

**GOVERNMENT OF THE NORTHWEST TERRITORIES**

**CLOSING ARGUMENT**

**FOR**

**CANADIAN ZINC MINING LTD.  
PRAIRIE CREEK MINE  
WATER LICENCE RENEWAL  
MV2021L2-0004**

Submitted to:

Mackenzie Valley Land and Water Board  
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## List of Acronyms

Aboriginal Affairs and Northern Development Canada	AANDC
Aquatic Effects Monitoring Program	AEMP
AMC Mining Consultants (Canada) Ltd.	AMC
Brodie Consulting Ltd.	BCL
Canadian Association for Laboratory Accreditation Inc.	CALA
Canadian Council of Ministers of the Environment	CCME
Crown-Indigenous Relations and Northern Affairs Canada	CIRNAC
Closure and Reclamation Plan	CRP
Canadian Zinc Mining Ltd.	CZN
Dense Media Separation	DMS
Environment and Climate Change Canada	ECCC
Effluent Quality Criteria	EQC
Government of the Northwest Territories	GNWT
Initial Dilution Zone	IDZ
Information Request	IR
Metal and Diamond Mining Effluent Regulations	MDMER
Mackenzie Valley Land and Water Board	Board/MVLWB
Run-of-Mine	ROM
Site Specific Water Quality Objectives	SSWQO
Surveillance Network Program	SNP
Tailings and Backfill Management Plan	TBMP
Water Management Pond	WMP
Water Quality Objectives	WQO
Waste Rock and Ore Stockpile Management Plan	WROSMP
Waste Rock Pile	WRP
Water Storage Pond	WSP
Water Treatment Plant	WTP
Variable Load Discharge	VLD

## 1.0 Introduction

This closing submission outlines the Government of the Northwest Territories' (GNWT) concerns and recommendations regarding Canadian Zinc Mining Ltd.'s (CZN) Prairie Creek Mine Water Licence Renewal Application MV2021L2-0004.

This submission is provided for the Mackenzie Valley Land and Water Board's (the Board or MVLWB) consideration. This submission takes into consideration all of the documents provided up to April 14, 2022, including the Water Licence Application; information provided through various Information Requests; Undertakings and discussions at the August 31 – September 2, 2021 Technical Session; and the December 13-16, 2021 Public Hearing.

Note several of the GNWT's recommendations from our Technical Intervention have been resolved in discussions with CZN throughout this water licence process. The GNWT would like to thank CZN for participating in these discussions. However, where required, based on additional information available following the submission of the GNWT's Technical Intervention, revised recommendations have been included for clarity and accuracy purposes. The GNWT appreciates the opportunity to express its concerns and provide recommendations and suggestions to the Board on this licence application.

### 1.1 Report Outline

These closing arguments are structured to mirror our Technical Intervention and are divided into the following sections:

**Section 1** – Introduction;

**Section 2** – General recommendations related to the Water Licence;

**Section 3** – Discussion of the GNWT recommendations related to water management, effluent discharge and monitoring;

**Section 4** – Discussion of the GNWT recommendations related to waste rock and tailings management;

**Section 5** – Discussion of the GNWT recommendation related to contaminated soil management; and,

**Section 6** - Discussion of the GNWT recommendations related to security estimates, including review of CZN's estimate.

## **2.0 General Recommendations**

### **2.1 Applicable Regulations**

The GNWT had included recommendations within the Intervention to ensure that the Water Licence is at least as stringent as the Metal and Diamond Mining Effluent Regulations (MDMER). As such, Recommendation 1 stands.

### **2.2 Term Length**

Many of the GNWT's recommendations, including for a shorter term, are based on significant uncertainties with the mine plan, water management, effluent testing and maintaining compliance. CZN has noted that these concerns are unwarranted and that our claims are not credible, however this position is outlined in our written Intervention.

The GNWT maintains that the Board not grant a 20 year licence for the Prairie Creek mine and that the measures proposed by the GNWT and other parties are considered in context of the challenges with the mine, the uncertainty and historical record of site operation.

Regarding term specifically, the GNWT has noted that there is no precedence for CZN's proposal that a condition in the Water Licence require a review every five years. The legislation does not contemplate a licence that requires a review of its very own terms and conditions. The process and requirements for such a review are not clear, nor how the licence would be amended or approved, if so required. Ultimately, if CZN is open to a review of the Water Licence every five years, a term of five years that then requires an assessment of whether the terms and conditions are appropriate, etc., seems to meet this same end. Further, if conditions were favourable and predictions confirmed, the Water Licence could then be renewed for the remaining mine life, without a need for shorter-term renewals.

As such, the GNWT reiterates our recommendation that the Board consider a shorter term for the Prairie Creek mine until water quality predictions and models have been updated through the initial years of the mine life.

## **3.0 Water Management, Effluent Discharge and Monitoring**

### **3.1 Water Management**

#### **3.1.1 Hydraulic designs for seepage and runoff collection and control**

Recommendation 3-1 and 3-2 requested the Facility Detailed Designs to include the hydraulic designs and precipitation design event for associated water management

structures, and for all water management structures, excluding conveyance structures, to include a 1 m freeboard.

Based on CZN's response to interventions, it is GNWT's understanding that they agree with these recommendations and as such GNWT considers recommendations 3-1 and 3-2 to be resolved. This is further supported as Schedule 4, Item 3 of the draft licence identified the requirement for hydraulic designs and Part F, Condition 10 identified the requirement to maintain a 1m freeboard.

CZN's response to interventions state the Camp Ditch is not an extension of the Water Storage Pond (WSP) or Run-of-Mine (ROM) Stockpile diversion ditch, and only collects groundwater from the alluvium, not runoff, to be captured in a new sump for discharge to the WSP. However, Figure 1-4 of the Water Management Plan depicts the WSP diversion ditch and ROM Stockpile diversion ditch both flowing into an area considered to be the realigned Camp Ditch before terminating in a sump located south of the Temporary Waste Rock Stockpile. Further, Section 4.1 of the Water Management Plan (WMP) states the WSP diversion ditch will discharge on the east side to the Camp Ditch. Without a detailed design, uncertainty will remain on whether the ditch is adequately mitigating against uncontrolled releases of potential non-compliant water into the receiving environment. Thus, GNWT considers recommendation 3-3 unresolved and still stands.

Recommendation 4 outlined GNWT's recommendation for items of inclusion in the waste rock pile designs and recommendation 5 requested that the waste rock pile design is submitted 90 days prior to construction for Board review and approval.

Based on CZN's responses, it is GNWT's understanding that they agree with these recommendations which were incorporated into the draft licence in Part E, Condition 13 and as such GNWT considers recommendations 4 and 5 to be resolved.

### **3.1.2 Submission of Facility Detailed Designs and associated monitoring/management programs for approval**

Recommendation 6-1, 6-2, 6-3 and 6-6 requested that Facility Detailed Design reports be submitted for select stockpiles. Based on CZN's response to interventions and technical session information requests, it is GNWT's understanding that they agree with these recommendations and as such GNWT considers recommendations 6-1, 6-2, 6-3 and 6-6 to be resolved.

