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File: MV2021L2-0004 and MV2021D0005

David Harpley, Vice President
Environment and Permitting Affairs
Canadian Zinc Corporation
Unit 1710 - 650 West Georgia Street
Vancouver BC V6B 4N9

Sent via email

Dear David Harpley:

**Re: Information Requests – Type A Water Licence Renewal Application MV2021L2-0004 and New Type A Land Use Permit Application MV2021D0005
Canadian Zinc Corporation – Prairie Creek Mine – Mining and Mineral Exploration**

The Mackenzie Valley Land and Water Board (MVLWB or the Board) staff have reviewed the evidence provided by Canadian Zinc Corporation (CZN) as part of the proceeding for their Type A Water Licence Renewal Application MV2021L2-0004 and new Type A Land Use Permit Application MV2021D0005 for mineral exploration, and mining and milling at Prairie Creek Mine, NT. Board staff have determined that additional information is required to assist with developing the draft Effluent Quality Criteria (EQC) for the draft Licence, and to establish security for the authorizations. The Information Requests are identified numerically in the following sections.

Information Requests Pertaining to Flow Ratio and Rate of Effluent Discharge

Board staff have compiled the evidence from Technical Session Information Requests (IR) 12 and 13, and information provided in response to Undertaking 3 into Table 1 (see attached).^{1,2} CZN has provided the rate of Effluent discharge for summer and winter scenarios of 4.8 m/4.8 m and 8 m/6 m pipe lengths (summer/winter), as shown in Table 1; however, the rate of Effluent discharge has not been provided for the 2 m/1.5 m pipe length scenario.

Information Request 1: Provide the rate of effluent discharge for the 2 m/1.5 m pipe length scenario and include all supporting information and data (in Excel format) used to derive the rate of effluent discharge.

CZN has provided the flow ratios of 19, 18, and 19 for pipe length (summer/winter) scenarios of 2 m/1.5 m, 4.8 m/4.8 m, and 8 m/ 6 m, respectively; however, it is not clear how the flow ratio for each pipe length scenario was derived.

¹ See Public Registry for [CZN-PH Undertaking Responses – CZN – Revised Jan31 22.](#)

² See Public Registry for [CZN – Technical Session – Responses to IRs – Sep20 21.](#)

Information Request 2: Demonstrate how the flow ratio for each pipe length scenario was derived and provide supporting rationale as to why a flow ratio of 19 applies to both the 2 m/1.5 m and the 8 m/6 m pipe length scenarios. Provide all supporting information and data (in Excel format).

Information Request Pertaining to Proposed Effluent Quality Criteria Based on Metal and Diamond Mining Effluent Regulations Discharge Limits

Appendix 2 of the MVLWB/GNWT *Guidelines for Effluent Mixing Zones* outlines the standard screening procedure for identifying parameters of potential concern in the effluent that will require EQC to be set in the Licence by the Board. In addition, operating mines in Canada are required to comply with the Metal and Diamond Mining Effluent Regulations (MDMER), which is administered by Environment and Climate Change Canada (ECCC). The MDMER regulates the release of prescribed deleterious substances (MDMER, Section 3) through maximum discharge limits (MDMER, Schedule 4). During the proceeding, GNWT and ECCC requested that EQC be included for any of these prescribed deleterious substances that are not otherwise identified as parameters of potential concern through the standard screening process. The discharge limits defined in the MDMER are based on static end-of-pipe concentrations rather than derived to meet water quality objectives (WQO) in the receiving environment. As a result, concentrations of these parameters should not vary with pipe length. Board staff are seeking confirmation from CZN the parameters that are set according to MDMER discharge limits from Schedule 4, Table 1.

Information Request 3: Confirm the proposed EQC for total lead, total nickel, total zinc, Radium-226, and unionized ammonia are based on the discharge criteria in Schedule 4, Table 1 of the MDMER.

