

EA0809-002: Prairie Creek Mine, Canadian Zinc Corporation
Final Submission by the Nahʔą Dehé Dene Band
June 3rd, 2011

Plain Language Summary

The Nahʔą Dehé Dene Band (NDDB) has been concerned about the impacts of Prairie Creek Mine for the past thirty years. The mine is located in the Nahanni River watershed and is upstream from the community of Nahanni Butte. Historically, NDDB was concerned about the establishment and preliminary operation of the mine and the risks to the watershed from the tailings pond and other abandoned wastes. More recently, NDDB has been concerned about potential impacts to water, fish, and wildlife from both pilot and expanded production operations at the mine site and from the hauling of materials and ore along the winter access road. Because of these concerns, in 2008 NDDB asked the federal government to carry out an environmental assessment of the mine before giving it the permits it needs to start full-scale production.

Over the past few years, NDDB has carried out research, held internal community meetings, met with the mine owner -- Canadian Zinc Corporation (CZN), and participated in environmental assessment meetings and hearings. NDDB has continually stated that it wants the water, fish, and wildlife protected as much as possible.

NDDB has also expressed interest in benefiting from mine operations through training, employment, and business opportunities. Recently, NDDB and Canadian Zinc Corporation signed an impact benefit agreement (IBA) that will provide benefits to the community but still allow NDDB to push for strong environmental protection measures. This IBA, if properly implemented, will reduce negative social impacts and strengthen positive social and economic benefits from the mine. Using the IBA and the environmental assessment process, NDDB wants to find the best way to balance land, water, and wildlife protection with economic benefits for the community.

At this time, NDDB still has the following concerns about the environmental impacts of the mine:

- Possible contamination of the water and fish in Prairie Creek from mine operations;
- Possible contamination of wetlands and waterways around the mine site along the winter haul road corridor from spills;
- Contribution to cumulative contamination of the Nahanni River, through Prairie Creek;
- Disturbance to wildlife,-- particularly boreal caribou, moose, and Dall's sheep -- around the mine site and along the winter haul road corridor;
- Damage to cultural resources in the traditional mountain passes from winter haul road operations; and
- Overhunting and other disturbances to wildlife from public access to over-wintering habitat along the winter haul road corridor.

NDDDB believes that further actions could be taken to protect the water in Prairie Creek. The first is to improve the efficiency of the Water Treatment Plant so that the waste water entering Prairie Creek is similar to the quality of the water already in the creek and does not have to be mixed with creek water in order to meet protective water quality objectives. If the Water Treatment Plant cannot be improved, then NDDDB wants CZN, the regulators, and NDDDB to reach consensus on the protective water quality objectives to be set for Prairie Creek before a water licence is issued.

NDDDB wants to strengthen the Spills Contingency Plan for the mine area and access road so that all possible risks of spills are reduced as much as possible. NDDDB also wants CZN to demonstrate that the mine is profitable enough that cost considerations will not outweigh environmental safety considerations arising from hauling operations.

NDDDB wants to prevent the Prairie Creek Mine from contributing to the long-term contamination of Prairie Creek and the Nahanni River by reducing ongoing leaking of harmful minerals like selenium mercury from the mine waste that has been put back into the ground. At the very least, ongoing monitoring of possible leaking of harmful minerals should take place so that steps can be taken in the future to deal with this problem. Funds need to be put aside now to fully cover the costs of correcting unforeseen problems in the future.

NDDDB wants the Draft Wildlife Management Plan to be strengthened so that more active and structured monitoring will occur. The present draft plan is based on documenting wildlife sightings and encounters, but this is not adequate to identify, understand, and explain changes to wildlife that may occur. Good information on changes to wildlife is necessary for future decisions regarding mine operations.

NDDDB wants to participate in the research and monitoring of possible archaeological sites, especially in the mountain passes used traditionally by the NDDDB people.

NDDDB wants public use of the access road to be restricted. If this can't be done, then NDDDB wants strict rules in place so that overhunting along the access road does not occur.

NDDDB wants ongoing support from CZN and government agencies so that it can take full advantage of training, employment, and business opportunities from the mine. It also wants proactive support to reduce negative social impacts that may arise.

NDDDB wants funding to be able to participate fully in the proposed Prairie Creek Technical Advisory Committee. This committee will review and provide advice on monitoring and other technical matters that have to do with mine operations.

Introduction

The Nahʔą Dehé Dene Band (NDDDB – also known as the Nahanni Butte Dene Band) has had long-standing concerns about the impacts of the Prairie Creek Mine since it was first developed in the late 1970s and early 1980s. These concerns have arisen because the mine operation is wholly within the traditional land use area of the NDDDB, which encompasses the greater Nahanni River watershed, and because the Band's home community of Nahanni Butte is downstream from the mine site. Furthermore, the winter haul road to the mine site runs through ecologically sensitive traditional hunting and trapping areas of NDDDB members. For these reasons, in spite of some limited engagement with the mine from an employment perspective, the NDDDB has taken a cautious approach to mine operations and has expressed ongoing concerns about damage to the land and pollution of the water from proposed mine operations.

