Aboriginal Affairs and Northern Development Canada | Affaires autochtones et Développement du Nord Canada

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VIA EMAIL: chubert@reviewboard.ca

Re: Canadian Zinc Corporation– Proposed Prairie Creek Mine– EA0809-002

Thank you for your letter dated June 27, 2011, providing instructions to parties on the proposed water quality objectives committee and final written submission approach to the Prairie Creek Mine Environmental Assessment (EA0809-002).

Aboriginal Affairs and Northern Development Canada (AANDC) provides the following to the Mackenzie Environmental Impact Review Board (Review Board) regarding a proposed process forward to address concerns raised during the June 23-24, 2011, technical hearing in Fort Simpson.

Site-Specific Water Quality Objectives

During the June 23-24th, 2011, technical hearing held by the Review Board, it was apparent that differences in opinion existed with regards to the establishment of site-specific water quality objectives (SSWQOs) for the Prairie Creek Mine.

During the technical hearing, AANDC and other parties were questioned on whether SSWQOs were required before the close of the Environmental Assessment (EA). AANDC notes that water quality impacts were identified as a "Key Line of Inquiry" for this EA. The *Terms of Reference for the Environmental Assessment of the Canadian Zinc Corporation's Prairie*

Creek Mine, June 26, 2009 (TOR) state that water quality impacts are (p. 11):

> *... the topic of greatest concern that requires the most attention during the environmental assessment and the most rigorous analysis in the Developer's Assessment Report. Designation as a Key Line of Inquiry is intended to ensure a comprehensive analysis of the issues most likely to cause significant environmental impacts or significant public concern.*

AANDC also notes that the TOR specifically references a requirement to consider SSWQOs through discussion of the following (p. 22):

> a. *Whether there are any site-specific sensitivities in the receiving environment that require additional precautionary limits on effluent quality above applicable national standards and guidelines for effluent quality and protection of aquatic ecosystems; and*
> b. *Identify the site-specific water quality objectives the developer is committed to meeting in order to protect the downstream environment;*

AANDC provided both a written technical report and a technical presentation outlining specific sensitivities of the Prairie Creek receiving environment (e.g. the traditional fishery and the Nahanni National Park Reserve). At the technical hearing in Fort Simpson, June 23-24, 2011, AANDC's technical consultant, Barry Zajdlik, provided a brief overview of the Reference Condition Approach (RCA) and explained that the use of the RCA does not mean that there will be zero change in the receiving environment during mine operations and post-closure. The adoption of RCA-based SSWQOs will mean that inputs to the Prairie Creek system will be at the highest level of natural variability for the life of the mine and post-closure. Therefore, with RCA-based SSWQOs there will be changes in Prairie Creek downstream of the Prairie Creek Mine operations. Subsequently, AANDC has, and continues to advocate for, precautionary objectives lower than national guidelines and for all parties to this EA to be involved in defining acceptable levels of change for consideration when the Review Board is making a determination on SSWQOs.

It was recommended by AANDC, as well as Parks Canada, that a committee be formed to participate in a process through which SSWQOs would be established to ensure significant adverse effects do not occur in Prairie Creek, thereby protecting the downstream environment. This recommendation was also supported by the Naha Dehe Dene Band.

Other parties to the EA expressed interest in participating in such a process, and Canadian Zinc Corporation (CZN) committed to meeting with

AANDC during the week of June 27, 2011, to discuss differences in opinion and explore an amenable path forward to resolve issues. A meeting was held between AANDC and CZN on June 27, 2011, to discuss the issue of SSWQO establishment and to provide clarity on a path forward for consideration by the Review Board.

Based upon this meeting, AANDC provides a description of a proposed path forward (i.e. proposed initiative) for the derivation of SSWQOs for the Prairie Creek Mine in Attachment A. Where differences in opinion between AANDC and CZN exist, both positions have been provided to aid in the Review Board's decision-making process. A schematic has also been included to provide a visual description of the proposed process to further assist the Review Board in its evaluation. It is requested that the Review Board provide direction on whether to proceed with this process, and where differences in opinion between AANDC and CZN exist, what the process should be. AANDC is confident that the proposed process will provide vital information for this assessment while allowing the EA to proceed in a timely manner.