CZN's response to interventions and technical session information requests (IR#21, July 31, 2021) indicate they disagree with recommendations 6-4, 6-5, 6-7, 6-8 and 6-9 that a Facility Detailed Design is needed for other stockpiles and the Catchment Pond, given they are either simple and/or small stockpiles with lined pads for seepage/runoff

collection, are located inside a building, or, in the case of the Catchment Pond, is an existing structure to which only a liner is to be added. However, the GNWT considers any lined facilities to be engineered structures that need a design to ensure contact water is properly managed to mitigate against uncontrolled releases of non-compliant water into the receiving environment. Thus, GNWT considers recommendations 6-4, 6-5, 6-7, 6-8 and 6-9 unresolved and still stand. For clarity, the detailed design is to focus on the base liner and water containment (if present) to mitigate against the release of non-compliant water. A detailed geotechnical design for the stockpile slopes is not considered necessary. A revised recommendation 6 that provides further clarity in this regard is presented below. Finally, the GNWT supports the requirement for detailed designs that was included in the draft licence and corresponding submission timelines.

### **Recommendation 6 (Revised):**

The GNWT recommends that the following Facility Detailed Design reports, including for any base liner and water containment if present, are submitted 90 days prior to construction for review and Board approval.

- 1) Water Storage Pond
- 2) Waste Rock Pile
- 3) South Yard excess material pile
- 4) ROM Ore Stockpile
- 5) Temporary Waste Rock Stockpile
- 6) Secondary Tailings/ROM Ore Stockpile
- 7) Dense Media Separation (DMS) Float Stockpile
- 8) Active Tailings Stockpile
- 9) Lined Catchment Pond

Recommendations 7-1, 7-4, 7-6, 8-2 and 9-1 requested the WROSMP (Waste Rock and Ore Stockpile Management Plan), TBMP (Tailings and Backfill Management Plan), WMP and/or Facility Detailed Designs describe the geotechnical and/or water quality monitoring for select mine components. Based on CZN's response to interventions and technical session information requests (IR#21, July 31, 2021), it is GNWT's understanding that CZN agrees with these recommendations, or that appropriate geochemical and water quality monitoring will be part of the WROSMP, TBMP and Surveillance Network Program (SNP). As such GNWT considers recommendations 7-1, 7-4, 7-6, 8-2 and 9-1 to be resolved.

CZN's response to interventions and technical session information requests (IR#21, July 31, 2021) indicate they disagree with recommendations 7-2, 7-3, 7-5, 7-7, 8-1 and 9-2 that geotechnical monitoring should be part of the detailed facility design given they

disagree that a detailed engineering design is needed for these structures. CZN instead suggests geotechnical monitoring can be completed as part of annual geotechnical inspections. The GNWT considers this acceptable, but the WROSMP, TBMP and WMP should note this monitoring. Based on CZN's responses, it is GNWT's understanding that they agree that appropriate geochemical and water quality monitoring will be included as part of the WROSMP, TBMP and SNP. Specific to the legacy 930/970 level waste rock piles, the WMP includes an SNP station #24 for these piles but provides no start date or monitoring frequency. These details should be provided in an updated WMP. Thus, GNWT considers recommendation 7-2, 7-3, 7-5, 7-7, 8-1 and 9-2 partially resolved.

In review of the draft licence, GNWT noted that Part F, Condition 17 includes the requirement for annual geotechnical inspections for all Engineered Structures, which should also include the Active Tailings Stockpile (if not considered to be an engineered structure) and 930/970 level legacy waste rock piles. The GNWT further notes that the Catchment Pond was included in the list of engineered structures in the draft licence and therefore the Part F, Condition 17 addresses recommendation 9-1. Revised recommendations 7, 8 and 9 are outlined below to address the outstanding issues noted above.

**Recommendation 7 (Revised):**

The GNWT recommends that the Waste Rock and Ore Stockpile Management Plan specify that an annual geotechnical inspection is to be completed for the following Mine components:

- 1) ROM Ore Stockpile
- 2) Temporary Waste Rock Stockpile
- 3) DMS Float Stockpile
- 4) Legacy 930/970 level waste rock piles

**Recommendation 8 (Revised):**

The GNWT recommends that the Tailings and Backfill Management Plan specify that an annual geotechnical inspection is to be completed for the Active Tailings Stockpile.

**Recommendation 9 (Revised):**

The GNWT recommends that the Water Management Plan specify:

- 1) An annual geotechnical inspection is to be completed for the Catchment Pond

2) Start dates and water quality monitoring frequency for SNP 24

Regarding recommendation 10, the Waste Rock and Ore Stockpile Management Plan and Facility Detailed Designs, Tailings and Backfill Management Plan, and the Water Management Plan and Facility Detailed Designs be revised as described herein and submitted to the Board for public review and approval.

The GNWT is agreeable to the approach proposed by CZN in their response to interventions that these plans be submitted 90 days before any activity such as construction.

### **3.1.3 Adaptive Management and Decision Tree**

The GNWT and several other intervenors raised questions throughout these proceedings regarding how CZN would be able to consistently meet Effluent Quality Criteria (EQCs) in the effluent as well as Water Quality Objectives (WQOs) at the edge of the mixing zone. CZN's compliance in both cases will rely on managing the contributions of untreated water quality and water quantity discharged from Cell B to the collection pond, the volume and resulting quality of Cell B water diverted through the lime treatment system, and water from the Mill Ditch reporting directly to the Catchment Pond. CZN may also need to account for a scenario whereby Cell A achieves a positive water balance, and CZN diverts some inputs from Cell A directly into Cell B.

There has been significant discussion regarding the level of adaptive management planning that is appropriate for this stage of the project to provide the GNWT and other stakeholders confidence that the discharges associated will be able to consistently meet EQC in the exfiltration trench and WQO at the edge of the mixing zone.

CZN sought to address the GNWT's concerns through a memorandum titled "Water Storage and Discharge Adaptive Management, MV2021L2-0004" outlining a high-level approach to how compliance with EQCs would be maintained as well as providing clarifications during the technical workshop and public hearing. The GNWT reiterates that while this memorandum addressed part of the concern, neither the memorandum nor CZN's responses to follow-up questions during the public forums provide adequate clarity on how CZN would consistently maintain compliance with EQCs and WQOs.

CZN has agreed to an acceptable resolution by proposing an adaptive management plan that can appropriately be incorporated into an updated Water Management Plan and will be subject to intervenor review. While the details of that adaptive management plan including triggers and thresholds have yet to be finalized, the GNWT agrees with CZN that *"It doesn't appear... that providing this information now is going to materially assist the Board in writing the licence"* (Public Hearing Day 1, Page 167/256).

