



October 29, 2010

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Via email: *chubert@reviewboard.ca*

**Re: EA0809-002, Prairie Creek Mine, Canadian Zinc Corporation:
Information Requests**

Parks Canada Agency (PCA) thanks the Mackenzie Valley Environmental Impact Review Board (the Board) for the opportunity to provide further information requests (IRs) with respect to the above review. Our information requests focus on issues discussed during the Technical Meeting in Dettah, Northwest Territories (October 6-8, 2010), and the new information provided during the Meeting.

Please also note that when possible we have referred to information requests from other parties, where their requests reinforce or complement ours. We are also submitting an information request jointly with Environment Canada.

Finally, we note that the Board identified November 29 as the deadline for the developer to respond. While we have no interest in protracting the review of this project, we would like to emphasize that our IRs have been carefully considered and represent a requisite basis of information for our evaluation of the project and its potential impacts to Nahanni National Park Reserve of Canada.



We look forward to receiving Canadian Zinc Corporation's responses to the requests as part of the ongoing assessment of this project. If you have any questions, please feel free to contact Wendy Botkin at (204) 984-1152 or *wendy.botkin@pc.gc.ca*.

Sincerely,

Eric Betsaka
A/Superintendent, Nahanni National Park Reserve of Canada
Parks Canada Agency

cc Rob Kent, A/Field Unit Superintendent, Southwest NWT, Parks Canada

IR Number: Parks_Canada _2-1
Source: Parks Canada Agency (PCA)
To: Canadian Zinc Corporation (CZN)
Subject: Access Road
Reference: Technical Meeting Day 2; Undertakings 12, 17

Preamble:

CZN's response to the first round information request, Parks_Canada_10, items(c-i)and (l) , did not fully address questions regarding the access road. During the Technical Meetings, CZN provided part of the outstanding information. The responses, however, lacked detail. As such, CZN committed to providing additional information related to operations and maintenance, as well as design aspects of the access road. Although Parks Canada only needs this information within Nahanni National Park Reserve of Canada (NNPR), we assume it would be useful for others with interests outside the park). For the sake of clarity and completeness, PCA outlines our understanding of this commitment in the request below (See Numbers 1-7).

Additional information is also requested to fully understand the spatial and temporal aspects of environmental impacts resulting from the road during construction, operation, and post-closure. PCA recognizes that information presented to date by CZN may partially address some items requested in the environmental risk assessment; however, a complete consolidation of all considerations, that includes consideration of significance and environmental impacts of the road, will assist parties in understanding determining significance of potential adverse environmental effects of the road. Additionally, PCA notes that environmental impacts local to the road bed are of particular interest. The localized details will likely compliment the larger spatial scale information that was the major focus of the access road information presented to date by CZN. (This information request is identified as Number 8)

Request: (See also DFO_2-2; 2-4; 2-5; NRCan-1)

With consideration given to information provided by CZN to date, PCA provides the following detailed requests.

1. Identify if there is a recognized or typical standard/guide for design, construction, and operation that is utilized in the Northwest Territories for access or haul roads. If this exists, please indicate if CZN proposes to follow this standard for this proposed road.
2. Provide typical cross-section diagrams of the access road to depict the various construction situations that are encountered on site, including, but not limited to: construction on well drained and poorly drained soils, ice rich permafrost soils, weaker soils, cut and fill locations, and approaches for stream crossings.
3. The road may be constructed of snow, ice, granular, or a combination of construction materials depending on the local environmental and physical setting. Provide details on the type of road to be constructed along the length of the route in tabular format, as well as depicted on a map(s).
4. Estimate quarry/borrow material volumes along the length of the road and depict the location of the material source on a map.

