

**MACKENZIE VALLEY ENVIRONMENTAL IMPACT REVIEW BOARD**

**In the Matter of:** **An Environmental Assessment of Canadian Zinc Ltd. Prairie Creek Decline Drilling and Pilot Plant Development Proposal**

**And In the Matter of:** **A reconsideration of that Environmental Assessment pursuant to section 130(1)(b)(i) of the *Mackenzie Valley Resource Management Act***

**REASONS FOR DECISION**

**Background:**

Canadian Zinc Ltd. (CZN) has proposed to excavate a 600m underground decline and underground exploration drilling, and to operate a metallurgical pilot plant at the existing Prairie Creek mine site. This development was referred to the Mackenzie Valley Environmental Impact Review Board (Review Board or the MVEIRB) on April 11<sup>th</sup>, 2001. The Review Board conducted an Environmental Assessment (EA), and submitted its Report of Environmental Assessment to the federal Minister on February 6<sup>th</sup>, 2002.

The EA Report was returned to the Review Board by the federal Minister for further consideration pursuant to subparagraph 130(1)(b)(i) of the *Mackenzie Valley Resource Management Act* (MVRMA) on September 3<sup>rd</sup>, 2002. In the accompanying letter, the Minister stated the specific concerns which require further consideration as follows:

*"Canadian Zinc Corporation (CZN) has not provided a detailed description of its alternative to treat (if necessary) and discharge all effluent (from plant and decline) to the receiving environment if the integrity of the tailings facility is not proven, and the use of the tailings*

*pond is subsequently removed from the development plan. If the Board's intent is that the geotechnical assessment of the tailings pond is to be provided at the regulatory stage, then CZN must be required to provide detail on any proposed treatment options at the assessment stage. The reviewers and the Board must have an opportunity to assess the adequacy of any proposed treatment options and associated impacts should the geotechnical assessment conclude that the use of the tailings pond is not appropriate."*

On December 24<sup>th</sup>, 2002, after re-considering the Report of EA, the MVEIRB issued an information request to CZN which contained 11 questions pertaining to water treatment and water quality. Canadian Zinc responded on January 31<sup>st</sup>, 2003, with new information, including a proposal to add a polishing pond to the proposed water treatment system. The new information from CZN was circulated to the parties to the EA, and comments were received from Deh Cho First Nations, Liidlii Kue First Nation, Indian and Northern Affairs Canada, Parks Canada, the Department of Fisheries and Oceans, and the Canadian Parks and Wilderness Society.

Based on consideration of the original Report of Environmental Assessment, the Public Record, the new information received from CZN, and related comments received, the Review Board has decided to include three additional recommendations to the Report of EA. The Board's reasons are outlined below.

### **Analysis:**

Following an analysis of the CZN response to Review Board Information Requests and of comments received from the parties to the EA, the Review Board is of the view that CZN has satisfactorily addressed all outstanding issues relevant to the effects of the development, with the exception of the matters discussed below.

#### **1. The Tailings Pond**

The Review Board notes that the tailings pond is still included as a part of the development. It is proposed as a backup treatment facility in the event that the polishing pond does not treat water adequately. Although the polishing pond is expected to improve the quality of discharge water, potentially reducing or eliminating the risk of having to rely on the tailings pond, it is possible that the tailings pond could still have a role in the water treatment process.

The Review Board asked CZN to "...provide alternatives to its current plan to treat and discharge water to the surrounding environment". CZN's January 31<sup>st</sup>, 2003 response states that:



“...the tailings pond remains a viable alternative to the current treat and discharge plan”.

The Review Board recognizes that the addition of the polishing pond for water treatment purposes significantly reduces the likelihood of reliance on the tailings pond. However, the tailings pond has still been included as a part of the water treatment alternatives.