The Board appears to have accepted both the GNWT's stated requirement for a robust Adaptive Management Plan for the Project and CZN's position that the Plan is best incorporated into the Water and Wastewater Management Plan by requiring CZN include a "Response Framework"<sup>1</sup> in Schedule 1, 1, k; Schedule 5, 2, b, viii; and Schedule 5, 2, b, xiii of the draft water licence. The GNWT is also satisfied that an approved Water and Wastewater Management Plan will be in place prior to construction as per Part F, Schedule 3 of the draft licence. The GNWT therefore considers our position regarding an Adaptive Management Plan pursuant to meeting EQC and WQO (i.e., Recommendation 11, 12, 13, 14 and 15) resolved with the following revised recommendations:

**Recommendation 11, 12, 13, 14 and 15 (revised):**

The GNWT recommends that CZN host a "Response Framework" workshop following licence issuance to provide an opportunity for the GNWT and other stakeholders to provide input into the Framework that will reside within an updated Water and Wastewater Management Plan pursuant to ensuring water quality meets EQC in the exfiltration trench and WQOs at the edge of the mixing zone during operation.

The GNWT further recommends that the Response Framework include consideration of the GNWT's Intervention regarding Adaptive Water and Wastewater Management during operations. GNWT expects to have an opportunity to thoroughly review the updated Water and Wastewater Management Plan including the Response Framework prior to approval.

**3.1.4 Effluent Water Quality and Final Point of Control**

CZN noted in their Technical Session IR response package that "*onsite testing for key parameters in water will be necessary in order to ensure rapid turn-around (within 1-2 hours) of reliable results*". However, at present, an "*accurate and sophisticated measurement approach*" that is "*sufficiently accurate for the concentrations expected to be associated with the operations EQC*" is still being investigated. Further, CZN notes in their response to interventions that they believe "*Onsite testing is not considered to be necessary for any other parameter*" suggesting that "*zinc concentrations will be the determinant of water treatment requirements and effluent discharge limitations.*"

The GNWT understands CZN's intention is to use a colourimeter for day-to-day monitoring of zinc, and to support compliance. CZN has not yet demonstrated that zinc can be used as a sentinel for other key parameters in all streams of contact water

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<sup>1</sup> Defined by the MVLWB as a "systematic approach to responding to the results of a monitoring program through adaptive management actions" on Page 8/105 in the Draft Water Licence.

contributing to the blended effluent. The Board however appears to have left the option open for CZN to rely on “Sentinel Parameters” (P9/105 of the draft licence) to maintain compliance. This does not provide the GNWT confidence that CZN will be able to meet EQC for all parameters in the final effluent consistently.

**Recommendation 16 (revised):**

The GNWT recommends that the Board continue to require CZN to develop an accurate on-site testing method prior to construction. The approach should outline a reliable and accurate method to analyze water quality and receive results within a 1–2-hour period as per CZN’s stipulated needs. The approach should demonstrate how all EQC parameters can be reliably tested. Further, it is suggested that the method specify that the test results will be completed on water quality that is representative of the final effluent that will be discharged. This method can be included in the Water and Wastewater Management Plan.

## **3.2 Effluent Quality Criteria**

### **3.2.1 Accuracy of Calculated Parameter Aggregates**

The *“parameter aggregates from ...computations”* that will be compared to EQCs will rely on the accuracy of multiple water quality and water quantity measurements to calculate the concentrations present in the blended effluent within the Catchment Pond intended for discharge via the exfiltration trench.

The GNWT is satisfied that the flow measurement protocol presented in the application, in conjunction with the memo titled “Flow Trends and Climate Change Predictions Prairie Creek Mine, NT” provided in response to GNWT-39, as well as the clarification provided by CZN during Technical Sessions, has sufficient built-in conservatism within the measurement of flow in Prairie Creek during low flow conditions. The GNWT is also satisfied those flow measurements from the water treatment plant, and Cell B will be sufficiently accurate as industry-standard measurement approaches will be applied.

The GNWT remains concerned with how CZN will coordinate multiple water chemistry measurements from Cell B, the Mill Ditch, outflows from the water treatment system, and potentially Cell A to ensure compliance in the final effluent. This is particularly important as the proposed sampling frequency from the catchment pond (SNP 13) outlined in the draft Water Licence is weekly and less frequent than the likely turnover within the Catchment Pond given storage *“is limited as the pond is shallow (~1 m deep)”* (EQC Report). Thus, CZN’s demonstration of ongoing compliance with EQCs will need to be calculated as per the current water management approach. The GNWT put forward Recommendation 17 to address concerns with how compliance with EQCs will be determined. Specifically, the GNWT recommended that the Water Licence reflect

that CZN should use the maximum concentration of each parameter from each stream when computing the parameter aggregates for comparison to EQCs based on all samples collected over the preceding month. CZN agreed to this stipulation in their response to interventions with the exception that *“it should only apply to dissolved zinc as the determinant of water treatment requirements and effluent discharge limitations.”*

The GNWT reiterates that compliance should be demonstrated with all parameters for which EQC have been derived and also reiterates that CZN must demonstrate compliance with all applicable MDMER EQCs (e.g., total zinc in addition to dissolved zinc).

**Recommendation 17 (revised):**

The GNWT recommends that the Water Licence or Water and Wastewater Management Plan reflect that CZN should use the maximum concentration of each parameter from each stream when computing the parameter aggregates for comparison to EQCs based on all samples collected over the preceding month.

The GNWT also notes that this recommendation is related to the revised Recommendation 16 regarding rapid on-site testing.

**3.2.2 Water Balance**

Recommendation 18 outlined GNWT’s recommendation for items of inclusion in operations monitoring and use of the resultant data to update site water quality predictions and the water balance for operations. CZN provided no response to this recommendation, therefore the GNWT considers recommendation 18 to still stand.

Recommendation 19 outlined the GNWT’s recommended timelines for submission of an updated WMP, and for the Water Licence to specify the frequency at which updates to the source terms, water balance, and water quality predictions will be completed following operations. In their response to interventions, CZN disagreed with the timeline for submission of an updated WMP, instead proposing the WMP be submitted 90 days prior to dewatering, and that updates to the WMP be provided as part of the annual Water Licence Report.

The GNWT is agreeable to the approach proposed by CZN in their response to interventions that the WMP be submitted 90 days before any activity such as dewatering.

The GNWT disagrees that the annual Water Licence Report is the process by which updates to source terms, water balance, water quality predictions and the Water Management Plan are made. It is agreed the annual Water Licence Report is the place to document results and analysis and from them identify if an update is required. WMP

updates should be a separate process for Board review and approval. As an alternative to being included as specific water licence conditions, the GNWT believes the WMP could instead specify the frequency at which updates to the source terms, water balance, and water quality predictions will be completed following operations. A revised recommendation 19 is proposed below.

**Recommendation 19 (Revised):**

The GNWT recommends that the updated Water Management Plan be submitted to the Board for review and approval 90 days prior to dewatering activities and that the Water Licence include a requirement for a Water Management Plan, and the Water Management Plan include the following content: frequency at which updates to the source terms, water balance, and water quality predictions will be completed following operations.

The GNWT recommends that any updates to the WMP during operations are to be a separate process for Board review and approval and not a component of the annual Water Licence Report.