5. Estimate the snow and water quantity along the length of the road route and depict the location of the water source(s) on a map. PCA recognizes that CZN provided a partial response to this information previously; however, it is requested that an assessment along the length of the route be provided. Our assumption is that the snow and water volumes would be a function of the type of road to be constructed (related to item 3 above).
6. Provide details of the operation and maintenance activities for the access road.
7. If monitoring of the access road occurs during construction and operation, describe the monitoring program. The response is specifically to address: frequency of access road inspection to assess the need for maintenance/repair; items considered in access road inspections (e.g., signs of permafrost degradation).
8. Conduct a spatial and temporal environmental risk assessment along the length of the road route that considers the impacts of planned activities (unrelated to spills or other accidents and malfunctions) during the following phases of the road:
 - Road construction, inclusive of transfer facilities
 - Road operation, inclusive of transfer facilities
 - Road post-closure, inclusive of transfer facilities

Include, but do not limit, a consideration of impacts on the following:

- Topography
- Slope stability
- Permafrost
- Groundwater quality and quantity
- Surface water drainage patterns
- Sensitive areas

If applicable, the environmental risk assessment is to consider:

- Assessment of unmitigated effects
- Spatial boundaries – magnitude (i.e., low, medium, high) and extent (i.e., regional and local)
- Temporal boundaries – frequency (i.e., frequent, intermittent, infrequent), duration (i.e., permanent, long-term, medium term, short term), significance (i.e., low, medium, high)
- Proposed mitigation
- Assessment of residual effects
- Residual effects/influence of mitigation
- Significance of residual impacts
- Probability

The environmental risk assessment could be consolidated in tabular format. The table below is provided for consideration.

CZN is to define the criteria and level/ranks for the criteria used in the risk assessment, as well as significance. A comparison of the unmitigated effects with the residual effects is to illustrate and quantify the effectiveness of mitigation.

[illegible]

IR Number: Parks_Canada_2-2
Source: Parks Canada Agency (PCA)
To: Canadian Zinc Corporation (CZN)
Subject: Prairie Creek water quality that is protective of aquatic life
Reference: Technical Meeting Day 2; Undertaking 10

Preamble:

The Developer's Assessment Report (DAR) provided an initial screen of water quality parameters that require further consideration in terms of applicable water quality objectives (refer to DAR Table 8-7: Generic Water Quality Objectives). Select analysis provided in the DAR does not consider Prairie Creek background water quality in its screening analysis for water quality objectives. PCA notes that the water quality in Prairie Creek downstream of the mine, is a function of treated process water, treated mine water, as well as, Prairie Creek water quality and quantity. In general, the water quality parameters identified in the DAR (Tables 8-7 and 8-8) were considered by CZN to be parameters that form the basis of the water quality objectives to be achieved in Prairie Creek. CZN water quality objectives appear to be based on the concept that the Prairie Creek water quality will protect all types of aquatic life for all life stages. PCA supports this position.

Appendix J of the CZN Response to IRs provided predicted water quality in Prairie Creek and comparison to water quality objectives for a broader range of parameters than the range that was presented in the DAR. During the Technical Meetings it was noted that CZN was not intending to consider all of the water quality objectives presented in Appendix J in determining acceptable in-stream Prairie Creek water quality. This resulted in uncertainty in the water quality parameters that CZN would consider when determining mine water discharge quality and quantity. To address this uncertainty, PCA requested during the Technical Meeting a summary table of water quality parameters and concentrations that are protective of aquatic life in Prairie Creek. CZN took this request under consideration.

For clarity, the request is identified below.

Request:

Provide a summary table of water quality parameters and concentrations that are protective of aquatic life in Prairie Creek (i.e. site-specific objectives). Describe the method(s) applied to determine the water quality parameters and concentrations.

IR Number: Parks_Canada_2-3
Source: Parks Canada Agency (PCA)
To: Canadian Zinc Corporation (CZN)
Subject: Prairie Creek water quality – downstream mixing zone
Reference: Technical Meeting Day 2; Downstream Mixing Analysis (NHC 2010)

Preamble:

The Developer's Assessment Report (DAR) provided limited information regarding the method of mine water discharge to Prairie Creek and the associated aspects of water quality mixing within Prairie Creek. CZN's Response to Information Request (IR) document (September, 2010) and discussion during the Technical Meeting demonstrated that mixing of mine water and Prairie Creek water is to occur within an initial dilution zone downstream of the discharge location. A summary report for the downstream mixing analysis was distributed during the Technical Meeting (*Prairie Creek Mine outfall performance – downstream mixing analysis DRAFT* (NHC 2010)). It was not possible to review the summary report during the Technical Meeting, and therefore limited inquiries/comments have been provided on the downstream mixing zone results to date.