The Deh Cho First Nations (DCFN), Department of Indian Affairs and Northern Development (DIAND), Parks Canada Agency and the Department of Fisheries and Oceans (DFO) all expressed concerns that the engineering integrity of the tailings pond has not been certified and that potentially serious risks of failure could be attendant on any use of this facility.

The Review Board recognizes that there are still major outstanding questions about the integrity and stability of the tailings pond. These questions are:

- 1) Is the tailings pond liner intact and impermeable?
- 2) Is the underlying and surrounding soil stable, in light of existing ice-rich permafrost melting and subsidence in the tailings facility (particularly with respect to the sliding back slope and dam)?

There is no evidence on the record of this proceeding which would allow answers to these questions. If the tailings pond failed, it would spill into Prairie Creek upstream of Nahanni National Park. In the Board's opinion, this would be likely to cause a significant and unacceptable adverse impact on the environment.

## **2. The Polishing Pond**

In its January 31<sup>st</sup>, 2003 response to the Review Board, CZN introduced a polishing pond as an additional water treatment step. The Board has treated this proposal as a useful mitigation measure proposed to address the potential impacts of the CZN development. The Review Board does not consider the polishing pond to be a fundamental expansion of the development. The pond is on the site of the development and is integrated into the site design in a way that does not expand the footprint of the operations at the site. Considering these facts and the progress in the EA to date, the Review Board has decided not to treat the polishing pond as an expansion of the scope of the EA. The environmental effects of polishing pond will nonetheless be considered as part of the EA as will its potential for mitigating the overall effects of the proposed development.

The polishing pond addresses many of the concerns raised by the parties to the EA pertaining to water treatment. On the Review Board's analysis, it will play a useful role in mitigating the adverse impacts of the proposed development.



However, because of the proximity of the polishing pond to Harrison Creek and Prairie Creek, its stability is an important issue. A failure at this site would in the Review Board's view likely result in a significant adverse impact on the environment. The stability of the polishing pond is therefore essential, not only to ensure its operation and the mitigation it can provide for water quality impacts, but also because the results of slumping or erosion of the polishing pond could by themselves result in a significant adverse impact on the environment.

### 3. Constructed Wetland Water Treatment

CZN also suggested the construction of a wetland as an option for biological treatment of wastewater. The Review Board notes the concerns expressed by DCFN, DFO and Parks Canada pertaining to the viability and potential effectiveness of this option. In Review Board's view, this is an untested technology for mitigation considering the location of the proposed development.

The Board notes that the development site is in an ecologically sensitive area upstream of a National Park and World Heritage Site, and that reliance on a constructed wetland for water treatment would, if performance of the system were not optimal, result in risks to the environment that have not been adequately studied. The Review Board concludes that a constructed wetland for water treatment at the site of the proposed development carries with it unacceptable environmental risk. This proposed treatment option is unproven and the Review Board is not willing to rely on this mitigation measure as a basis for its decision.

#### **Decision:**

In light of all of the evidence filed and based on the analysis and reasons outlined above the Review Board recommends approval of the proposed development pursuant to 128(b)(ii) of the *Mackenzie Valley Resource Management Act* (MVRMA) subject to the imposition of the following mitigation measures and the condition outlined below:

- 1) CZN is required to file with the Mackenzie Valley Land and Water Board (MVLWB) and the federal Minister, a favourable geotechnical assessment and engineering certification of the suitability of the tailings pond before it can be used. This assessment must certify that the tailings pond liner is intact and impermeable, and that the soil underlying and surrounding the tailings pond is stable.

[This recommended measure supersedes recommended measure #2 from the Report of Environmental Assessment of February 6<sup>th</sup>, 2002.]



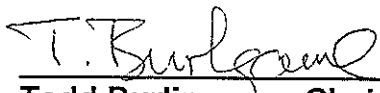
2) CZN is required to file with the MVLWB and the federal Minister, a favourable geotechnical assessment and engineering certification of the suitability of the site of the proposed polishing pond and related water treatment facilities before they can be used.