Recommendation 20 outlined the GNWT's recommendation that response triggers be developed for specific source terms to indicate when updates to the site water balance and water quality predictions may be needed. CZN has provided responses to the Intervention noting where and why they do not believe triggers are required for each of the source terms with the perspective on operational water management adjustments. However, this was not the recommendation, which was to have triggers for each source term to understand when an update to the site water balance and water quality predictions is needed. In other words, at which point a source term differs so much from what was originally assumed that the water balance and water quality predictions are no longer valid and require updating. If some source terms can differ significantly (e.g., >50%) from initially assumed and have no significant impact on the water balance or water quality predictions, CZN could use this as justification that no trigger is necessary for that particular source term. This adaptive management approach to assessing key inputs to the WSP will reduce uncertainty in the water discharge method/strategy. A revised recommendation 20 for greater clarity is provided below.

**Recommendation 20 (Revised):**

The GNWT recommends CZN develop response triggers for each of the following water quality and quantity source terms to inform the need to update the site water balance and water quality predictions when source terms deviate from the initially assumed values:

- 1) Effluent and wastewater flow rates between the Mill and WSP
- 2) Outflow rate of treated and untreated water to Prairie Creek
- 3) Flow rates in Prairie Creek
- 4) Water quality of non-contact mine water
- 5) Water quality of treated discharge
- 6) Water quality of Waste Rock Pile (WRP) runoff/seepage
- 7) Water quality of Camp Ditch water
- 8) Water quality of Mill Ditch water
- 9) Water quality of Prairie Creek
- 10) Inflow rate of contact mine water to WSP
- 11) Inflow rate of non-contact mine water to WSP
- 12) Inflow rate of WRP runoff/seepage
- 13) Inflow rate of runoff/seepage from other stockpiles
- 14) Inflow rate of Camp Ditch water to WSP
- 15) Inflow rate of Mill Ditch water to Catchment Pond

### **3.3 Effluent Discharge**

#### **3.3.1 Variable Load Discharge (VLD)**

As noted in our Intervention, the GNWT does not support the inclusion of VLD as a condition of the water licence. When the previous water licence was approved, the Minister of Aboriginal Affairs and Northern Development Canada (AANDC) noted that they were not supportive of this method in the approval letter. The letter also suggested that CZN provide additional information subsequent to issuance to support the approach. Since that time, no additional information has been provided that alleviates the concerns that had been brought forward. No evidence has been provided regarding how water quality samples will be obtained in real-time to allow for fluctuation of concentrations in effluent. The GNWT supports and reiterates the issues noted by AANDC, now Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), that the implementation of VLD would be extremely challenging from an enforceability standpoint. This is because the volume released, the concentration of effluent released, and the mixing ratio of effluent streams all change in real time with flow in Prairie Creek. Therefore, even if a sample was taken and rush analysis occurred, results would not be available for a few hours, even if they had a Canadian Association for Laboratory Accreditation Inc. (CALA) certified analytical laboratory onsite (which the GNWT understand CZN is no longer proposing to have). In the time taken to analyze the sample, the exact concoction of effluent released to Prairie Creek would likely change as Prairie Creek is prone to quick changes in flow (typically as a result of precipitation in the mountainous environment). Therefore, even if the sample failed, variance in the flow and volume calculations could result in a prosecution being rejected by the courts.

Further, when other mines have a failure, a sample is collected immediately to confirm whether the sample in fact failed. This is not possible under the VLD strategy as effluent concentrations and discharge volumes would be different.

As such, the GNWT maintains Recommendation 21 that VLD be removed from the Water Licence as CZN is no longer pursuing it. Should CZN wish to pursue this in the future, an amendment with supporting rationale will be required.

### **3.3.2 Adherence to other legislation**

The GNWT maintains Recommendation 22

### **3.3.3 Water Quality Predictions – Prairie Creek**

The GNWT noted that CZN had originally used the 65<sup>th</sup> percentile of seasonally specific water quality parameters in Prairie Creek upstream of the Project (Review Comment Table, 2021) to derive the dilution of effluent achieved within the mixing zone and at the edge of the mixing zone. Those dilution factors were subsequently applied in the derivation of EQC for the project resulting in unnecessary potential risks to the aquatic receiving environment. The GNWT laid out our concerns with this approach in support of our Recommendation 23 suggesting that CZN use a higher percentile of baseline concentrations as input to the EQC calculation to minimize the frequency under which WQOs at the edge of the mixing zone may be exceeded. In CZN's response to interventions, they conceded to using the 90<sup>th</sup> percentile of upstream water quality concentrations in Prairie Creek to derive EQC that will allow for compliance with WQO at the edge of the mixing zone. The GNWT generally maintains Recommendation 23 and appreciates CZN's agreement to use the 90<sup>th</sup> percentile of upstream water quality.

It is noted however that there remains uncertainty in how CZN calculated the 90<sup>th</sup> percentile of upstream water quality concentrations in Prairie Creek. This concern was highlighted in our review of CZN's IR2 Package which included updated modelling of dilutions in the mixing zone using the 90<sup>th</sup> percentile and associated EQC. CZN responded to our concerns on March 29, 2022, noting that they had "*removed those samples [i.e., outliers] for which the total metal concentration was clearly an outlier from the majority*". This is not a defensible rationale. The GNWT therefore provides the following revised Recommendation 23:

#### **Recommendation 23 (revised):**

The GNWT continues to recommend that the Board incorporate updated effluent quality criteria for all parameters of concern in the Water Licence. The updated EQCs should be calculated using the 90<sup>th</sup> percentile of seasonally specific water

quality in Prairie Creek with the objective that WQOs are met at the edge of the mixing zone 100 m downstream from the exfiltration trench. The calculated EQCs should account for the refined exfiltration trench width of 2 m in the summer and 1.5 m in the winter. The 90<sup>th</sup> percentile of seasonally specific water quality in Prairie Creek should be calculated using a scientifically defensible and clearly defined procedure.

The GNWT has reconsidered our position regarding a nitrate Site Specific Water Quality Objective (SSWQO). We accept CZN's rationale as outlined in their response to interventions where they noted *"that the current SSWQO of 0.02 mg/L is already much less than the CCME's [Canadian Council of Ministers of the Environment's] long-term objective for the protection of freshwater aquatic life of 0.06 mg/L"*. While CZN has not put forward supporting derivation documentation, we accept that the proposed SSWQO of 0.02 mg/L provides a greater level of protection than the generic WQO. It is assumed that CZN's intention is for this WQO to be expressed as mg/L Nitrogen as the value is more inline with the CCME long-term nitrite water quality objective of 0.06 mg/L-N. While 0.02 mg/L is also acceptable, it affords an unnecessary level of protection for aquatic life in Prairie Creek. The GNWT therefore puts forward the following revised Recommendation 24:

**Recommendation 24:**

The GNWT recommends that the Board adopt CZN's proposed nitrite SSWQO of 0.02 mg/L-N or 0.06 mg/L<sup>2</sup>. Both values are provided to the Board for clarity.

**3.3.4 Site Water Quality Predictions**

The GNWT maintains Recommendation 25.

