Mackenzie Valley
Review Board

Note to file

EA 0809-002
Canadian Zinc Corporation, Prairie Creek Mine

January 22, 2009

Re: CPAWS submission of references for October 20, 2008 letter

The attached submission was received January 14, 2009 from the Canadian Parks and Wilderness Society (CPAWS). It identifies weblinks to documents referenced in CPAWS' October 20, 2008 scoping submission.

On January 14 and 15, 2009, CPAWS provided PDF copies of the weblinks. Those (with exceptions noted below) have also been placed on the Review Board's website and paper public registry for the Prairie Creek Mine environmental assessment, and are identified by footnote number (e.g., "CPAWS Oct. 20 Footnote 13 [title]").

The following documents referred to in CPAWS October 20, 2008 letter have not been uploaded (with reasons):

- Footnote 8 – "MVEIRB, Reasons for Decision and Report of Environmental Assessment for the DeBeers Gahcho Kue Diamond Mine" – This document is a product of the Review Board, is freely available on the Review Board's website at the noted weblink, and the weblink in under the Review Board's control (in other words, the Review Board is confident the citation will not be removed).

- Footnote 14 – "July 18, 2008 letter from CZN to Adrian Paradis, MVLWB" – This document is already on the Prairie Creek Mine public registry, dated August 25, 2008 – "Correspondence between CZN and MVLWB".

- Footnote 26 and 27 on UNESCO have been joined together as a PDF file and only the table of contents and excerpts relevant to the Nahanni National Park Reserve have been placed therein.

- Footnote 43 – "N.J. Mochnacz, Interim Report: Fisheries…"- This document is already on the Prairie Creek Mine public registry, dated December 19, 2008 – "RfR 38 (1of3)"

As always, if you have any questions, comments or requests for information, please contact me.

Regards,

Alistair MacDonald
Environmental Assessment Officer
Mackenzie Valley Review Board
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Mackenzie Valley
Review Board

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EA0809-002

CPAWS
CANADIAN PARKS AND WILDERNESS SOCIETY
NORTHWEST TERRITORIES CHAPTER
Box 1934, Yellowknife, NT X1A 2P5

January 14, 2009
By email

Alistair MacDonald
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Dear Mr. MacDonald:

Re: References for October 20, 2008 CPAWS Letter: *Scoping of Environmental Assessment: Canadian Zinc Corporation – Prairie Creek Mine (EA 0809-002)*

On behalf of the Canadian Parks and Wilderness Society (CPAWS and CPAWS-NWT), I am writing as a follow up our Oct 20, 2008 letter to you (signed by Alison Woodley) to provide the documents referenced in that letter. I understand that you have requested parties send you all documents they reference, rather than providing internet links. I therefore thought it prudent to send you the referenced documents in PDF format at this time that are not already on the Review Board's public registry.

The following lists the documents I am sending you electronically by email. Each item indicates the page and footnote numbers in our earlier Oct 20, 2008 letter for ease of reference. We also provide the website address of each document for convenience. Please add each of these documents to the public registry for this EA.

1. As referred to on page 5, footnote 8 and on page 14: "MVEIRB, Reasons for Decision and Report of Environmental Assessment for the DeBeers Gahcho Kué Diamond Mine, Kennedy Lake, NT, June 28, 2006, EA 0506-008." http://reviewboard.ca/upload/project_document/1151527459_EA0506-008-Gahcho_Kue-Report_of_Environmental_Assessment.pdf
2. As referred to on page 11, footnote 13: http://www.nrcan.gc.ca/mms/canmet-mtb/mmsl-lmsm/mend/reports/exSumm102-e.htm

3. As referred to on page 11, footnote 14: "July 18, 2008 letter from CZN to Adrian Paradis, MVLWB." http://www.mvlwb.ca/mv/Registry/2008/MV2008D0014/MV08D14%20Response%20to%20MVLWB%20July%2014-08%20Letter%20by%20CZN%20July18-08.pdf

4. As referred to on page 11, footnote 16: "CZN Scoping Study, 2001." http://www.sedar.com/DisplayCompanyDocuments.do?lang=EN&issuerNo=00002753