Upon review of the downstream mixing analysis report, it is understood that it is a draft document that provided only a summary of results, with limited to no methods of analysis. The analysis considered a limited range of discharge conditions, and a limited number of water quality parameters.

Request: (see also INAC02-01)

1. Provide the full final report, instead of a draft summary, that details the downstream mixing analysis.
2. Complete the downstream mixing analysis for, but not limited to, the following scenarios:
 - a. Average Prairie Creek flows expected during typical operations.
 - b. Worst case Prairie Creek low flows.
 - c. Worst case Prairie Creek high flows.
3. Define the selected typical ranges and worst case conditions.
4. Present the concentration contours within the mixing zone.
5. Complete the downstream mixing analysis for all water quality parameters that could impact aquatic life.
6. Present a summary of the mixing zone dimensions required for water quality to comply with water quality objectives.
7. Provide details of an environmental impact analysis to aquatic life within the mixing zone.

IR Number: Parks_Canada_2-4
Source: Parks Canada Agency (PCA)
To: Canadian Zinc Corporation (CZN)
Subject: Prairie Creek water quality predictions and mine site water balance
Reference: Technical Meeting Day 2; Undertakings 3, 5, 7, 10,

Preamble:

The Developer's Assessment Report (DAR) and Response to Information Request (IR) (Appendix J) provided by CZN predicted concentrations of parameters of concern in Prairie Creek for select mine water discharge as well as Prairie Creek flow rate conditions. The results of the analysis were discussed in detail during the Technical Meeting. The following was noted:

- In-stream predicted concentrations are a function of the end of pipe water quality and quantity discharged to Prairie Creek, as well as, Prairie Creek flow rate and water quality.
- After complete mixing of the mine discharge water with Prairie Creek, the predicted concentrations can be compared to Prairie Creek water quality objectives to assess if the discharge scenario is acceptable with respect to Prairie Creek water quality. The water quality parameters and objectives were uncertain at the time of the Technical Meeting (This is the subject of Parks_Canada_2-2 above).
- There is no water balance calculation for each condition analyzed to demonstrate that the mine water discharge rate adopted in the analysis will not compromise on site water storage.

Request: (see also INAC02-03)

1. Predict in-stream Prairie Creek water quality at Harrison Creek and the Park Boundary for the following scenarios:
 - a. Average Prairie Creek flows expected during typical operations and monthly average inflows expected during typical operations.
 - b. Average Prairie Creek flows expected during typical operations and worst case high mine inflows (assuming worst case connectivity to the PCAA and HCAA).
 - c. Average Prairie Creek flows expected during typical operations and low mine inflows.
 - d. Worst case Prairie Creek low flows and monthly average inflows expected during typical operations.
 - e. Worst case Prairie Creek low flows and worst case high mine inflows (assuming worst case connectivity to the PCAA and HCAA).
 - f. Worst case Prairie Creek low flows and low mine inflows.
 - g. Worst case Prairie Creek high flows and monthly average inflows expected during typical operations.
 - h. Worst case Prairie Creek high flows and worst case high mine inflows (assuming worst case connectivity to the PCAA and HCAA).
 - i. Worst case Prairie Creek high flows and low mine inflows.

CZN is to define the selected typical, high, and low flow conditions.

2. For the nine scenarios outlined above, conduct a water balance to demonstrate that mine site water storage capabilities are acceptable. Worst case mine site scenarios should also consider the implications on catchment pond storage capacity and required discharge flow rates due to high or worst case mine inflow volumes occurring in combination with surface flood events, as this combination may require higher discharge volumes.

CZN is to identify the selected typical ranges and worst case conditions.

3. Compare in-stream Prairie Creek water quality predictions to water quality objectives that are based on protection of aquatic life.

IR Number: Parks_Canada_2-5
Source: Parks Canada Agency (PCA)
To: Canadian Zinc Corporation (CZN)
Subject: Potential for bioaccumulation of mercury
Reference: IR response to Parks_Canada_33
Technical Meeting – Undertakings 3, 8, 10

Preamble:

The Developer's Assessment Report (DAR) submission indicated that concentrations of mercury in treated waste-water discharged to Prairie Creek will exceed natural levels of mercury in the river. Therefore, if the mine becomes operational, it will result in increased loadings of mercury to Prairie Creek and the potential for bioaccumulation of mercury in aquatic food webs.