**3.3.5 Effluent Mixing Zone**

In 2017, the GNWT and MVLWB recommended that the size and shape of an Initial Dilution Zone (IDZ) should not occupy more than 25% of the width of a river and that *"Mixing zones must not be used as an alternative to reasonable and practical pollution prevention practices, including wastewater treatment."* (p.6 of the GNWT/MVLWB Guidelines for Effluent Mixing Zones). The GNWT reiterates from our Intervention that an objective of the MVLWB Water and Effluent Quality Management Policy (2011), is that *"the amount of waste to be deposited to the receiving environment is minimized"* while still providing sufficient latitude for proponents to effectively manage the discharge of effluent.

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<sup>2</sup> Nitrite-nitrogen is converted to nitrite by multiplying the ion value by 3.284.

The GNWT suggested during the Technical Sessions that a mixing zone occupying 25% of the wetted width of Prairie Creek under low flow conditions should be adopted for the current Water Licence. This recommended mixing zone width represents the current best practice for the Northwest Territories and minimizes the potential for deleterious effects to the receiving environment, specifically potential deleterious effects to migrating fish and any impacts to fish habitat.

GNWT posed questions to CZN during the Public Hearing regarding a exfiltration trench width that would meet those best practices. CZN highlighted that while they would *“potentially need to treat more water to meet those EQC”* (Public Hearing Day 1, Page 91/256) associated with a narrower exfiltration trench (i.e., shorter than the 8 m summer, 6 m winter width proposed in the application), CZN did not suggest these lower EQC were operationally unfeasible. Those questions also resulted in undertakings issued to CZN which required the presentation of flow ratios and associated EQC with multiple exfiltration trench lengths including the GNWT’s recommended 2 m summer / 1.5 m winter size. The GNWT reiterates that this exfiltration trench scenario is the only option presented as part of these proceedings which approximately conforms to the MVLWB / GNWT mixing zone guidance.

The GNWT reiterates the following revised recommendations:

**Recommendation 26 (Revised):**

The GNWT recommends that the Water Licence should conform to current best practices for IDZs to the extent possible while ensuring that site water balance, as well as WQOs, can be consistently achieved in Prairie Creek. CZN’s modelling dated March 11, 2022 indicates that an exfiltration trench of 2 m in the summer and 1.5 m in the winter will meet both requirements while still being operationally feasible. This exfiltration trench size was also recommended by the GNWT in our review of the draft water licence.

**Recommendation 27 (revised):**

The GNWT recommends that the Board require a maximum and minimum size of the summer and winter exfiltration trench in the Water Licence and that monitoring be required to assess if the size of the exfiltration trench impedes fish foraging and the migration of fish, the size of the exfiltration trench should be restricted. CZN’s modelling dated March 11, 2022 indicates that an exfiltration trench of 2 m in the summer and 1.5 m in the winter will meet both requirements while still being operationally feasible. Again, this exfiltration trench size was also recommended by the GNWT in our review of the draft water licence.

### **Recommendation 28 (revised):**

As the size of the mixing zone will determine the EQCs and effluent concentrations therein, the GNWT recommends that the Water Licence adopt EQC associated with the 2 m summer / 1.5 m winter exfiltration trench. While determination of the ultimate EQC still requires CZN's input regarding how outliers from the Prairie Creek upstream water quality dataset were determined, the EQC presented in the "Treated Mine Water" rows within the [65 avg In-Stream-Seasonal] tab of the model "CZN Response to IR - Eff M\_84-85\_90p\_2m Mar11\_22" for should be viewed as maximum acceptable EQC for the project.

### **3.3.6 Point of Compliance**

The GNWT remains concerned that CZN *"does not appear, as of yet, to be able to confirm compliance with effluent in a final point of control...prior to discharge"* (Public Hearing Day 3, Page 64/217). GNWT questioned Environment and Climate Change Canada (ECCC) on this issue asking whether CZN had *"identified a final point of control to the satisfaction of Environment and Climate Change Canada?"* (Public Hearing Day 2, Page 166/238). ECCC responded stating that *"it wasn't clear...where their [CZN] final discharge point is because the final discharge point is the last point of control of the quality of the effluent where they can either hold the effluent until it meets compliance before discharge or treat it there."* (Public Hearing Day 2, Page 166-167/238).

The draft licence now identifies SNP 13, the inlet works within the catchment pond, as the point of compliance (i.e., the final discharge point). However, the licence does not identify whether the final discharge point would also be considered an effective final point of control. The approach to managing effluent discharges maintained by CZN throughout these proceedings is not sufficient to allow the final blended effluent to be held until compliance can be demonstrated. As summarized by CZN in their response to Technical Session IR #1 the strategy to manage effluent is as follows:

*"In the event that noncompliant water is present in the Catchment Pond, discharge from Cell B, and therefore also the Water Treatment Plant (WTP), would stop temporarily. Simultaneously, pump-back of Catchment Pond water to Cell B would be initiated. During the pump-back period, water from the Mill Ditch will continue to flow into the Catchment Pond, and shortly thereafter, Catchment Pond water should be acceptable for discharge, at which point pump-back would cease, and water release from Cell B would re-start.*

*In winter, Cell B/WTP water would flow directly to the inlet works of the infiltration trench to avoid icing issues in the Catchment Pond. Compliance confirmation checks would occur at WTP outflow. If a problem is detected, WTP discharge will be immediately*

*adjusted or cease. This water would be pumped, so ceasing discharge means simply switching off the pumps, or switching them to WTP internal recycle.”*

The GNWT highlights again for the Board that storage in the Catchment Pond “*is limited as the pond is shallow (~1 m deep)*” (EQC Report), indicating that the final effluent blend (i.e., both treated and untreated water from Cell B and the Mill Ditch) could not be tested to demonstrate compliance with EQC prior to discharge through the exfiltration trench. The GNWT therefore provides the Board with a revised recommendation 29 highlighting the need for a final point of control to meet ECCC’s guidance.

**Recommendation 29 (revised):**

The GNWT recommends that the final discharge point (i.e., point of compliance: SNP 13 in the draft licence) also serve as the final point of control whereby the final blended effluent (i.e., treated and untreated water from Cell B and the Mill Ditch) can be held while testing occurs to ensure that effluent quality is compliant with EQC prior to discharge.

**3.3.7 Water Treatment**

During Day 1 of the Technical Session (2021, p.150), CZN outlined that in the event that water from Cell A needs to be treated and discharged, a condition of the Water Licence could require CZN to notify the Board prior to treating and discharging effluent from Cell A. The GNWT notes, however, that according to the figure provided and description of wastewater management in Attachment 10-1 in response to IRs, CZN identifies that water from Cell A could be placed into Cell B with subsequent treatment but water from Cell A will not be transported directly to the water treatment plant.

However, in response to IRs, CZN included SNP 07 as a proposed monitoring station. The description for SNP 07 is "Cell A to Water Treatment Facilities".

In response to interventions, CZN clarified that Cell A water would not be transferred to Cell B but would be discharged directly.

As such, the GNWT believes Recommendation 30 to be resolved as it is not applicable to the water management options being proposed by CZN.