5. As referred to on page 13, footnote 26: http://whc.unesco.org/en/about/

6. As referred to on page 13, footnote 27: "30th Session of the World Heritage Committee, Decision 30 COM 7B.22, 2006." http://whc.unesco.org/en/sessions/30COM

7. As referred to on page 15, footnote 28: "The Boreal Below: Mining Issues and Activities in Canada's Boreal forest, May 2008, Northwatch and MiningWatch Canada." http://www.miningwatch.ca/index.php?/Arsenic/Boreal_Below_report

8. As referred to on page 16, footnote 31: "Reclamation Research Group (2008) Acid Mine Drainage and effects on fish health and ecology: A Review." http://reclamationresearch.net/publications/Final_Lit_Review_AMD.pdf

9. As referred to on page 16, footnote 32: http://www.nrcan-rncan.gc.ca/sd-dd/pubs/h2o/3-4_e.html

10. As referred to on page 17, footnote 34: "Kuipers, J.R. A.S. Maes, K.A. MacHardy and G. Lawson (2006), Comparison of Predicted and Actual Water Quality at Hardrock Mines: The reliability of predictions in Environmental Impact Statements, Kuipers & Associates, PO Box 641, Butte, MT USA 59703." http://www.earthworksaction.org/pubs/ComparisonsReportFinal.pdf

11. As referred to on page 19, footnote 39: "John L. Weaver, Big Animals and Small Parks: Implications of Wildlife Distribution and Movements for Expansion of Nahanni National Park Reserve, Wildlife Conservation Society – Canada Conservation Report No. 1 July 2006." http://www.wcscanada.org/media/file/Nahanni_full_report.pdf

12. As referred to on page 19, footnote 40: "February 4, 2005 letter from Dr. John Weaver, Wildlife Conservation Society-Canada to Martin Haefele, Environmental Assessment Officer, MVEIRB." http://www.mveirb.nt.ca/upload/project_document/EA0405_002/Technical_Reports/EA0405-002%20Letter%20from%20John%20Weaver%20to%20MVERIB%20regarding%20Grizzly%20Bear%20Research_Feb4,%202005.pdf

13. As referred to on page 20, footnote 43: "N.J. Mochnacz, Interim Report: Fisheries Survey of Prairie Creek Watershed, August, 2001." http://www.mveirb.nt.ca/upload/project_document/1152044576_121B.PDF

14. As referred to on page 21, footnote 47: "July 8, 2005 Letter from Dr. Derek Ford to Kishore Rao, Deputy Director, World Heritage Centre." http://www.cpaws.org/files/nahanni-fordletter.pdf

15. As referred to on page 21, footnote 48: "Horner, R.B., Lamontagne, M. and Wetmiller, R.J., Rock and Roll in the NWT: The 1985 Nahanni Earthquakes, Geos, Vol. 16, no 2, Spring 1987." http://earthquakescanada.nrcan.gc.ca/historic_eq/20th/nahanni/nahanni85_e.php

16. As referred to on page 21, footnote 49: "Ali O. Öncel, 2002. Earthquake-induced static stress of the 1985 Nahanni earthquakes, Northwest Territories, Canada, Natural Resources Canada." http://earthquakescanada.nrcan.gc.ca/pprs/research/oncelagu2002.php

17. As referred to on page 22, footnote 52: "Hyndman, R.D, Cassidy, J.F., Adams, J, Rogers, G.C., and Mazzotti, S, Earthquakes and Seismic Hazard in the Yukon, Beaufort, Mackenzie, CSEG Recorder, Geological Survey of Canada, May, 2005." http://www.cseg.ca/publications/recorder/2005/05may/may05-earthquakes.pdf

18. As referred to on page 24, footnote 55: http://www.dehcholands.org/docs_final_draft_dehcho_land_use_plan_june_02_06.htm

There are a few referenced documents in the Oct 20, 2008 we are still hunting down and will send to you as soon as we get them in electronic format. I understand it is not necessary to send you legislation.

Should you have any questions or require additional information, please do not hesitate to contact me at Jennifer@cpaws.org.