Information Requests Pertaining to Proposed Water Quality-Based Effluent Quality Criteria

CZN has proposed water quality-based EQC for each pipe length scenario, which are concentrations derived to meet specified WQOs at the edge of the mixing zone boundary in the receiving environment. Board staff note that the EQC for four parameters (total arsenic, dissolved lead, dissolved zinc, and nitrite) vary by pipe length. Board staff are unclear why the EQC do not vary with pipe length for other parameters including a number of total metals and metalloids (antimony, cadmium, copper, iron, mercury, selenium, and silver), nutrients (total ammonia, nitrate, and total phosphorus), sulphate, total dissolved solids, and total suspended solids. While Board staff understand that proposed EQC for some parameters including total lead, total nickel, total zinc, Radium-226, and unionized ammonia may be consistent with Schedule 4, Table 1 of the MDMER, Board staff are unclear why proposed water quality-based EQC for the remaining parameters are not adjusted for each pipe length scenario.³

In addition, the proposed EQC appear to be inconsistent with the modelling results provided by CZN.⁴ CZN's response to Information Request 12 from the Technical Session demonstrates that the predicted receiving water concentrations for all parameters vary with pipe length; however, these predictions do not appear to be reflected in CZN's proposed EQC for the parameters that have not been adjusted for each pipe length scenario.

³ See the [Metal and Diamond Mining Effluent Regulations SOR/2002-222](#)

⁴ See Public Registry for [CZN – Technical Session – Responses to IRs – Sep20 21](#), Attachment 2-2 (Model results 2 m pipe), 2-4 (Model results 4.8 m pipe), and 2-6 (Model results 8 m pipe)

Information Request 4: Clarify the apparent inconsistency in approach for the proposed water quality-based EQC for each pipe length scenario and provide supporting rationale for not adjusting EQC for all of the parameters. If the inconsistency identified is an error, provide revised EQC. Provide all supporting information and data (in Excel format) used to derive the water quality-based EQC values.

Information Request Pertaining to Security

CZN submitted an initial closure cost estimate with their Applications, and have since revised their initial estimate in response to Undertaking 9. As part of their response to Undertaking 9, CZN indicated that they have continued to discuss the cost to close and reclaim the site with the Government of the Northwest Territories (GNWT) and, separately from this, have indicated they plan to submit further information as part of their final argument. The submission of revised estimates at this stage in the proceeding, as well as during final argument, if submitted, constitutes new evidence, not further argument supporting CZN's position regarding the cost to close and reclaim the site.

CZN submitted their response to Undertakings on January 31, 2022 (revised version after an initial submission on the January 18, 2022 deadline). In response to Undertaking 9, which pertains to closure costs, CZN attached a memorandum and report that proposes a revised cost to backfill the underground void from what was previously presented and subject to public review. The revised cost is based on trucking all final tailings in non-paste form underground.^{5, 6} The response indicates that closure costs for other mine components were also adjusted.

On day two of the Public Hearing (December 14, 2021) the existing liability at the site was discussed during an exchange between Board staff and CZN. CZN acknowledged the GNWT's estimate of existing liability (approximately 11 million dollars), and indicated that they have provided approximately two million dollars to the GNWT in accordance with the security requirements of existing authorizations that pertain to the project; the difference being approximately 9 million dollars. During the same exchange, CZN acknowledged that the authorizations they are seeking should account for the existing liability, and suggested that the Board consider the need for CZN to generate revenue through operations;⁷ however, CZN has not provided a recommendation to the Board as to how they propose the existing liability be incorporated into the security requirements of the authorizations currently being considered.

With respect to the timing for when security should be required, CZN stated it is their preference that security be required in installments (phasing), rather than being required as one sum upon a new Licence coming into effect. CZN suggested that the approach could reflect the development of the waste rock pile;⁸ however, CZN has not proposed a phased approach, such as specific project milestones that would trigger phased increases in security or a description of each milestone. CZN also has not estimated the cost to close and reclaim the site at each milestone to reflect the liability at such points in time during the project's lifecycle.⁹ The

⁵ See Public Registry for [CZN-PH Undertaking Responses – CZN – Revised Jan31 22, p. 9](#).