The GNWT maintains Recommendation 31 that a condition of the water licence require CZN to notify the Inspector and the Board prior to discharge of Cell A water. Of note, during discussions with the Board during the development of hearing undertakings, the GNWT understands that CZN may discharge Cell A water directly to the Catchment Pond if needed. The GNWT notes that Recommendation 31 should apply to any water being discharged from Cell A. In the draft licence Part F, Condition 30 it states: “A minimum of ten days prior to implementing the contingency option of any Discharge of

Effluent from Cell A of the Water Storage Pond as described in the approved Water and Wastewater Management Plan, the Licensee shall provide written notification to the Board and an Inspector". The GNWT supports the inclusion of this condition to address Recommendation 31.

### **3.3.8 Post-closure water management**

Recommendation 32 outlines the GNWT's recommendation for a more detailed post-closure water management methodology and discharge strategy to be developed for the Closure and Reclamation Plan (CRP) that considers noted uncertainties. Based on CZN's response to interventions, it is understood they agree updates to the CRP are needed, but do not wish these details to be embedded within the Water Licence. The GNWT agrees these items could be addressed in the Board's CRP review process. A revised Recommendation 32 is presented below.

#### **Recommendation 32 (Revised):**

The GNWT recommends that the Water Licence contain a condition to update the Closure and Reclamation Plan to include a more detailed post-closure water management methodology and discharge strategy that considers the following uncertainties. The GNWT recommends that these items be addressed through the Board's Closure and Reclamation Plan review process and not as a Water Licence condition.

- 1) How runoff and seepage from the legacy 930/970 level waste rock piles will be considered in post-closure water quality predictions, and how these will be monitored and treated if necessary.
- 2) Location of the final point of controlled discharge for treated groundwater seepage from the underground Mine or treated surface runoff and seepage from the new WRP or legacy waste rock piles at closure.
- 3) Location where untreated groundwater seepage from the underground Mine enters Prairie Creek.
- 4) Location where WQOs are proposed to be achieved in Prairie Creek. For example, location where seeps daylight into Prairie Creek, within or after a mixing zone, or further downstream.
- 5) How seepage from the underground Mine or surface runoff and seepage from the new or legacy waste rock piles will meet acceptable quality at the point of entry into Harrison Creek or Prairie Creek.

- 6) How groundwater seepage from the underground Mine that bypasses the collection wells, groundwater seepage from the new waste rock pile that bypasses the collection sump, or groundwater and surface runoff from the legacy waste rock piles that flows freely to Harrison Creek, will be managed if it exceeds water quality limits and or results in WQO exceedances in Prairie Creek downstream.

Recommendation 33 outlined GNWT's recommendation for updates to the predictive post-closure water quality model based on post-closure monitoring data, to be addressed as part of updates to the CRP. CZN provided no response to this recommendation, therefore the GNWT considers recommendation 33 to still stand.

Recommendation 34 outlined GNWT's recommendation for specific post-closure water quality criteria be developed for underground mine seepage and waste rock pile seepage/runoff early in the mine life, to be addressed as part of updates to the CRP. CZN provided no response to this recommendation, therefore the GNWT considers recommendation 34 to still stand.

Recommendation 35 outlined GNWT's recommendation for the CRP to describe the contingency for continued onsite water treatment to achieve WQOs in Prairie Creek. CZN provided no response to this recommendation, therefore the GNWT considers recommendation 35 to still stand. The GNWT supports the inclusion of Schedule 8, Item 2 in the draft licence which states: "Describe the contingency to continue on-site water treatment for as long as necessary to achieve water quality objectives in Prairie Creek."

## **3.4 Monitoring**

### **3.4.1 Acute Toxicity Testing**

As noted previously, alignment with requirements in the MDMER is essential. As per 14(1) of those regulations:

*Subject to section 15, the owner or operator of a mine shall collect, once a month, a grab sample of effluent from each final discharge point and determine whether the effluent is acutely lethal by conducting acute lethality tests on aliquots of each effluent sample in accordance with sections 14.1 to 14.4.*

As well, MVLWB Standard Water Licence Conditions Template (v, 2.) (2022<sup>3</sup>) Part F, Condition 20 requires actions to be taken should effluent be determined to be acutely toxic.

As such, the GNWT maintains Recommendation 36 that discharge is not acutely toxic.

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<sup>3</sup> Of note, the Standard Water Licence Conditions template was updated in 2022 however the condition remains the same as referenced previously. The citation was changed to reflect Version 2 for accuracy but does not change our initial recommendation or previous evidence.

To address this recommendation, the GNWT supports the inclusion of monthly acute toxicity testing at SNP 13 as proposed in the draft water licence.

As well, the GNWT maintains our recommendation that the water licence include a prohibition for diluting effluent with freshwater or any other effluent to meet effluent quality criteria immediately prior to discharge via the exfiltration trench. The GNWT provided additional clarification to the Board in response to public hearing undertaking 10 as well as follow-up discussions with Board staff following that submission. The GNWT notes that this is captured in Part F, Condition 32 of the draft water licence which states: “The Licensee shall not dilute Effluent with freshwater or any other Effluent to meet Effluent Quality Criteria specified in Part F, Condition EFFLUENT QUALITY CRITERIA – EXFILTRATION TRENCH prior to discharging Effluent from the Inlet Works to the Exfiltration Trench at SNP station 13”.

### **3.4.2 SNP Monitoring**

The GNWT recommended that an updated SNP map be included in the Water Licence and Water Management Plan. Recommendations 37 and 38 are maintained. The GNWT understands that a map of SNP locations was included as a requirement of the Water and Wastewater Management Plan in the draft water licence, however the GNWT still believes a map in the licence would be helpful for all parties to understand the SNP without having to locate a map in other documents.

As well, the GNWT maintains Recommendation 39 that an additional SNP groundwater station be added and be installed in the alluvium downgradient of the fuel tank farm to provide early warning of leaks for the construction and operations phases. The GNWT supports the inclusion of SNP 3-12b in the draft water licence to address this recommendation.

### **3.4.3 Aquatic Effects Monitoring Program**

Within the Intervention, the GNWT recommended that the Aquatic Effects Monitoring Program (AEMP) working group be initiated at the end of January (Recommendation 43) and that the Water Licence be submitted within six months of licence issuance.

Regarding Recommendation 43, the GNWT notes that the end of January has already been surpassed and maintains that this working group be established as soon as possible. The GNWT further notes that the draft water licence requires the establishment of the working group within 90 days of licence issuance, however the GNWT notes this does not preclude CZN from establishing the working group in advance of this deadline.

Regarding Recommendation 44, CZN replied that their preference would be to submit their AEMP Design one year prior to mine dewatering. As noted at the public hearing, the GNWT is agreeable to this approach and updates our recommendation as follows.

**Recommendation 44:**

The GNWT recommends the Water Licence require the AEMP Design be submitted for approval at least one year prior to mine dewatering.

## **4.0 Waste Rock and Tailings Management**

### **4.1 Waste Rock Management**

The GNWT has reviewed the information presented to date on the waste rock and tailings management and has tried to clarify the following recommendations on the management of waste rock and tailings.