3) If these geotechnical assessments fail to establish either the integrity and stability of the tailings pond or the suitability of the proposed site of the polishing pond and related water treatment, the Review Board recommends that the CZN development proposal, as it is now constituted, be rejected without an Environmental Impact Review, under paragraph 128(1)(d) of the MVRMA. In the Review Board's opinion, the likelihood of significant adverse impacts on the environment in the area of the proposed development cannot be justified unless the integrity of these structures can be established and their mitigative potential realized.

The Review Board's decision is conditional on the above measures which complement and are in addition to recommended measures three to fifteen in the Report of Environmental Assessment of February 6<sup>th</sup> 2002, (see Attachment One below).

The Review Board also based its decision on the understanding that CZN would implement all of the commitments to mitigation measures made in submissions to the Review Board (as per Report of Environmental Assessment of February 6<sup>th</sup> 2002, see Attachment Two below) and the January 31<sup>st</sup> Information Request response (attached below). Note also the suggestions of the Review Board, as per the Report of Environmental Assessment of February 6<sup>th</sup> 2002 (see Attachment Three below).

**For the Mackenzie Valley Environmental Impact Review Board:**

  
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Todd Burlingame, Chairman

DATED: the 04 of April, 2003.



Facsimile  
Mackenzie Valley Environmental Impact Review Board

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From: Alan Ehrlich  
 Pages: 7, including this cover  
 Date: Tuesday, April 15, 2003  
 File: EA01-003 Decline and Metallurgical Pilot Plant

Subject: Attachments to Reasons for Decision

The attached material should be attached to the Reasons for Decision document that was released by the Review Board on April 15<sup>th</sup>, 2003. The first attachment describes commitments made by Canadian Zinc Ltd. (CZN) in its Jan. 31<sup>st</sup> submission. Attachment 2 lists commitments made by CZN during the EA previous to the Board's Report of EA. (Minor changes have been made to point one in accordance with the commitments cited in the previous attachment). Attachment 3 lists suggestions made by the Review Board in the Report of Environmental Assessment.

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## Attachment

### New Commitments by Canadian Zinc Ltd.

In its Jan. 31<sup>st</sup> response to the Review Board's Information Request, Canadian Zinc Ltd. has committed to do the following :

• CZN to construct a series of sumps to be in the Decline, with one primary settling sump near the portal.
• CZN to construct a polishing pond with 20 hour retention time. The polishing pond to serve as treatment pond for the 870 portal discharge.
• CZN to line the polishing pond with impermeable clay or synthetic liner and to make provision to allow for cleanout and capture of floating hydrocarbons.
• CZN to raise pH in polishing pond by adding lime or soda ash. CZN to make provisions for use of settling aids.
• CZN to develop a site water management system that includes all mine water.
• CZN to employ oil absorbent pads and/or booms at the settling pond and all sumps.
• CZN to discharge all water via the final site catchment pond.
• CZN to keep ammonia levels in discharge at acceptable level. CZN to switch to gelignite based explosives if ammonia levels are problematic.

The Review Board further notes that CZN has stated (in the Jan. 31<sup>st</sup> response to the MVEIRB information request): "It is CZN (sic) understanding that the general consensus was that such use, if approved, would be subject to geotechnical certification prior to use and CZN is in agreement with this approach".

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**Attachment 2  
Commitments made by CZN during the Course of the Environmental  
Assessment**

1. CZN has committed to having the geotechnical assessment carried out and providing an engineering certification as to the suitability of the tailings facility before commencement of any discharges to the impoundment.
2. CZN has committed to include a re-evaluation of the PMF potential of Prairie Creek in the above-noted geotechnical assessment of the tailing impoundment
3. CZN supports the establishment of a No Hunting Zone around the mine property as a means of ensuring worker safety
4. CZN does not allow personal firearms on the property for recreational or hunting purposes; as a result, increases in the numbers of site personnel have no impact on increased hunting pressure.