In July 2008, when Canadian Zinc Corporation (CZN) began the process of applying for a Type A water licence and related land use permits to expand its operations from 'pilot' to 'production' capacity, NDDDB asked the federal Department of Aboriginal Affairs and Northern Development¹ (AANC) to refer the licence application to a formal environmental assessment (EA) process. AANC agreed to this request and the project was referred to EA in the late summer of 2008.

Following this referral, NDDDB entered into two separate but parallel processes regarding the proposed Prairie Creek Mine operation:

- Engagement in the EA, beginning with an assessment of NDDDB traditional interests and concerns; and
- Negotiation of an Impact Benefit Agreement (IBA) with Canadian Zinc Corporation.

In April 2009, the Nahʔą Dehé Dene Band (NDDDB) published a confidential report entitled 'Traditional Knowledge Assessment of the Prairie Creek Mine' that: a) provided an overview of the history of the Nahʔą Dehé got'ine (people) and their traditional land use and cultural activities in the Nahʔą Dehé (Nahanni River) valley and surrounding area; b) described specific traditional values and interests in the area potentially impacted by the Prairie Creek Mine; and c) identified preliminary concerns, from a cultural perspective, about the operation of the mine and winter haul road operations. A copy of this report was submitted to the Consultation Support Unit of AANC, which was the agency that funded the traditional knowledge (TK) assessment. The concerns identified in this report were also discussed internally amongst Band members and with Canadian Zinc Corporation through a series of meetings held during the spring and summer of 2009.

In August of 2009, NDDDB prepared a summary of this report and subsequent meetings and submitted this summary, entitled 'Addendum to the April 2009 Document: Traditional Knowledge Assessment of the Prairie Creek Mine', to Canadian Zinc Corporation, AANC, Parks Canada, and the Mackenzie Valley Environmental Impact Review Board (MVEIRB), with some sections remaining confidential. This addendum included the following information:

- an overview of the community concerns expressed during the original TK assessment;

¹ Then referred to as Indian Affairs and Northern Development.

- a summary of the specific concerns and recommendations arising from the CZN presentations and subsequent discussions with the community, along with recommendations to address these concerns; and
- a summary of the traditional knowledge information which substantiated NDDDB rights and interests in relation to CZN's proposed mining operations.

The TK assessment and summary documents provided a basis for both IBA negotiations and ongoing participation in the EA process.

In March 2010, CZN submitted its Developer's Assessment Report (DAR) to the MVEIRB. Since that time, NDDDB has participated in a review of the DAR through background research, meetings with CZN, meetings with regulators, community information sessions, and participation in technical hearings. NDDDB also carried out community-based socio-economic research that resulted in the tabling of the document 'Human Resource and Community Economic Development Survey Report and Analysis (January 2011)' with the MVEIRB.

This ongoing engagement in the EA process has been guided by the overriding position of NDDDB, confirmed through the community survey, that potential benefits from the mine operation must be balanced against potential damage to the land, water, and wildlife from mine operations. In essence, the community understands and appreciates the potential benefits arising from mine operations, but does not want to sacrifice the long-term health of the land for short-term economic gain.

Given this perspective, in February 2011 NDDDB concluded an IBA agreement with Canadian Zinc Corporation that acknowledges NDDDB Aboriginal and treaty rights in the Prairie Creek area and offers training, employment, business, and other benefits to the community – while affirming NDDDB's right to continue to protect its traditional land use and environmental interests through ongoing engagement and intervention in the EA process.

This final submission is a continuation of NDDDB's efforts to find an acceptable balance between environmental protection and economic benefit in relation to the Prairie Creek Mine.

Description and Discussion of Impacts

In its original 'TK Assessment of the Prairie Creek Mine' report, the following potential major environmental impacts were identified in detail. These were reiterated in the addendum report submitted to the MVEIRB.

- "Although the Prairie Creek Mine is a considerable way up the creek from the high land use area at its mouth and in Dahtaihtth'i (Deadmen Valley) generally, K'atlo Dehe [Prairie Creek] is a swift and shallow creek and therefore likely easily impacted by pollutants, cumulatively or through a sudden spill. There are concerns that any polluting of the river would negatively impact fish using the lower portion of the creek, big game using licks in the vicinity of the mouth of the creek, and harvesters using the river for fishing, hunting, or camping purposes while occupying or traveling through the area.