#### **4.1.1 Soil cover for the waste rock pile**

In the GNWT's Intervention Recommendation 45, the GNWT has expressed concern about the type of material in WSP dam, which is the main source of the cover material. CZN has stated in subsequent discussions with GNWT that the material is clay, which has low strength and resulted in a slope failure several decades ago. The GNWT noted in our Intervention that this is probably not the type of material that makes up the significant mass of the WSP dams. In addition, this material may be very inappropriate for use in the cover on the waste rock pile because i) its low shear strength may not be stable on 2H:1V slope, and ii) its low resistance to erosion. The GNWT notes that CZN did not respond to this recommendation in their Responses to Interventions and it was not fully clarified at the Public Hearing. The GNWT continues to have concerns about the types of available soil and material for closure covers and their suitability for use in the closure of the waste rock pile. The GNWT has revised its recommendation to be more explicit regarding when it expects this information should be submitted to the Board.

**Recommendation 45 (revised):**

The GNWT recommends that the Water Licence include a condition to verify, within one year of the start of operations, the types of available soil and material for closure covers and their suitability for use in the closure of the waste rock pile.

## 4.2 Tailings Management

### 4.2.1 Surface Tailings

The GNWT has expressed concern in our Intervention and at the Public Hearing regarding surface tailings management. In the Intervention, the GNWT stated that it accepts CZN's analysis that it may be possible to place all of the tailings underground at closure. In GNWT IRs 92-94, the GNWT noted several factors which may make it difficult to achieve this objective. The GNWT suggested that a sensitivity study be conducted to better characterize the risk of more tailings volume than can be contained in the mine workings. However, CZN did not prepare a sensitivity study. CZN did suggest that it may be necessary to conduct additional underground mining (Tailings Management & Backfill Plan, AMC 2021) in the inert carbonate rocks outside of the ore zone. The GNWT concurs that this is a reasonable contingency.

However, CZN has indicated that this mining will be conducted early in the mine life (years 2 – 4 of mining). In our intervention (Recommendation 46), the GNWT recommended a Licence condition that requires comprehensive monitoring of tailings properties and volumes each year for the first two years of mining. The information would be used to update the mass/volume balance for underground disposal of tailings over the mine life. Mining of the necessary additional void space can then be determined and monitored by CZN to reduce the risk of tailings left on the surface at mine closure. The GNWT notes that CZN did not respond to this recommendation in their Responses to Interventions.

The GNWT supports the inclusion of proposed Schedule 5, Item 8, (b) (iii) from the draft water licence which requires “Details of comprehensive monitoring of tailings properties and volumes each year for the first two years of mining” to address recommendation 46. However, the GNWT has progressed its understanding that this information would be required throughout the operations of the mine, and therefore has updated its recommendations as follows.

#### **Recommendation 46 (revised):**

The GNWT recommends a Licence condition that requires comprehensive monitoring and annual reporting of tailings properties (grain size distribution, moisture content) and volumes (by location; WSP, surface stockpile, live stockpile and U/G placement) continuously through the mine life.

#### **4.2.2 Tailings storage contingencies**

Recommendation 47 of the GNWT's Intervention was for further information on the tailing storage contingencies. The GNWT proposed a list of items for the Tailings and Backfill Management Plan that CZN should address when the plan is revised. CZN did provide some details in their brief response to interventions. However, the GNWT still recommends that this information on the contingency be presented in the Tailings and Backfill Management Plan.

As such, the GNWT maintains its recommendation from the Technical Intervention on this topic. The GNWT does acknowledge that the draft Water Licence, Part F, Condition 9, states that the updated plan should be submitted one year prior to commencing of milling. The GNWT supports this timeframe and has revised its Intervention Recommendation 48 below.

##### **Recommendation 47:**

The GNWT recommends that the Tailings and Backfill Management Plan be updated to include the contingency for tailings storage in the WSP, including a description of:

- 1) Contingency to place a maximum amount of 50,000 tonnes of tailings into the WSP
- 2) The WSP cell that is acceptable to contain tailings
- 3) The impact on the total and live water storage capacity of the cell and residence time
- 4) How any excess water resulting from the reduced storage capacity will be managed
- 5) Potential implications that the storage of tailings within the WSP will have on water treatment requirements

##### **Recommendation 48 (revised):**

The GNWT recommends that the updated Tailings and Backfill Management Plan be submitted for review and Board approval one year prior to commencement of milling operations.

## **5.0 Contaminated Soil Management**

The GNWT maintains recommendation 49 that the scope of the Water Licence include the construction, operation, and closure of a bioremediation cell.

The GNWT supports the inclusion of Part E, Condition 14 of the draft Water Licence to address recommendation 50 and the inclusion of SNP 27 to address recommendation 51.

## **6.0 Securities**

As part of the GNWT's review, an assessment of the current liability associated with the Water Licence and Land Use Permit was completed to develop an update to the estimate of mine closure cost. The GNWT retained Brodie Consulting Ltd. (BCL) to develop an updated cost estimate to assist in the review. As part of the application review, BCL and the GNWT engaged in numerous discussions with CZN, including during and following the Public Hearing, to resolve concerns and inform each other of positions. Herein, the GNWT has clarified or reiterated our positions that have formed the GNWT's estimate for reclamation securities.

### **6.1 Unit cost for backfilling surplus tailings from the surface into underground workings**

Regarding the RECLAIM estimates, the line item in the cost estimate with the potential for the biggest difference between the GNWT and CZN is the backfilling unit cost. As discussed in the GNWT's Intervention, CZN's consultant has presented a cost which suggests that they can do this work for about one-tenth of the cost of similar work at the Giant mine by doing the work using mechanical methods.

CZN continues to rely upon post-closure seepage volume and quality predictions which are based upon modeling using pre-mining hydrogeologic conditions with no accounting for changes that will occur due to mining-induced stress relief and the effects of residual (un-minable broken rock) in the stopes. The GNWT remains of the opinion that there is a material risk of post-closure seepage being greater than CZN's predictions, especially if there are aspects of mine backfilling and/or bulkhead construction which are less than best achievable.

CZN continues to argue for backfilling of development drifts at closure using mechanical methods, which are less costly than paste backfill. The GNWT notes that the backfill plan calls for cemented backfill everywhere, not most places. But more importantly, long and permeable conduits (drifts loosely filled with mechanically placed tailings) will allow groundwater flow through the mine. The current closure plan has three bulkheads,

which may (or may only partially) limit seepage flow out of the mine. As such, the GNWT believes that such an approach is not acceptable. Tight backfill with cemented tailings backfill should be required as the basis for reclamation security. The GNWT and its consultant have looked at the cost of producing and placing cemented tailings at Giant Mine in the past few years. As stated in the GNWT's Intervention, the most recent work at Giant was done at the cost of just over \$200/m<sup>3</sup>. Although the work at Giant was comparable to the expected work at Prairie Creek, the GNWT have suggested a much lower cost in its Intervention for Prairie Creek (\$50/m<sup>3</sup>) because of the lower potential risk to the environment at Prairie Creek than Giant related to their main contaminant of concerns (zinc at Prairie Creek as opposed to arsenic at Giant Mine). This resulted in a higher cost at Giant due to a higher standard of QA/QC for this reason. However, this cost item for the backfilling should be reassessed as part of a security review in year 2 or 3 of operations to better assess actual costs and performance. At this time, it is not feasible to develop a more accurate estimate for the Prairie Creek situation because parties have only a conceptual sense of where the backfill is to be placed. The GNWT have used \$50/m<sup>3</sup> because it is a rate which, in our judgment, is sufficient to address the uncertainties and difficulties of placing the tailings in the remaining void space in the mine in a manner which ensures no tailings remaining on surface and tight filling to achieve the objectives for limiting groundwater flow through the mine.