The proposed process describes activities to be completed before EA closure, and those that could be confirmed following EA closure but before the Water Licence hearing (i.e. instances requiring further data collection or testing). CZN would report on the activities completed before EA closure. CZN's submission should include proposed provisional SSWQOs and a proposed acceptable level of change to be used in site-specific ecological risk assessments. The proposed level of acceptable change must reflect the values of other interested parties to the EA, and CZN is encouraged to solicit input from these parties (see Attachment B). Therefore, the Review Board should consider the CZN report, as well as input from interested parties, and make a decision on this issue within its Report of Environmental Assessment following closure of the public record. Further, AANDC stresses that if, through the development of SSWQOs, new or additional water treatment or water storage alternatives are presented, further information will need to be provided to all parties and the Review Board for their consideration and inclusion in this EA.

AANDC and CZN jointly propose 5 weeks and a deadline of August 8, 2011 for submission of the report described above.

Parties to the EA must be permitted the opportunity to comment on all work submitted by CZN to the Review Board for its consideration. AANDC would require a minimum of 4 weeks to review the information submitted and provide comments to the Review Board.

Additional Technical Information to be submitted – Tailings Management

During the Fort Simpson technical hearings the Developer received several undertakings to provide additional technical information to the Review Board by July 8, 2011. This included information relevant to tailings management.

> *Undertaking #1: Canadian Zinc Corporation to provide an updated paste backfill analysis that describes the underground paste backfill model (hearing transcripts June 23, 2011 p 84).*

AANDC requests an opportunity to review this information and provide comments for the Review Board's for consideration as part of the Review Board's overall decision-making process. AANDC once again stresses that if, through the assessment of tailings management, operational design changes are required to further manage tailings and tailings disposal, further information will need to be provided to all parties and the Review Board for their consideration and inclusion in this EA. AANDC requests a minimum of 4 weeks to review the information submitted through Undertaking #1 and provide comment. This work could occur concurrently with the proposed SSWQOs process, as not to affect timelines further.

Final Arguments

AANDC expects that the Review Board will allow sufficient time for the completion of final arguments following the submission of all new information and associated comment periods. AANDC submits that final arguments should be received from all parties, as well as the Developer, concurrently, after which the Board could close the record of EA0809-002. These comments could include amendments or changes to the recommendations originally proposed in parties' technical reports.

Closing Remarks

AANDC appreciates the opportunity to propose a path forward for resolution of outstanding issues. AANDC will endeavour to do all it can to assist and complement the process moving forward such that the public record can close and the EA can come to a conclusion.

AANDC would like to clarify one final item from the meeting between AANDC and CZN on June 27th, 2011. During these discussions, CZN indicated that issues associated with the SSWQOs, water storage and effluent quality criteria (EQC) are linked and that EQC for their operation

should include a load-based approach. AANDC agrees that SSWQOs, water storage and EQC are linked, and that it is appropriate for AANDC to further investigate the load-based approach prior to the water licencing phase of the project, as the establishment of EQCs is not within the purview of the Review Board.

AANDC looks forward to providing final arguments to complete the EA process for Canadian Zinc Corporation's Prairie Creek Mine. Should you have any questions, feel free to contact Krystal Thompson at Krystal.Thompson@inac.gc.ca or (867) 669-2595 or Robert Jenkins at Robert.Jenkins@inac.gc.ca or (867) 669-2574.

Sincerely,

Teresa Joudrie
Director, Renewable Resources and Environment
Aboriginal Affairs and Northern Development Canada

Attachment A -Proposed Process for Deriving SSWQO's for Prairie Creek Mine

Step 1. Confirm Reference Condition benchmarks

- Inclusion of any additional and relevant datasets.
- Do the concentrations of parameters change between summer and winter or among different locations upstream of the Prairie Creek mine.
- Transparent treatment of data-points less than detection limits.
- Consideration of bias in estimated RCA benchmarks due to unequal number of data-points by location and/or season.
- Identify data quality and data gaps.
- Consider use of data from both above and below Harrison Creek and from Harrison Creek itself.