<b>No.</b>	<b>Commitment Made</b>	<b>Impact to be Mitigated</b>	<b>Section per Terms of Reference</b>
1	Geotechnical assessment of tailings facility to be completed & report submitted for approval prior to discharge of process water to pond	Ensure stability of tailings impoundment and suitability for proposed use; mitigate potential for structural failures/seepage losses	Water quality & quantity
2	Tailings solids to be retained in existing thickeners in mill	Mitigate potential environmental effects associated with subaerial/subaqueous tailings solids storage	Water quality & quantity
3	Process water to be tested prior to discharge either to tailings pond (if approved for use) or to receiving environment	Mitigate loadings to receiving environment and potential impacts to water quality & aquatic resources	Water quality & quantity
4	Process water to be treated, if necessary, to meet criteria for discharge to receiving environment as set under Water Licence	Mitigate loadings to receiving environment and potential impacts to water quality & aquatic resources	Water quality & quantity
5	Pilot plant to be operated within confines of existing mill building & foundation	Minimize potential disturbance to external ambient environmental; provide for spill containment	Terrain; vegetation; water; aquatics wildlife; land use; noise; aesthetics



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<b>No.</b>	<b>Commitment Made</b>	<b>Impact to be Mitigated</b>	<b>Section per Terms of Reference</b>
	building & foundation	environmental; provide for spill containment	noise; aesthetics
6	Water, up to 75 m <sup>3</sup> per day, 4,000 m <sup>3</sup> total, to be obtained from existing wells	Mitigate potential impacts associated with water intake from Prairie Creek	Water quality & quantity
7	CZN personnel to inspect tailings dams daily throughout duration of development	Ensure stability of tailings impoundment; mitigate potential for structural failures/seepage losses	Water quality & quantity
8	CZN to report observed instabilities to geotechnical engineers	Ensure stability of tailings impoundment; mitigate potential for structural failures/seepage losses	Water quality & quantity
9	CZN/geotechnical engineers to develop response plan to observed instabilities	Ensure stability of tailings impoundment; mitigate potential for structural failures/seepage losses	Water quality & quantity
10	CZN to monitor tailings pond water level, 870 portal & catchment pond flow rates weekly throughout duration of development	Mitigate potential impacts and cumulative effects to water quality & aquatic resources	Water quality & quantity
11	CZN to monitor water quality of discharges from minesite to receiving environment monthly throughout duration of development	Mitigate potential impacts and cumulative effects to water quality & aquatic resources	Water quality & quantity
12	Routine preventive maintenance to be employed to ensure efficient operation of generators and support equipment	Mitigate potential impacts to air associated with inefficient operation of combustion engines	Air quality & climate
13	CZN to work closely with First Nations to fulfill provisions of Development Cooperation Agreement	Ensure opportunities to First Nations for involvement in & contributions to development	Socioeconomic
14	Operational planning meetings to be conducted on a daily basis throughout duration of development	Ensure operations conducted in compliance with terms and conditions of licences & mitigation measures properly employed	All
15	Operations reports to be	Ensure operations conducted in	All

