We are working through a number of comments provided on the draft M-40 permit. I wanted to highlight one of them, as I think it is best placed under EMA. I also discussed this one, briefly, during a call with Nations yesterday. This is the condition that was proposed. I don't think its something we can or will do in our M-40 amendment:

The Permittee shall provide a mitigation plan to augment flow in Granite Creek (within IR#12) to pre-mining levels, to reverse water quality trends, and to address exceedances by June 20, 2021.

This was also outlined in more detail in a letter provided to EMLI in 2019 (attached – Water Quality/Quantity Concerns)

Additionally, in a condition related to future water treatment, this proposed condition was provided:

A Best Achievable Technology Assessment that conforms with the IDZ policy of the Province. (NTD: this should be re-worded to reflect most other permits and included in the EMA and MA permit– IDZ is not allowed without first assessing BAT).

Again, this is not something I see being included in the M-40 permit, but wanted to ensure you were aware of the concern/request.

Regards,



Sean Shaw, Ph.D., P.Geo.
**Director, Technical
Operations, Major Mines
Office**
Ministry of Energy, Mines
and Low Carbon Innovation
Phone: 778-698-7259

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Withheld pursuant to/removed as

s.16