⁶ *Ibid*; as described in the AMC report, final tailings refers to tailings remaining at surface upon closure

⁷ See Public Registry for [CZN – Public Hearing – Transcripts – Day 2 – Jan5 22](#)

⁸ See Public Registry for [CZN Public Hearing Presentation Dec 1 2021](#), slide 33

⁹ See the [LWB GNWT CIRNAC Guidelines for Closure and Reclamation Cost Estimates for Mines](#) for more information pertaining to security phasing

uncertainty surrounding phasing and the other points discussed previously are addressed in the information request below.

Information Request 5: To assist the Board with assessing CZN's request that security requirements be phased, Board staff request CZN provide their proposed approach to phased security requirements, including:

- a. A description of each project milestone for which security requirements would be triggered; and
- b. A revised RECLAIM estimate of the cost to close and reclaim the site at each project milestone and which incorporates CZN's approach to addressing the site's existing liability.

Please submit the information in both PDF and Excel formats.

Responses to these Information Requests should be submitted to Board staff by **March 2, 2022**. The information will be distributed for a public review process that allows CZN to provide responses.

Please contact [Andy Wheeler](#) at (867) 766-7467 with any questions or concerns regarding this letter.

Yours sincerely,



Andy Wheeler
Regulatory Specialist

BCC to: Canadian Zinc Corporation Distribution List

Attached: Table 1 – Summary of Proposed Effluent Quality Criteria Relative to Exfiltration Trench Pipe Length

Table 1 Summary of Proposed Effluent Quality Criteria Relative to Exfiltration Trench Pipe Length

Pipe Length (Summer/Winter)	EQC in mg/L					
	2 m/1.5 m		4.8 m/4.8 m		8 m/6 m	
Water Quality Parameter	Maximum Average Concentration	Maximum Grab Concentration	Maximum Average Concentration	Maximum Grab Concentration	Maximum Average Concentration	Maximum Grab Concentration
Total Antimony	0.033	0.066	0.033	0.066	0.033	0.066
Total Arsenic	0.0133	0.0266	0.0205	0.041	0.0315	0.063
Total Cadmium	0.0011	0.022	0.0011	0.0022	0.0011	0.0022
Total Copper	0.009	0.018	0.009	0.018	0.009	0.018
Total Iron	0.22	0.44	0.22	0.44	0.22	0.44
Total Mercury	0.11	0.22	0.11	0.22	0.11	0.22
Total Lead	0.08	0.16	0.08	0.16	0.08	0.16
Dissolved Lead	0.0198	0.0396	0.0505	0.101	0.063	0.126
Total Nickel	0.25	0.5	0.25	0.5	0.25	0.5
Total Selenium	0.004	0.008	0.004	0.008	0.004	0.008
Total Silver	0.00005	0.001	0.00005	0.0001	0.00005	0.0001
Total Zinc	0.4	0.8	0.4	0.8	0.4	0.8
Dissolved Zinc	0.086	0.172	0.215	0.43	0.26	0.52
Ammonia as N	1.5	3	1.5	3	1.5	3
Unionized Ammonia as N	0.5	1	0.5	1	0.5	1
Nitrate as N	6	12	6	12	6	12
Nitrite as N	0.079	0.158	0.095	0.19	0.145	0.29
Total Phosphorus	0.15	0.3	0.15	0.3	0.15	0.3
Sulphate	600	1200	600	1200	600	1200
Total Dissolved Solids	1000	2000	1000	2000	1000	2000
Total Suspended Solids	15	30	15	30	15	30
Radium 226 (Bq/L)	0.37	1.11	0.37	1.11	0.37	1.11
Flow Ratio (Q _{up} /Q _{eff})	19		18		19	
Q _{eff} (L/s)	?		590		560	

Notes: Q_{up} = rate of flow in Prairie Creek Upstream; Q_{eff} = rate of Effluent Discharge; ? = indicates information was not provided.

Parameters highlighted grey identify concentrations that vary by pipe length.

Sources: [Response to Undertakings 1 to 9 and 12](#); [Technical Session Information Requests 12 and 13](#).