- A primary concern with respect to the Prairie Creek Mine is the possibility of long-term or sudden contamination of Nahq̄a Dehé [Nahanni River], either through the K'atlo Dehe itself, or through the valley along Ée Túé [beaver dam water, or Fishtrap Creek] from potential spills of fuel or other contaminants along the haul road². The seasonally shallow and slow water, the back channels, and the sand and gravel islands, which are subject to seasonal flooding, are a potential catchment area for upstream pollutants. Any type of contamination could affect fish populations in the river and make this area less suitable for occupation and harvesting purposes.
- High traditional use of the wetland valleys running north of Nahq̄a Dehé along Ée Túé, Tehts'éhia Dehé (Tetcela River), and between Shiha [small mountains, or Silent Hills] and the Nahanni Range, due to rich and varied habitat in these valleys, makes these areas particularly sensitive to industrial development and therefore of concern to the Nahq̄a Dehé Dene Band. First, the integrity of the wetlands and the creeks that run through these valleys must be preserved, particularly given that the haul road crosses the upper reaches of Ée Túé, which is a fish harvesting creek that flows directly into Nahq̄a Dehé. Maintaining natural water quality is of paramount importance along the entire haul road. Second, wildlife over-wintering in the area may be disturbed by winter hauling and transfer activities (particularly sensory disturbances), and winter and spring habitat may be damaged by haul road construction and possible contaminant spills. Third, the Nahq̄a Dehé Dene Band is very concerned that increased access to this area by outside people using the haul road for winter hunting activities may affect wildlife populations.
- Given that the ancestors of the Nahq̄a Dehé people are known to have traveled overland to a greater extent than via waterways, the mountain passes that provide easy access into and between valleys are potential areas for pre-historic and historic artifacts. For this reason, it would be useful to carry out archaeological work at Nóḡha Eteneh Goteodé?á (wolverine trail) and particularly at Tthq̄ot'oooh (Second Gap) prior to any redevelopment of the winter haul road; before site damage might occur.
- Given that the mine haul road runs directly through [the] lowland area [between Second Gap and the Liard River] in a meandering pattern, through country that harbors mineral licks and over-wintering habitat for woodland caribou, it is important to fully assess the current alignment of the road in this particular area to ensure that it is not affecting important wildlife habitat. The Nahq̄a Dehé Dene Band has also expressed concerns about use of the road by outside hunters, particularly their access to woodland caribou in the lowland area, and the possibility of over-harvesting.”

² During the initial operation of the haul road in 1982, a major fuel spill did occur and it is not yet clear whether this spill has been fully cleaned up (DIAND, 1982).

In essence, the community is concerned about the following impacts:

- Short and/or long term contamination of the water and fish in Prairie Creek from mine operations;
- Short and/or long term contamination of wetlands and waterways around the mine site and along the winter haul road corridor from spills;
- Contribution to short and/or long term contamination of the Nahanni River, through Prairie Creek;
- Disturbances to wildlife,-- particularly boreal caribou, moose, and Dall's sheep -- around the mine site and along the winter haul road corridor;
- Damage to cultural resources in the traditional mountain passes from winter haul road operations; and
- Overhunting and other disturbances to wildlife from public access to over-wintering habitat along the winter haul road corridor.

This final NDDDB submission will address each of these impacts in relation to the information presented in the DAR and subsequent hearings, information request rounds, and technical reports.

Contamination of Prairie Creek

Developer's Conclusion

It has been very difficult for NDDDB to follow and fully comprehend the water quality management approach taken by Canadian Zinc Corporation because of the complexity of the approach. Moreover, until as recently as late May 2011, neither the DAR nor subsequent technical documents submitted to the MVEIRB by CZN regarding water quality contained clear, reliable, and convincing water quality prediction scenarios; complete and specific impact predictions; and comprehensive mitigation measures.

However, based on the most recent memos submitted to the MVEIRB by Hatfield Consultants, in response to concerns expressed by NDDDB and regulators at both the October 2010 and April 2011 technical hearings, NDDDB has taken the liberty to summarize CZN's conclusion as follows:

The water quality management system being proposed by CZN -- consisting essentially of a twinned Water Storage Pond, reuse and controlled balancing of mine water versus mill process water in the effluent on a seasonal basis, a Water Treatment Plant treating mill and process water separately, a two-pipe exfiltration trench, use of an initial dilution zone (IDZ) in Prairie Creek, and downstream Site Specific Water Quality Objectives (SSWQOs) based primarily on aquatic effects toxicity testing -- "should be sufficiently protective of the aquatic environment downstream of the Prairie Creek Mine" (p. 18; Appendix D/Memo 1; May 11, 2011).

With respect to post-closure impacts, Robertson Geoconsultants Inc. states that "Under average flow conditions, the predicted post-closure concentrations of most trace metals (including Cd, Pb, Zn, Sb, and Hg) are slightly higher than for pre-mining conditions. However, only mercury is predicted to

exceed the site specific objectives for average flow conditions at Harrison Creek and the Park Boundary... Under minimum flow conditions, the influence of seepage from the backfilled mine is predicted to be more evident. Under those flow conditions, post-closure concentrations of several trace metals (including Cd, Pb, Zn, Sb, and Hg) are predicted to be higher than estimated pre-mining concentrations. Zinc and mercury may exceed their respective site specific objectives during winter low flow” (RE: ADDENDUM – Updated Predictions of Post-Closure Water Quality in Prairie Creek; Appendix N; March 11, 2011; p. 10). Neither Robertson nor CZN provide an assessment of the long-term impact of this increase in metal concentrations in Prairie Creek.