Sincerely,

Jennifer Morin

Jennifer Morin
CPAWS-NWT

CPAWS FN13

MEND - Mine Environment Neutral Drainage at CANMET-MMSL

EXECUTIVE SUMMARY - Paste Backfill Geochemistry - Environmental Effects of Leaching and Weathering

Mine Environment Neutral Drainage at CANMET-MMSL

The influence of **paste backfill** on operational and long-term mine and ground **water quality** has been identified as one of the priorities of the MEND Program. This report provides a brief summary pertaining to current practices in the geochemical characterization of both cemented and uncemented **paste backfill**, and methods used to predict environmental impacts to surface and ground**water quality** associated with the application of **paste backfill** in underground applications. Data was collected via a literature review, and a survey of mines known to use **paste backfill**.

The findings indicate that the amount of available information and research on the influence of underground**paste backfill** on mine **water quality** is typical of a relatively new field. To date, research by the community at large has focused on the structural characteristics of **paste** in terms of meeting the required **backfill** strength using the most economic amount and mix of binder materials. In light of the belief that the chemical reactivity of tailings and the volume of leachate generated are reduced by thickening, and by the addition of alkaline additives such as cement, little information on the influence of**paste backfill** on mine **water quality** appears to have been developed.

Exceptions have been where:

- the mineralogy and reactivity are extreme, with potential effects

on **paste** strength;
- a portion of the **paste** is being deposited on surface (with potential surface **water** impacts); and,
- concern regarding potential ground**water** contamination from underground waste disposal in the United States led to initiation of the Underground Injection Control (UIC) Program that incidentally includes placement of mine waste**backfill** in underground mines under its legislation (Levens et al., 1996).

Recognition of the fact that any **backfill** has the potential to generate contaminant plumes in the long term, and potentially influence ground and/or surface **water** appears to have increased the site-specific evaluation of **paste** characteristics of newly proposed mines in recent years.

Despite the lack of extensive detailed study, the use of **paste backfill** in underground environments has been generally considered beneficial to reduce overall environmental impacts associated with mining, due to:

1. Reduction in the volume of tailings requiring surface disposal, thereby reducing surface impacts through footprint reduction;
2. Use of the full tailings stream in the **backfill**, rather than the coarse fraction used in more conventional sand fill, thereby reducing the need to handle and dispose of a separate slimes stream;
3. Reduction in the potential for tailings to oxidize or leach due to the nature of thickened tailings placed as underground **backfill** because of:

- Less free **water**, which reduces leachate generation;
- Less available oxygen as a result of the higher degree of saturation;
- Preferential flow of ground **water** around **backfill**, rather than through it due to the lower hydraulic conductivity of the **paste backfill**;
- The addition of cement that provides extra neutralization potential (NP) and decreases effective porosity; and,
- The potential for flooding at closure which reduces sulphide oxidation in long-term.

The general theories associated with **paste backfill** characteristics and geochemical reactivity appear sound, but there does not appear to be much field validation on the actual influence of key parameters. Lack of controlled conditions in active mine environments appears to significantly limit the ability to separately assess potential scale up issues. The field would benefit from research targeted at the specific components of **paste** theory (such as the separation of the influence of thickening and binder addition), examination of scale-up issues (preferably in the controlled environment of an isolated well characterized and instrumented backfilled stope), collection of detailed case studies, and additional monitoring of mine waters to assess the influence of **paste backfill** on mine **water quality** over time. The lack

of detailed information currently available is of concern, and highlights the need to compile detailed site data and monitoring data for future assessment and validation of predictions currently being initiated. And as with any new field, establishing a standard base of terminology would be useful.

In the bigger picture, there may be a need to better define the potential importance of this issue, such that priorities for studying this matter can be assessed. For example, are existing backfilled mines producing significant ground **water** contaminant plumes? Certainly sidehill mines that continue to drain from portals or other openings are known to be potential closure problems when not suitably mitigated (i.e. Britannia Mine in B.C., **Canada**; Summitville Mine in Colorado, U.S.). And there appears to be sufficient information to suggest that there might be potential impacts from backfilled mines where the wall rock and **backfill** are particularly reactive (i.e. Bernier and Li, 2003). However, a general survey of existing underground mines might put the significance of the issue in perspective.

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