A peer reviewed scientific article authored by Spencer et al. (2008) (Integrated Environmental Assessment and Management, 4: 327-343) documented elevated levels of mercury in slimy sculpin body tissues immediately downstream of the Prairie Creek mine. The data reflected a 2.4 and 2.8 fold increases in mercury levels in fish tissues between the upstream reference site and downstream exposed sites.

Analyses of these data showed that statistical differences in concentrations of mercury in sculpin at the upstream (non-exposed site) compared to the downstream near-field site and the far-field downstream site are close to being statistically significant ($P = 0.07$) but not statistically significant at probability of 0.05). Given low sample sizes inherent to the study by Spencer et al (2008), the lack of a statistical difference in concentrations of mercury in sculpin tissues among the upstream site, and the two downstream sites exposed to mining effluent from the Prairie Creek mine, is not surprising and likely reflects a sampling design used by Spencer et al (2008) that was not overly powerful. Nevertheless, differences in levels of mercury in sculpin among these 3 sites is statistically significant at a probability of 0.10, which in many studies, is used to assess statistical significance if a study design is known to be only moderately powerful. Moreover, the lack of statistical significance does not change the fact that average levels of mercury downstream of the mine were between 2.4 and 2.8 times higher than that above the mine, and does not preclude the possibility that these elevated levels are biologically significant, and are of potential concern as the mine transitions to full operation.

Based on potential concerns related to mercury contamination of Prairie Creek due to the discharge of mercury from the Prairie Creek Mine to Prairie Creek, Parks Canada requested (Parks_Canada_33) that CZN clarify why details of their assessment of contaminant loads did not include an evaluation of a potential increase in loadings of mercury, and an evaluation of their potential environmental effects on biological communities in this system.

The reply from CZN did not address this concern and re-iterated that differences in mean levels of mercury among the three sites were not "statistically significant" at a probability of 0.05. Parks Canada

was aware of the lack of the statistical differences, measured at the restrictive probability of 0.05, and this was not the central issue of Parks_Canada_33.

Request:

Given that existing data has shown that slimy sculpin downstream of the Prairie Creek contain elevated average levels of mercury in their tissues compared to an upstream site, and that full mining operations are projected to increase loadings of mercury to Prairie Creek,

1. Provide empirical data to document that the discharge of mercury-rich effluent to Prairie Creek will not jeopardise the health of fish and the entire foods web in Prairie Creek.
2. In the absence of these data, ensure that mercury is included in the predictions for downstream concentrations during mine operations, (See EC-2-1; INAC02-1), and that potential environmental effects on biological communities in the system are considered.

IR Number: Parks_Canada_2-6
Source: Parks Canada Agency (PCA)
To: Canadian Zinc Corporation (CZN)
Subject: Adaptive management of wildlife impacts
Reference: Technical Meeting Day 2; Undertaking No. 23

Preamble:

In their Developer's Assessment Report (DAR), CZN states that an adaptive management framework be implemented to manage impacts of their development on wildlife populations. Monitoring and adaptive management are important to ensure anticipated or unanticipated effects on wildlife are mitigated and the ecological integrity of Nahanni National Park Reserve is unaffected. Canadian Zinc's response to Parks_Canada_05 provided little information on how the monitoring program and associated adaptive management will occur. Discussion on Day 2 of the Technical Meeting provided minimal additional information and resulted in Undertaking No. 23. To clarify our requests related to Undertaking No. 23, PCA is providing the following request.

Request:

1. Outline the adaptive management process proposed by CZN. Provide sufficient detail on the following key elements of monitoring within the adaptive management framework:
 - a. Selection of valued ecosystem components that will be monitored with a clear rationale on:
 - i. how they indicate trends for the ecosystem and anthropogenic change
 - ii. which areas and seasons within the study area will be addressed by their inclusion
 - iii. which variable will be monitored (e.g., Dall's sheep recruitment, grizzly bear occupancy)
 - b. Design of monitoring programs including geographic extent, timing, survey method, personnel requirements, and study controls that will be used to allow development specific change to be detected and mitigated
 - c. Indicate the thresholds that will be used to determine change, including descriptions of effect size, power, confidence, sample size, and frequency
 - d. Describe how results from monitoring programs will be integrated into decision making and the process in which mitigations will be determined
 - e. Comment on the use of additional research and adaptation of monitoring programs to determine efficacy of mitigation measures

Where CZN believes sufficient information exists (e.g., Dall's sheep) provide a full assessment of data in the context of the above questions to help describe how adaptive management would be applied as proposed.