NDDB Position

NDDB continues to have concerns about the assumptions and predictions being made by CZN in relation to its water quality management system. Since submitting the DAR in March 2010, CZN has made a number of changes to its proposed water management system:

- The Water Storage Pond has been redesigned to separate the mill process water from the mine water;
- A new loading ratio of 500:1 (creek water to process water) was recently introduced (Appendix C; May, 2011; p. 6);
- The outfall into Prairie Creek has been redesigned four times -- from direct discharge into Harrison Creek, to a single pipe outflow to Prairie Creek, to a diffuser, to a one-pipe exfiltration trench, to the currently proposed two-pipe exfiltration trench; and
- The water quality data appears to have been recalculated using different mathematical methods to justify the safe use of toxicity-derived SSWQOs at the outer edge of an initial dilution zone (IDZ).

Changes to the water quality management system have occurred as recently as May 22nd of this year in spite of the fact that final technical submissions by NDDB and regulators are due June 3rd.

Dealing with the late submission of new data and other changes has been problematic.

From an NDDB perspective, it appears that these changes have been made because CZN cannot meet the most protective water quality objectives at the end-of-pipe and therefore has to use higher, toxicity-based objectives and an IDZ in Prairie Creek to substantiate its water quality management system, taking into account the significant seasonal flow variation in the river and in the water flowing out from the mine shaft as well as the toxicity of its mine process water.

Although these changes could be considered a positive result of the EA process (improvement of mitigation measures), they also indicate to NDDB that the project was not well thought out in advance of the DAR with respect to some fundamental environmental issues. From an NDDB perspective, these ongoing changes raise uncertainties and concerns about the integrity of the overall water quality management system.

The main concerns are about the physical complexity of the water management system, its vulnerability to technological and/or human error or malfunction, the process for establishing and monitoring the SSWQOs, and the difficulty in establishing effective and timely intervention and mitigation of problems as they arise.

In a recent memo (Appendix F/Memo 3; May 11, 2011), Hatfield Consultants, working on behalf of CZN, acknowledges the complexity of the system by stating that “Use of environmental (receiving water) quality targets rather than effluent quality targets has precedents (for example, air quality permitting often follows this approach), and would place responsibility on the mine to ensure downstream water quality in Prairie Creek was maintained, while allowing flexibility in the management of effluent discharges to meet these downstream water quality compliance objectives. However, *operationally this would be more complex than regulation of end-of-pipe loadings* “ (p. 9 -- italics added).

From NDDDB’s perspective, there are simply too many variables to manage to reliably ensure the protection of Prairie Creek and downstream water bodies, including the onsite management of process and mine water; the discharge balance between process and mine water; the seasonal variations in the flow rate in Prairie Creek (including the possibility of extreme low flows during late winter); operation of an unproven exfiltration system, which, according to Northwest Hydraulic Consultants, is not normally used in-stream or with upward discharge (Appendix A, April 28, 2011; p. 3); and accurate monitoring of in-stream mineral concentrations in a vaguely-defined IDZ.

It is important to note that the technological, mechanical, and logistical design of this water management system has never been fully presented or discussed by CZN, so its efficacy and physical limitations have not been reviewed to date. In essence, its successful technical operation has been assumed but never presented for formal review and critique.

Even if the water quality management system works as proposed, the system is expected to result in seasonal, operational, and post-closure exceedances of the SSWQOs proposed by CZN. But the response to potential exceedances will take considerable time to occur according to the Water Quality Monitoring and AEMP Approach outlined in Appendix O of the Second IR Response (pp. 9-14). According to the procedures outlined, exceedances simply lead to more sampling, and all samples will have to be sent off-site for analysis before further action. NDDDB estimates that it will take at least one month to confirm whether an exceedance has occurred, during which time the exceedance will have continued without corrective action taken, and only if and when acute toxicity has been confirmed will process water be held back and corrective action taken.

NDDDB still does not understand why CZN does not publicly address the most obvious mitigation measure: enhancement of the Water Treatment Plant such that mineral concentrations can meet EQCs *most protective* of the aquatic environment, before the effluent enters Prairie Creek. Hatfield (Appendix D/Memo 2; May 9, 2011) notes that one of the CCME (2003) factors considered in defining IDZs is that “Mixing zones should not be used as an alternative to reasonable and practical pollution prevention, including wastewater treatment (pollution prevention principle)” (p. 3). Although Hatfield states in this memo that “Best available treatment technologies are planned to treat wastewater that cannot be recycled before discharge from the mine” (p. 3), CZN has acknowledged to NDDDB that the treatment plant could be enhanced (CZN personal communication with Peter Redvers, NDDDB consultant, October 2010). CZN has failed to publicly present a rationale for not doing so.

With respect to post-closure impacts, NDDDB is concerned that the disposal of tailings in the mine shafts will result in long-term leaching of metals via groundwater into Prairie Creek, leading to long-term disruption of existing water quality parameters and the potential bioaccumulation of toxins in Prairie Creek and waterbodies downstream. CZN has not provided a clear and detailed assessment of the *impact* of the long-term and cumulative increase of metals in Prairie Creek post-closure nor provided firm mitigative measures to address this concern.

NDDDB Recommendations

In order to protect its traditional interests in the Prairie Creek watershed, NDDDB recommends that the MVEIRB require Canadian Zinc Corporation to enhance its Water Treatment Plant such that it can meet EQCs *most protective* of the aquatic environment.