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<b>No.</b>	<b>Commitment Made</b>	<b>Impact to be Mitigated</b>	<b>Section per Terms of Reference</b>
	completed daily throughout duration of development	compliance with terms and conditions of licences & mitigation measures properly employed	
16	Operational monitoring to be ongoing throughout duration of development	Ensure operations conducted in compliance with terms and conditions of licences & mitigation measures properly employed	All
17	Process/tailings pond water quality to be tested monthly throughout duration of development	Mitigate loadings to receiving environment and potential impacts to water quality & aquatic resources	Water quality & quantity
18	All personnel to undergo safety orientation training prior to commencing work at the minesite	Ensure safe and efficient work environment including nuisance animal prevention and animal attack avoidance	Wildlife
19	Minewater discharge rate from decline to be monitored daily throughout duration of development	Mitigate loadings to receiving environment and potential impacts to water quality & aquatic resources	Water quality; Aquatic resources
20	Minewater from the decline to be discharged to a sump for settling prior to discharge to the receiving environment, or discharged directly to tailings impoundment (if approved for use)	Mitigate loadings to receiving environment and potential impacts to water quality & aquatic resources	Water quality; Aquatic resources
21	Minewater sump to be lined or sealed as necessary to prevent uncontrolled seepage	Mitigate loadings to receiving environment and potential impacts to water quality & aquatic resources	Water quality; Aquatic resources
22	Minewater from decline to be treated if necessary to meet receiving environment discharge criteria as set under Water Licence	Mitigate loadings to receiving environment and potential impacts to water quality & aquatic resources	Water quality; Aquatic resources
23	Minewater quality from decline to be tested monthly to ensure compliance with discharge limits throughout duration of development	Mitigate loadings to receiving environment and potential impacts to water quality & aquatic resources	Water quality; Aquatic resources

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<b>No.</b>	<b>Commitment Made</b>	<b>Impact to be Mitigated</b>	<b>Section per Terms of Reference</b>
24	Decline to be developed within carbonate host rock	Mitigate potential impacts associated with oxidation of sulphide minerals	Water quality; Aquatic resources
25	Waste rock to be sample weekly and analyzed monthly for ABA & metals scan throughout duration of development	Mitigate potential impacts associated with oxidation of sulphide minerals	Water quality; Aquatic resources
26	Waste rock to be stored adjacent to the portal or in the plant site area	Minimize disturbance of new areas; contain runoff from waste rock within plant site area	Terrain; vegetation; wildlife habitat
27	Decline to be allowed to flood upon completion of exploration program	Mitigate potential impacts associated with oxidation of any exposed sulphide minerals	Water quality; Aquatic resources
28	Portal entrance to decline to be secured as required	Mitigate potential for inadvertent access to underground workings	Reclamation; wildlife
29	Existing road network to be used to access portal area	Minimize disturbance of new areas	Terrain; wildlife habitat
30	CZN to work closely with First Nations to fulfill provisions of Development Cooperation Agreement	Ensure opportunities to First Nations for involvement in & contributions to development	Socioeconomic
31	Routine preventive maintenance to be employed to ensure efficient operation of generators and support equipment	Mitigate potential impacts to air associated with inefficient operation of combustion engines	Air quality; Noise

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**Attachment 3  
Suggestions Made by the Review Board**

<b>Review Board Suggestions</b>	<b>Page Number Reference</b>
1. The MVLWB consider the imposition of a security deposit of sufficient magnitude to finance the reclamation of the present minesite	42
2. That CZN prepare and submit to RWED and NNPR a suitable wildlife movements and interactions monitoring program effective for the duration of the developments.	42
3. That CZN maintain a wildlife-sighting log.	42
4. That CZN incinerate garbage daily.	42
5. That CZN provide contractors education about proper waste management, especially drillers who are working away from the mine site as food wastes attract wildlife and could result in serious injury or death to mine employees.	42
6. That CZN store chemicals that can attract wildlife such as reagents, and even old batteries coolants (glycol) indoors in a secure facility as they could taint the local food supply and/or cause sever injury or death to wildlife.	42
7. That CZN install an electric bear fence around the main accommodation and kitchen complex to ensure worker and wildlife safety, and that the fenced in area including, if feasible, an area for waste incineration	43
8. That the Federal Minister and the Minister responsible for National Parks decide on the scope and nature of acceptable protection required to ensure the ecological integrity of Nahanni National Park, including the possibility of establishing a buffer zone where land use activities are restricted to those compatible with the park purpose and management plan. The Deh Cho First Nations should be consulted as part of this policy discussion.	47
9. That INAC and/or CZN remove the cache of chemical reagents from the mine site, or, relocate the cache of chemical reagents into a secure enclosed building to prevent their exposure to the elements and undertake a ground cleanup	52