IR Number: Parks_Canada_2-7
Source: Parks Canada Agency (PCA)
To: Canadian Zinc Corporation (CZN)
Subject: Mitigation of possible impacts to carnivores
Reference: Technical Meeting, Day 2

Preamble:

Carnivores are a valued ecosystem component of the Greater Nahanni Ecosystem and integral to the ecological integrity of Nahanni National Park Reserve. They present special challenges to development as attraction to sites often leads to conflict and in many instances increased mortality rates. Most carnivores (e.g., grizzly bears and wolverines) have very low reproductive rates and have large home ranges. Even slight increases in mortality can have significant effects on populations, as evidenced by the ban on grizzly bear hunting in the Mackenzie Mountains. This is particularly important with the Prairie Creek mine as grizzly density in the area is considered very high (Weaver 2008). However, effective management of attractants, appropriate placement and design of infrastructure, strong education efforts with staff, and monitoring combined with adaptive management approaches can adequately mitigate impacts. In response to IR 1 Parks_Canada_04 7a, Canadian Zinc provided a paragraph of high level information. During the Technical Meetings, Canadian Zinc committed to several of these approaches in principle (Day 2 – page 273-278). Further clarification is now asked for to ensure mitigations will be appropriate and adequate.

Request:

1. Provide infrastructure design mitigations that will be used to discourage predator and scavenger attraction to the mine site and transfer facilities.
2. A good synopsis of food and waste management in terms of disposal has been presented by the developer. Yet insufficient detail is in place on how attractants will be handled on site, and by workers away from the mine site, including along the road or in transfer facilities. All attractants should be stored in animal proof containers; please indicate which types of containers will be used.
3. Describe how other chemical and industrial grease materials will be stored; describe how they will be managed while in use or immediately following use.
4. Provide details of employee education and management programs to reduce negative encounters and to ensure policies are enforced.
5. Describe how grey water systems will be managed to ensure they remain clean, grease free, and not accessible to wildlife.
6. Describe the monitoring programs that will be in place to assess the effectiveness of the above programs and how problems will be dealt with.

IR Number: Parks_Canada_2-8
Source: Parks Canada Agency (PCA)
To: Canadian Zinc Corporation (CZN)
Subject: Road Impacts on wildlife
Reference: Technical Meeting Day 2 Undertakings #19, 21, 22

Preamble:

Woodland caribou are a valued component of the Greater Nahanni Ecosystem. Further, woodland caribou (boreal and northern mountain ecotypes) are a species listed under Schedule 1 of the *Species at Risk Act* (SARA) that use habitat within the environmental assessment study area. Any species listed under Schedule 1 of the SARA must be identified, and any adverse impacts of the development on them thoroughly assessed and mitigated, regardless of whether the impact(s) are deemed “significant.” If the project is carried out, the assessment must ensure that measures are taken to avoid or lessen those effects, and to monitor them.

As has been previously noted in the review process, PCA has insufficient information to determine the impact of the road on wildlife, and in particular, on woodland caribou, or to determine appropriate mitigation and monitoring programs (IR Round 1 Parks_Canada_3 and technical meetings day 2). During the Technical Meetings, CZN made commitments to meet these information requirements by proposing mitigations to avoid wildlife impacts (e.g. avoiding road work during calving/lambing season or during animal migration).

To address further information deficiencies during winter operation of the road, CZN committed (Undertaking #18) to undertaking three winter surveys for caribou and other wildlife (Tentative: November 2010; February to March 2011). In lieu of providing the full information from these surveys before preparation of technical reports, CZN proposed to assume a number of different outcomes from the February and March surveys, committing to appropriate mitigation requirements for a variety of outcomes to caribou that may result from the later surveys.

As discussed at the Technical Meeting, PCA has significant reservations that the approach outlined in this commitment will provide adequate information. However, we are reiterating our information request to allow the proponent an opportunity to demonstrate that its approach will provide the required information. If a review of the response to this Information Request shows the information is not adequate, then we will consider submitting a request for ruling regarding this issue.