If there is a reasonable and justifiable rationale for not enhancing the Water Treatment Plant to meet the most protective EQCs, NDDDB recommends that the MVLWB hold off on issuing a Type A Water Licence until there is full consensus between CZN, regulators (Parks Canada, Environment Canada, AANC, and Department of Fisheries and Oceans), and NDDDB regarding the water quality management system and criteria utilized such that minimal changes to the aquatic environment can be assured. NDDDB would accept a consensually-agreed-upon water quality management system.

With respect to post-closure impacts, NDDDB recommends that the MVLWB hold off on issuing a Type A Water Licence until there is full consensus between CZN, regulators, and NDDDB on the long-term efficacy, stability, and/or impact of the backfill tailings disposal system such that there is no significant potential long-term bioaccumulation or bio-concentration of contaminants in the downstream environment through groundwater leaching. Consensus must also be reached in relation to post-closure monitoring time frames.

NDDDB further recommends that CZN be required to post a reclamation bond significant enough to carry out post-closure monitoring and mitigation where leaching of metals is predicted to occur.

Potential Significance of Impact

If these recommendations cannot be met, NDDDB is concerned that the Prairie Creek aquatic environment will not be adequately protected and that both short-term and long-term degradation of the Prairie Creek watershed will occur, to the detriment of the NDDDB traditional land use area. NDDDB considers this potential degradation to be significant given the area's current pristine qualities and the fact that the mine is upstream of the Nahanni National Park Reserve, the South Nahanni River, and the community of Nahanni Butte.

Contamination along the Winter Haul Road

Developer's Conclusion

In Appendix I of its response to the second round of IRs (March 2011), CZN presents Table 2: Assessment of Spill Risk and Consequence along Access Road. In this table, CZN rates the risk and consequence of spills along Funeral Creek, sections of Sundog Creek, and the west slope of the Silent Hills as combinations of moderate-high, high-high, and high-moderate, although it does not fully detail the nature, extent, or characteristics of these risks.

CZN does note that a spill along the road between kilometres 0 and 54 would have a direct impact on either bull trout and/or grayling migrating or overwintering in the area (pp. 6-7)³. A spill between kilometres 84 to 101 would potentially impact the Tetcela River and Fishtrap Creek wetlands. Spills along the other sections, given less proximity to waterways, would have less significant impacts but are still to be avoided.

According to CZN, mitigation has or will be addressed through the following actions:

- Realigning the winter road, where possible, to avoid karst formations, wetlands, and steep slopes (p. 8);
- Using barriers or berms in high risk areas to prevent contaminant flow in waterways (p. 9);
- Developing a Spill Contingency Plan that will focus on fuel and sulphuric acid, define procedures for spill response, employ a trained spill response team, designate responsibility for clean-up, and utilize a third-party mobile spill response unit (pp. 1-3 and 11-14); and
- Controlling road operations to reduce risk -- ie. limiting the operational season, reducing speeds, ensuring trained drivers, and locating spill kits along corridor (pp. 9-10).

NDDB Position

NDDB has promoted and supported road realignment to avoid wetlands and supports the development of a Spill Contingency Plan, with NDDB involvement. However, given that NDDB believes that spills cannot be fully prevented during winter haul operations, considering the extreme nature of the terrain and weather in the area, NDDB has the following outstanding concerns relating to spill prevention and response:

- It is not clear whether adequate mitigative measures have been identified for the first 54 kilometres of the road, given the high risk and moderate to high impacts of a spill along this section;
- It appears that the proposed realignment of the road to the west of Silent Hills to reduce grade cannot be done, given soil and frost conditions (see Second IR Responses, Appendix I,

³ NDDB notes the discrepancy between this Appendix I statement from the Second Round of IR responses that grayling inhabit tributaries above the Prairie Creek Mine and the statement in Appendix I of the May 9th, 2011 Hatfield letter that the Prairie Creek fish community only includes "slimy sculpin... bull trout and mountain whitefish" (p. 2). NDDB has asked for clarification from DFO of this apparent discrepancy regarding grayling presence in the upper Prairie Creek watershed, given that NDDB harvest grayling in the pools along the mouth of Prairie Creek and are particularly concerned about contaminant impacts to grayling.

p. 8; EBA Consultants, Reclamation Assessment, Invasive and Rare Plant Survey 2010, pp. 1 and 8)-- if not, then other mitigative measures need to be discussed and identified for this steep section of the road;

- Spill response will be limited by the logistics of the road itself, particularly where there are adverse road or weather conditions, such as unseasonal melting or winter storms;
- There may be reliance on subcontractors to be accountable for spill response (Appendix I, p. 3;
- Regulating and controlling road operations must be carried out in the context of profitability – ie. CZN must move approximately 4000 30-tonne loads of concentrate out from the mine and a significant number of backhaul loads of materials into the mine during the winter period (likely early January through mid-March) for this mine to be viable – which means that the operational season, truck speed, loading and off-loading procedures, driver training requirements, etc. will be affected by cost considerations and not just safety considerations, particularly where mine operations are marginally sustainable. Sustainability of road operations has to take into account the possibility of shorter or irregular frost and ice conditions due to climate change.