Step 2. For confirmed RCA benchmarks, proceed to step 3.

- For parameters requiring additional data collection due to detection limit issues, poor quality data, etc., data collection should commence immediately. The remainder of the steps as described below will be followed post-EA for parameters requiring additional reference condition data.

Step 3. Compare highest predicted concentrations to confirmed RCA benchmarks.

- AANDC Position
  i. Recommend RCA benchmarks as SSWQOs at the end of the initial dilution zone for parameters which can be met by the currently envisaged operations. This is based on the highest predicted receiving water concentration at the edge of the initial dilution zone (i.e. mixing zone) in Prairie Creek.
- CZN Position as understood by AANDC
  i. Consider recommending RCA benchmarks as SSWQOs for parameters which can be met by the currently envisaged operations based on the highest predicted receiving water concentration in Prairie Creek at Harrison Creek. Such consideration will take into account the magnitude of the difference between the highest predicted concentration and the benchmark in order to have confidence that the benchmark can be reliably and consistently achieved without undue constraints on the operation. The consideration will also acknowledge that, if RCA is to be used as the basis for the benchmark, the location of relevance of the RCA

concentration should be the down-stream boundary of the expanded NNPR.

Step 4. Identify parameters that cannot achieve the RCA benchmarks confirmed in step 3 above.

- AANDC Position
  i. Met under the currently proposed operation (Highest predicted concentration)
- CZN Position as understood by AANDC
  i. Met with a suitable comfort margin under the currently proposed operation (Highest predicted concentration)

*Estimated time for steps 1-4 is 1 week

Step 5. For parameters identified within step 4, conduct an evaluation of which water treatment and storage options could achieve confirmed RCA benchmarks. The following items would be considered:

- Desktop evaluation of water treatment options for process water
- Best available treatment technologies
- Options for available water storage expansion[1]
- Capital and operating costs

[1] The potential for impacts of new or additional water treatment and water storage options will need to be included and assessed as part of the current EA.

Step 6. If different and cost effective water treatment or storage options are recommended for consideration, repeat steps 3 and 4.

Step 7. Identify outstanding parameters:

- AANDC Position
  i. for which RCA benchmarks are still not achieved
- CZN Position as understood by AANDC
  i. for which RCA benchmarks are not accepted

Step 8. Report from CZN including recommended SSWQOs[1] (based upon steps 1-7) and definition of acceptable level of change[2] to be used for parameters requiring Site-Specific Ecological Risk Assessments (Step 10). This report, as well as comments from reviewers, will provide the basis for a decision by the Review Board.

[1]SSWQOs requiring confirmatory testing through Step 9 would be classified as "provisional."
[2]See Attachment B - input from all parties to the EA should be solicited to ensure the risk assessments are suitably completed.
*Estimated time for steps 5-8 is 4 weeks

***AANDC considers it best practice to include steps 10 and 11 within the context of this EA.**
***CZN considers it acceptable to complete remaining steps within the context of the Regulatory Process.**