Request:

1. Describe the potential impacts on woodland caribou from the road routing and road operation during the winter.
2. Describe the associated mitigation for these impacts.

IR Number: Parks_Canada_2-9
Source: Parks Canada Agency/Environment Canada
To: Canadian Zinc Corporation
Subject: Assessment of spills and identification of mitigation along the access road and at the mine site
References: Information Request Response – Appendix F: Spill Contingency Planning
Technical Meeting – Day 2 – Undertakings # 13, 14, 15

Preamble:

In its response to first round Information Requests on spill contingency planning, Canadian Zinc (CZN) noted its intent to focus on the “assessment of the risks of spills occurring and mitigation considerations.” The adequacy of the response was discussed during the Technical Meeting, particularly by Environment Canada (EC) and Parks Canada Agency (PCA), and CZN made a commitment to provide more information and rigour to this assessment. The discussion included a request to clarify some of the examples in CZN’s response including: sulphuric acid spills, sensitive areas, an assessment of the impacts, clean up challenges, and a consideration of this information along the full length of the road. PCA has a mandated interest in this assessment in areas where spills could occur along the length of road within Nahanni National Park Reserve (NNPR), or in areas where a spill could have an impact on valued components within NNPR. EC’s interest extends to the entire length of the road, and to the mine site as well.

The initial IR response included some examples of high risk areas (steep grades), environmentally sensitive areas (karst) and spilled substances (sulphuric acid). Both PCA and EC require a more comprehensive evaluation. For instance, in addition to the karst, other sensitive areas would also include areas near bull trout spawning habitat, or key terrestrial habitat for migratory birds. Note that the existing access road and sections of the proposed Silent Hills re-alignment cross a site which supports roughly 8% of the Canadian breeding population of Trumpeter Swans. The Tetcela River and Fishtrap Creek feature the most extensive wetlands in the southeastern Mackenzie Mountains. ⁱ

The requested assessment information would be consistent with that provided in other project reviews considered by the Board, including, for instance, the review of the DeBeers Snap Lake Diamond project. In that review, the proponent followed a risk assessment approach to assess impacts of accidents and malfunctions. The assessment considered frequency, and consequence of a number of spill risk scenarios.

PCA and EC acknowledge CZN’s commitments within the technical meeting to provide this information. This information is required for Responsible Ministers to consider significance and potential mitigation before the end of the environmental assessment process. For the sake of clarity and completeness, PCA and EC reiterate the request as follows:

Request:

1. Conduct a spatial risk assessment along the length of the road, that considers the frequency of spills, the consequence of spills, and the challenges of clean up. The assessment should lead to a fuller assessment of the potential impacts of spills, appropriate mitigation, and their significance. The information requested should include:

(a) evaluation of locations where the frequency of potential spills is high, including, without limitation, steep grades, and hairpin turns. Where possible, this should include measurable/numerical limits (e.g. grade);

(b) evaluation of locations and seasonal conditions where the environmental consequence of a spill is high, including, without limitation, the karst landforms, bull trout spawning areas, trumpeter swan habitat, Polje Creek, and shoulder seasons conditions that may increase movement of contaminants;

(c) evaluation of locations and seasonal conditions where spill response and/or clean-up is challenging, including, without limitation, difficulties in mobilizing equipment, or containing contaminants;

(d) identification of the impacts of spilled substances, including all substances that may be transported over the road, including, without limitation, sulphuric acid, ore concentrate, process reagents, and fuel. This may include an evaluation of worst-case scenarios related to the above-noted risk factors.

(e) identification of mitigation considerations to address these risks, including both design and operational mitigations.

ⁱ Latour, P.B., J. Leger, J.E. Hines, M.L. Mallory, D.L. Mulders, H.G. Gilchrist, P.A. Smith and D.L. Dickson. 2008. Key migratory bird terrestrial habitat sites in the Northwest Territories and Nunavut. 3rd edition. Canadian Wildlife Service Occasional Paper No. 114. Available at <http://www.ec.gc.ca/Publications/default.asp?lang=En&xml=4625F589-01A1-4A7B-BBCE-C8E36573B657>