NDDB Recommendations

In order to reduce the potential for, or impacts from, spills along the haul road, NDDB recommends that:

- More stringent spill prevention and response plans be developed and approved by regulators for the first 54 kilometres of the road prior to final approval of mine operations;
- CZN clarify and finalize its road alignment plan for the Silent Hills prior to final approval of mine and access road operations;
- The Spills Contingency Plan be required to address the potential for spill events that occur during adverse road or weather conditions;
- In the Spills Contingency Plan, CZN hold overall responsibility for spills response whether spills occur from the actions of CZN or subcontracted personnel (individual party liability can be addressed after the fact);
- NDDB be consulted and play a meaningful role in Spill Contingency Planning and response; and
- CZN table a Mine Economic Feasibility Report with regulators prior to final approval of mine operations to ensure that there is enough profitability in the mine that profit versus safety considerations can be reasonably balanced without affecting mine sustainability.

Potential Significance of Impact

NDDB believes that there is high potential for trucks to go off the road and/or tip over during hauling operations given the nature of the terrain and weather along the winter road – and that, as a result, spills are likely to occur, with potentially significant negative impacts, particularly where fuel, acids, or water soluble chemicals are involved. CZN has, in fact, identified risk-consequence ratings of moderate-high, high-high, and high-moderate in some major sections along the proposed winter road.

Contamination of the Nahanni River

Developer's Conclusion

Canadian Zinc did not address potential impacts of mine operations on the Nahanni River.

NDDB Position

NDDB views the Prairie Creek Mine as only one of a number of upstream developments that include both the Selwyn and Canadian Tungsten mining operations. Cumulative impacts on the Nahanni River are of high concern to the community. Aside from upstream mining operations, NDDB must take into account environmental changes due to climate change and air-borne contaminants from other jurisdictions. From this perspective, a particular concern that has surfaced is bioaccumulation of mercury in fish populations in Prairie Creek and in the Nahanni River, as well as cumulative increases in other elements that bio-accumulate or bio-concentrate, such as selenium.

In its Second IR Responses document of March 2011, CZN presented Table 8 (Appendix D, p. 26), which shows predicted exceedances of proposed SSWQOs for mercury at most times of the year. From this chart, it also appears that mercury will remain in high concentration well below the effluent discharge site and the proposed IDZ, which means that it will likely get carried down to the Nahanni River, into and through the grayling overwintering ponds just above the Nahanni River on Prairie Creek, and further downriver to the slow-moving ox-bow bends in the Nahanni River just above the community of Nahanni Butte. Although Hatfield, in Memo 4 of May 9, 2011, indicates that the water conditions in Prairie Creek “would not favour the formation of methylmercury” (p. 4), the water conditions at the mouth of the creek and in the Nahanni River were not assessed. It is not clear whether the production of methylmercury would increase downstream and where that increase might occur (ie. where river conditions change such that the likelihood of methylmercury production increases).

NDDB has found out, through recent mercury testing in the Dehcho region carried out by Marlene Evans of Environment Canada, that mercury levels are generally rising in Dehcho waterbodies due to two phenomena: increased leaching of natural mercury from the ground due to permafrost melt and increased deposition of mercury throughout the Dehcho from airborne coal plant emissions in China (personal communication with Crosscurrent Associates Ltd., March 4th, 2011). For this reason, controlling mercury contamination, where it can be controlled, is emerging as a significant issue for NDDB.

NDDB Recommendation

NDDB recommends that, as a component of its previous recommendation regarding the Prairie Creek Mine water quality management system, particular attention be paid to reducing the presence of mercury and any other elements in the mine effluent known to bio-accumulate or bio-concentrate, such that levels of these elements do not exceed existing levels in Prairie Creek at all times.

Potential Significance of Impact

If the concentrations of mercury and other bio-accumulating or bio-concentrating elements in Prairie Creek exceed existing levels as a result of mine operations, then the mine is adding to the potential cumulative effects and impacts of these elements on the Nahanni River system, to the potential detriment of NDDB members who rely on both water and fish downstream for their own sustenance.

Disturbance to Wildlife

Developer's Conclusion

The Draft Wildlife Management Plan (Golder Associates; February 23, 2011) presented as Appendix K to the Responses to the Second Round of Information Requests (Canadian Zinc Corporation; March 2011) states that “Impacts can result from activities or features that attract wildlife; disrupt, impede or reduce movement; alter behaviour; or cause direct or indirect wildlife mortality” (p. 7). Golder Associates goes on to state that “Potential Project-related impacts to wildlife include:

- Direct and indirect effects to wildlife health and mortality;
- Changes in behaviour from attraction or avoidance by wildlife from adjacent areas;
- Direct and indirect wildlife mortality due to an increase in trapping and hunting activities associated with the access road (related to improved access and increased effectiveness of those activities);
- Impediment, disruption, or reduction of movement for individuals in local populations along traditional travel routes;
- Alteration in wildlife behaviour or wildlife mortality from human, vehicle, or aircraft interactions and collisions; and
- Disturbance related (e.g. noise) and physical barriers from access roads” (p. 7).

However, Golder Associates also states that “It is not the intent of this document [Draft Wildlife Management Plan, or WMP] to provide an impact assessment, but to provide a plan to manage and reduce risks to wildlife” (p. 7).