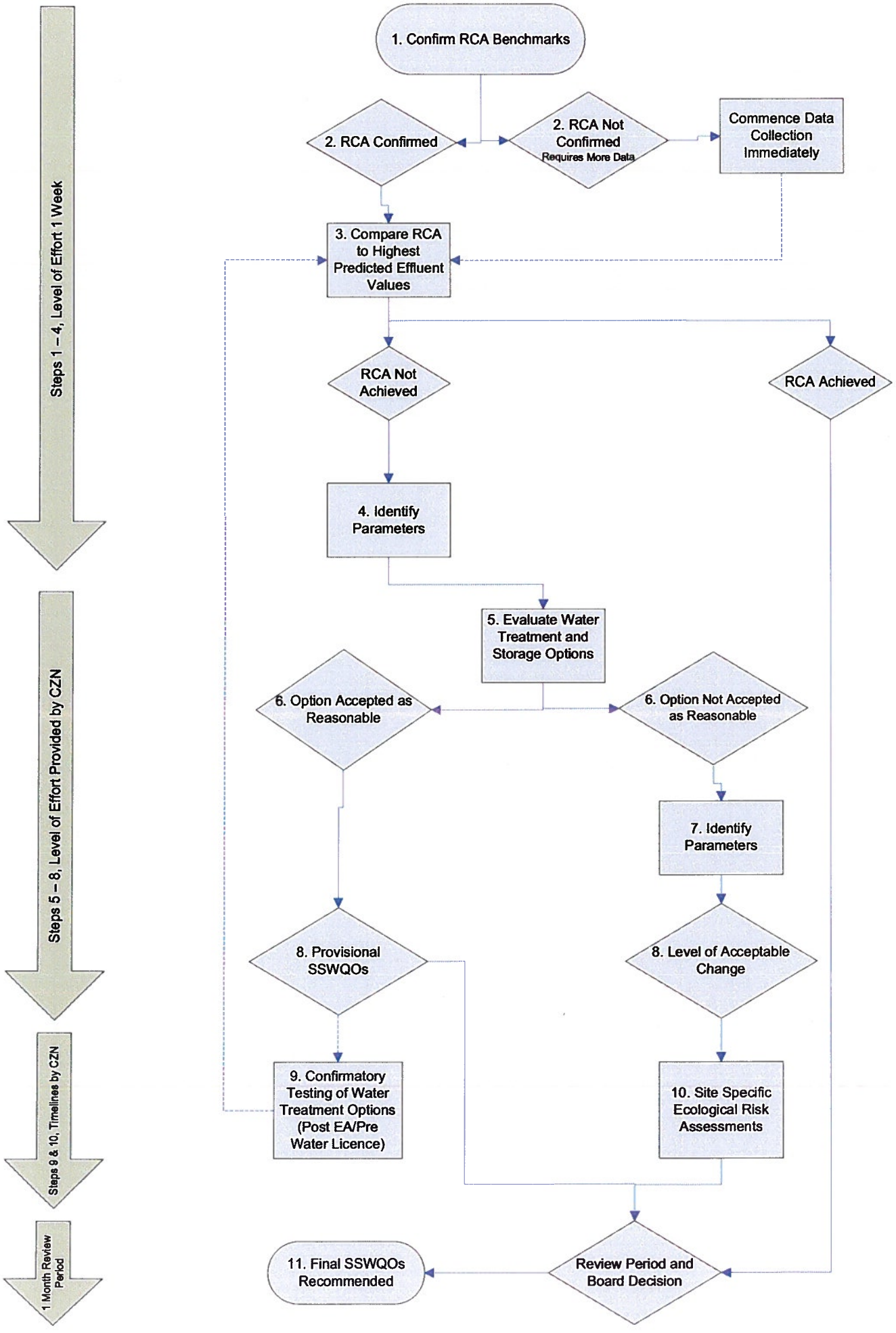
Step 9. Complete laboratory testing of water treatment options identified in step 5.[1]

[1]Confirmatory testing of treatment options could occur in the Regulatory Phase prior to water licence hearings.

Step 10. Conduct further site-specific ecological risk assessment[1] for parameters identified in step 7, to provide a rationale for acceptable non-RCA concentrations at or below the interim CZN concentrations. These assessments will be based upon the lowest acceptable level of change*.

[1] The ToR for this EA specifically make mention of risk assessment of impacts to the ecological integrity of the Nahanni National Park Reserve (p. 24).
* Specifically, several parties to the environmental assessment raised concerns with respect to biomagnification and nutrient enrichment. Considering this, the Board may wish that site specific ecological risk assessments for provisional non RCA benchmarks, particularly mercury (Hg) and selenium (Se), be completed within the context of the current EA. (AANDC position)

Step 11. Recommend SSWQOs based on the results of steps 3, 8 and 10.