Due to the purpose of the RECLAIM estimate (costs covered by the government to complete reclamation), the GNWT is of the firm opinion that should the backfilling be conducted under government contract, it will not be done at a 90% discount to the previous government's experience, as suggested by CZN.

The GNWT and its consultant are of the strong opinion that the old unit cost in RECLAIM is significantly low. In the absence of a detailed and site-specific cost estimate, the GNWT maintains its original recommendation that an appropriate order of magnitude unit cost for Prairie Creek is \$50/m<sup>3</sup>.

**Recommendation 52:**

The GNWT recommends that the Unit cost for backfilling surplus tailings from the surface into underground workings be set at \$50/m<sup>3</sup>.

The GNWT also note that CZN has suggested a lower volume of tailings will be in the surface stockpile at closure. The GNWT's consultant has used the total amount of tailings in the stockpile for our RECLAIM estimation of closure liability because 1) it is permitted up to that volume, and 2) once in the pile, it is a liability until it is removed. If CZN removes some of the stockpile before end of mine life, then they can apply for a reduction in security at that time.

## **6.2 Bulkhead Construction cost**

Concerning bulkhead construction, there is a significant difference of opinion between the GNWT and CZN regarding the cost of construction. The GNWT have previously noted the concern that exists regarding post-closure seepage water quality. In order to mitigate this risk, high quality bulkheads with well-grouted surrounding rock will be required by CZN. It is assumed that each bulkhead requires three rings of grouted drill holes. This could require about 50 drill holes of about 25 m each for a total drilling of 1250 m per bulkhead. The GNWT notes that recent underground drilling at Giant mine was contracted at a substantially higher cost than the cost as which CZN has proposed, not including the grouting effort or cost of bulkhead construction for each bulkhead. This recent data on costs suggests that the current GNWT estimate of liability for bulkheads at Prairie Creek is less than real liability at the time of mine closure. The GNWT recognizes that this information is being provided late in the process; however, the closing arguments are the opportunity to respond to CZN's latest security estimate provided via an Information Request after the hearing. The GNWT would still like to highlight this information to stress that even the GNWT's current estimate provided may be lower than actually realized. However, the GNWT will maintain the costs presented in our intervention for the current review. This can be re-assessed through future security updates as appropriate.

## **6.3 2021 RECLAIM estimate**

The GNWT has reviewed information relating to the mine plan and the closure plan throughout the proceeding. Following the Public Hearing, the GNWT reassessed its RECLAIM estimate submitted in its Intervention. Based on our other recommendations herein and presented through the proceeding, the GNWT maintains its estimate submitted as part of the GNWT's Intervention.

The GNWT has focused on two main areas of concern regarding our proposed estimate based on the current mine plan. The first concerns the cover for the waste rock pile. The GNWT has based our estimate on the design as presented in the Application. The GNWT has identified several significant concerns with that design and has prepared our estimate so as to mitigate those concerns such that a viable closure cover is ultimately established. CZN has suggested that those concerns will be addressed in a detailed design. However, at this time, the GNWT cannot responsibly put forward a security cost estimate which assumes that that future design will have a beneficial outcome resulting in a lower cost.

Secondly, concerning the placement of tailings in the mine after the end of operations. The GNWT have used a unit cost of \$50/m<sup>3</sup> for this work, more than double the company's unit cost. In addition to the concerns which the GNWT raised in our

questioning of the company, the GNWT note that the unit proposed used is roughly 1/4 of costs experienced in placing tailings backfill in the Giant Mine (\$200/m<sup>3</sup>).

With respect to these two items, as well as all of the other line items in the GNWT's estimate, it is our opinion, based on having applied RECLAIM to numerous mine projects, that our estimate is sufficient for the potential closure of mine by the government should that become necessary. Our estimate, as presented, is the amount the GNWT believes is sufficient and appropriate for the Prairie Creek development. As such, the GNWT directs the Board to its RECLAIM estimate submitted with our Technical Intervention for the details on the recommended security for the site.

Regarding the assessment of the current financial responsibility of CZN for the site in accordance with their existing land lease (for mine site maintenance) and associated 1987 release letter issued by Canada, the GNWT will review this matter in the context of the leasing process.

In its 2015 Reasons for Decision (p. 12), the MVLWB stated that it would "review and re-consider the security provisions in the Permit and Licence ... if necessary" when CZN "transitions to a mining lease," i.e., a surface lease allowing mineral production. The GNWT has informed CZN on several occasions, in writing, of lease application requirements and timeframes. As of the date of this closing argument, the GNWT has not received any applications from CZN for leases to support mineral production or an indication of when applications may be made. The GNWT will keep the MVLWB informed of developments in this regard, as appropriate.

The GNWT maintains Recommendation 53 for the estimated liabilities on site that should be reflected in the security decision by the Board.

## **6.4 Phasing of security**

The GNWT has reviewed the proposed phasing approach by CZN, outlined in their response to IR#5. As described herein on the waste rock pile and backfilling uncertainties, the GNWT still has concerns about the effectiveness of the mine plan in meeting its objectives.

Regarding the stockpile, the GNWT understands that there will be limited capacity to put backfill underground during the first year or two of mining. This will likely result in the stockpile reaching full capacity in year one. As such, the GNWT recommended in its RECLAIM estimate that security for the full capacity of the stockpile at the end of Year 1.

Regarding the waste rock pile phasing of security, the GNWT notes that the rock pile will develop roughly linear growth starting probably in Year -1 (ramp up and develop to

allow full production). After that, there will be steady production of waste rock as access is needed to reach new ore zones. This will continue on a roughly even basis throughout the mine life. Eventually, CZN will approach the end of mine life and will have no new ore to access. The production of waste rock will drop significantly, but the waste rock pile will be at nearly 100% capacity and will require virtually 100% of the reclamation effort. As such, the GNWT notes that the waste rock pile is likely to reach essentially 100% liability by about 80% of the mine life, even if there is still some small amount of rock to be added.

The GNWT will defer to the Board on how to best implement the phasing of the waste rock pile for the authorizations but notes that the project will require annual reporting on development to-date plus planned additions to the waste rock pile commensurate annual adjustments to the security provision. The phases will have to be tied to clear and reportable milestones that the Inspector can track and implement. As well, the GNWT stresses that security milestones should be related to future work to ensure liabilities are adequately covered at any given point in time.

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