For an actual impact assessment, NDDB refers back to the Developer's Assessment Report of March 2010, Volume 1. In that document, CZN states that the various elements of on-site mine operations will have the following impacts:

- The existing and proposed mine footprint are “limited and not of significance for wildlife” (p. 308);
- The ingestion of particulate matter from contaminated vegetation “is expected to be limited, given the rate of deposition onto the ground surface” (p. 309);
- Contaminant exposure, particularly to Dall's sheep which historically have frequented the mine site, is possible, but will be mitigated through on-site contaminant controls (p. 309-310);

- Sensory disturbance cannot be determined because “There has not been any documentation of disturbance related effects on wildlife since exploration or development work started” (p. 310”);
- Habituation of wildlife to the mine site is “not likely to occur” (p. 311) except for Dall’s sheep which “are already habituated to the presence of the Mine and regularly enter the site to lick for soda ash stored in the equipment storage yard” (p. 311) [the significance of potential ongoing habituation is not provided];
- Although CZN admits “it is possible that sheep may be lambing in proximity to the Mine and have not been affected by Mine-related activity to date” (p. 311), no prediction of impacts from expanded mine operations is provided;
- Wildlife movements may be affected along and across the Prairie Creek valley near the mine site, although grizzly bears are expected to continue traveling along the valley floor by the mine site, but “There is little that can be done to mitigate the potential for impact to wildlife movements until the Mine site is shut down and reclaimed” (p. 312); and
- “Wildlife mortality related to the sources of potential impact and risk is expected to be minimal and not of significance, with the exception of grizzly bears where encounters with humans [which NDDDB knows have occurred] are expected to increase with full production” (p. 313).

With respect to winter access road operations, CZN makes the following impact-related statements:

- The footprint of the access road will be a cleared roadbed of 174 kms long and 5 m wide, with some cut-and-fill, some granular fill, and some temporary structures [but CZN does not provide an impact assessment of this footprint, stating instead that the access road has been in existence since 1980 (p. 313)];
- Airborne contamination is “expected to be limited since most forms of wildlife in the area range widely and are not restricted in their occurrence to location in immediate proximity to the access road” and therefore “Mitigation measures are not considered necessary” (p. 314);
- Sensory disturbance from noise will occur but “In any event, given the seasonal constraints that the hauling operation is faced with, there is no reasonable or practical measures that can be implemented to reduce sensory disturbance” (p. 314);
- Habituation of wildlife to the access road “is not anticipated” (p. 315) as proper handling and disposal of wastes will occur and salt will not be used along the road;
- CZN anticipates that access road activities will potentially last from early November to mid-April but that there will be “limited exposure of wildlife along the access road during construction and operation” (p. 315) although logging of wildlife sightings will occur;
- Mortality of wildlife through vehicle collisions may occur for Dall’s sheep, woodland caribou, moose, wood bison, wolves, and wolverine but will be mitigated by limiting haul speeds, maintaining low snow banks and/or creating opening through snow banks every 100 m, and posting advance warnings of possible wildlife sightings; and
- Hunter access will be monitored by a CZN-funded and NDDDB-staffed checkpoint near the beginning of the access road during the operational season.

NDDB Position

NDDB acknowledges that unmitigable impacts will occur to wildlife as a result of mine production operations, but insists that reasonable and sound mitigation measures must nevertheless be taken in order to reduce those impacts. However, mitigation measures cannot be properly established and monitored for effectiveness unless there is both adequate baseline data and a formal impact-monitoring program in place. NDDB believes that neither of these mitigative elements has been fully addressed in the Draft Wildlife Management Plan.

For example, in spite of the ongoing presence of Dall's sheep in and around the mine site, CZN acknowledges that there have been no studies of the impact of the mine's historic or current operations on local populations. Limited baseline data on sheep populations, habitat use, lambing, or impacts of habituation have been gathered.

Furthermore, although CZN asserts that the access road has been in existence since 1980, the majority of the road (from Cat Camp east) was only used for two winters as a supply road, was never used or originally intended for use as a concentrate haul road, and has grown-in with vegetation considerably over the past three decades of disuse. In fact, EBA Engineering Consultants Ltd. has stated that "The road alignment has not been used for nearly 30 years and appears to be naturally revegetating very well without assistance... Virtually the entire road has been re-colonized by adjacent vegetation... the habitat on the road within the Alpine Tundra is at an advance seral stage" (EBA, Prairie Creek Mine Responses to Information Requests, Appendix B, September 2010, p. 5). Wildlife impact assessment must take these considerations into account; the impacts of re-clearing, realigning, and using the road for production hauling purposes cannot be minimized from a wildlife protection perspective.

NDDB notes that the main impact predictions regarding wildlife were provided by CZN prior to the wildlife surveys carried out around the mine site and along the mine access road and surrounding area from December 2010 through February 2011. These recent wildlife surveys, which resulted in response to questions raised at the October 2010 technical hearing, showed that there are relatively high populations of woodland caribou in the area just north of the mine site in the area along the western end of the access road. The surveys also show that there are relatively high overwintering moose populations along the central portion of the access road, particularly in the valleys (Golder Associates; Technical Memorandums; January 11th and March 11th, 2011). It is already known that Dall's sheep occupy the mountains around the mine site on an ongoing basis.