Steps 1 – 4, Level of Effort 1 Week
Steps 5 – 8, Level of Effort Provided by CZN
Steps 9 & 10, Timelines by CZN
1 Month Review Period
1. Confirm RCA Benchmarks
2. RCA Confirmed
2. RCA Not Confirmed
Requires More Data
Commence Data Collection Immediately
3. Compare RCA to Highest Predicted Effluent Values
RCA Not Achieved
RCA Achieved
4. Identify Parameters
5. Evaluate Water Treatment and Storage Options
6. Option Accepted as Reasonable
6. Option Not Accepted as Reasonable
7. Identify Parameters
8. Provisional SSWQOs
8. Level of Acceptable Change
9. Confirmatory Testing of Water Treatment Options (Post EA/Pre Water Licence)
10. Site Specific Ecological Risk Assessments
Review Period and Board Decision
11. Final SSWQOs Recommended

Attachment B –Derivation of Acceptable Effect Levels for Prairie Creek Mine

Development projects can bring economic benefits to the people of the North but at the same time will cause some change in the environment. That change can range from short term almost undetectable changes to very long term changes that affect generations of people, plants and animals.

The amount of change in the water environment that is acceptable reflects a personal balance between the benefits obtained from a development project and the value of the water, the animals that live in the water and how those animals and water are used. As individuals have different needs and beliefs, the balance between the amount of change that is acceptable will differ amongst individuals.

Also, because each person has different interests the part of the water environment that is important will vary from person to person. A sport fishermen or a sport fisherman guide might be concerned that the number of fish caught in a day will change. Other people might use the fish caught for food and therefore be concerned about chemicals that can make the fish unsafe to eat. Other people might want the water to be safe for drinking while others might want the water to stay the same as it has been in their lifetime.

Defining acceptable levels of change means considering; 1) over what distance the change is acceptable; 2) how long the change can last; and, 3) how large a change is tolerable.

For example, people who eat fish might wish the fish that they catch in traditional fishing areas be safe to eat at all times. This means that changes in chemicals in the water in a small area might be acceptable as long as the fish are safe to eat.

Since there are guidelines for what is "safe" to eat based on what is now known, people might decide that as long as increases in chemicals in fish fillets stay below guidelines that is acceptable. Others might feel that no changes in chemicals in fish fillets is "safer" because eating those fish has never caused problems. Although for both groups, the overall concern is that fish are "safe", two levels of safety are mentioned. One group is willing to allow some chemical changes in the fish as long as the fish are safe to eat but the other group want to see no changes in the chemicals at all. This brings up the idea of risk.

Some people are willing to take risks while others are not. The amount of risk that is acceptable varies from person to person and is often related to how much is known about the problem. In the fish eating example, how much chemicals will rise in fish tissues if chemicals are put in the water

may not be well understood. In this case people who are cautious might be concerned about very small amounts of chemicals added to the water.

But if the link between chemicals added to water and changes in chemicals in fish was well understood, large chemical additions to the water might be acceptable.

In the end, defining an acceptable level of change in the water environment for a person or a group of people requires deciding what is important to them, how much change is acceptable and how much risk is acceptable. Two examples of statements about acceptable changes are presented below.

Example 1:
I am not too worried about some changes close to the project, say for 10 kilometres, but I really don't want to see any changes in the way all the animals in the water live together.

This statement tells us what is of concern; the way all the animals live together. The statement also tells us over what distance changes could occur (within 10 kilometres of the project) and cannot occur (more than 10 kilometres from the project). Within the distance that change can happen we are also told that "some" change is acceptable over this distance. Finally, the statement tells us the level of risk that is acceptable in the area where no change is allowed is very low because of the statement "I really don't want to see ..."

Scientists, following discussion with a person or group of people can use this statement to set numerical limits on things that can be measured in the water environment so that the chemicals that will be added to the water will not cause the unacceptable changes. The numerical limits can be adjusted so that the level of risk is consistent with that expressed by the person or group.

Example 2:
I want the fish to be safe to eat for my grandchildren and their grandchildren. I only catch fish in pools 30km from the project.

This statement tells us what is of concern; safely eating fish for a long time. The statement also tells us where this condition should be met (in pools 30 kilometres from the project). The statement does not tell us what "safe" means and it does not tell us the level of risk that is acceptable. But, we do see that concern for safety of those eating fish extends for many generations.

Scientists, following discussion with a person or group of people can use this statement to set numerical limits on chemicals that will be added to the water so that fish are "safe" to eat. Because the fish must be "safe" to eat for many generations, the numerical limits for chemicals in fish that can be passed from generation to generation can be adjusted differently from other chemicals so that future generations can eat the fish safely.