NDDB notes that no further surveys are proposed by CZN, nor follow-up work that would more clearly delineate the normal habits and movements of these animal populations throughout the winter months. NDDB further notes that, in spite of apparently high over-wintering populations of woodland caribou, moose, and Dall's sheep in the area, there is no ongoing monitoring proposed in the WMP other than the recording of interactions and sightings (on-site and along access road), and occasional aerial observations by mine staff and other designated personnel.

From NDDB's perspective, the documentation of 'sightings' does not constitute 'monitoring'. Monitoring implies a more systematic set of research actions intended to detect and understand changes in behaviours or populations resulting from proposed development activities, whether or not it is believed that full mitigation of impacts can be achieved initially or through subsequent adaptive management measures. Ideally, effective monitoring can and will result in the implementation of successful adaptive management practices, which is NDDB's objective. At very least, it can provide sound information on current impacts such that mine expansion activities or ongoing cumulative impacts can be better understood for subsequent regulatory decision-making processes.

NDDB Recommendation

NDDB recommends that the Draft Wildlife Management Plan be expanded to include more proactive, science and TK-based monitoring practices, not just incident and sighting documentation, and that this redrafting be carried out by CZN in cooperation with NDDB, Parks Canada, and the GNWT. The final plan should be reviewed and approved by the proposed Technical Advisory Committee prior to any required regulatory approvals.

Potential Significance of Impact

CZN has acknowledged that limited mitigation of sensory disturbances can occur given the nature and extent of on-site and access road operations. However, the inability to limit certain types of sensory and habitat disturbances does not preclude responsibility for assessing the impact of those disturbances for future decision-making purposes (such as for mine expansion or extension, or subsequent cumulative impact assessments). If the impact of mine operations proves to be significant on resident wildlife populations, NDDB and others may wish to use this information in future decisions relating to mine operations. Significance cannot be determined without a structured, ongoing monitoring program, rooted in solid baseline data.

Damage to Cultural Resources

Developer's Conclusion

On the recommendation of NDDB, CZN carried out preliminary archaeological work at three sites along the access road in the summer of 2009. No archaeological remains were found in any of the areas examined (Developer's Assessment Report, Volume 1, p. 159). CZN is currently obliged to carry out an Archaeological Impact Assessment (AIA) of the proposed access road realignments in the summer of 2011 (CZN Responses to Information Requests; September 2010; p. 25) and is bound to report and handle archaeological remains as they are found according to GNWT legislation.

NDDB Position

Unfortunately, NDDB personnel expected to accompany and guide the archaeological work in the summer of 2009 were not available at the last moment, so the members most knowledgeable about

the identified sites were not present. NDDDB intends to fully participate in the upcoming AIA and will make a concerted effort to utilize its members who are most knowledgeable about the area. NDDDB still believes that, based on traditional knowledge research, remains may be present at the three sites identified.

NDDDB Recommendation

NDDDB recommends that the GNWT continue to oversee archaeological assessment work and that the required AIA be carried out as planned this summer, with direct NDDDB involvement. NDDDB further recommends that any cut and fill activities associated with access road construction in or around the sites of main concern be monitored by an archaeological technician and/or informed NDDDB member to ensure protection of potential heritage resources.

Potential Significance of Impact

The ancestors of the NDDDB used mountain passes extensively, so archaeological remains are more likely to occur in and around these passes. Construction activities in and around passes could damage cultural resources, although potential damage is likely low to moderate. Given that little archaeological work has been done to date in these passes, construction should be monitored for archaeological remains to the greatest extent possible.

Overhunting through Public Access to Overwintering Habitat

Developer's Conclusion

As noted in the 'Disturbance to Wildlife' section above, the Draft Wildlife Management Plan acknowledges that there may be increased killing of wildlife due to an increase in trapping and hunting activities along the access road (p. 7). CZN has not assessed or rated the degree of this impact, but the draft WMP does identify mitigation measures to reduce this potential impact. It suggests that:

- Use of recreational vehicles will be prohibited (but does not identify how this will be accomplished);
- Public use of the road will be deterred using warning signage and an NDDDB-staffed checkpoint;
- Public use and evidence of land use will be documented (although it is not clear what will or can be done with this information); and
- Off-winter entry to the access road will be blocked through the use of gates, berms, pits, and/or boulders.

CZN has stated that it would prefer to be in a position to restrict rather than just deter public use of the access road, for safety and wildlife protection reasons. In fact, it is possible that Parks Canada will restrict, if not prohibit, public use of that portion of the road inside Nahanni National Park Reserve. But Aboriginal Affairs and Northern Development (AANC), which manages road access

and use outside of the Park, has stated that, under existing legislation, it cannot restrict public use of the road.

NDDB Position

NDDB has consistently held the position that public access to the road should be restricted as a means to prevent overhunting of game animals – particularly Dall’s sheep, boreal caribou, and moose. NDDB has proposed creative solutions to access restriction, including allowing NDDB to lease or own a portion of the eastern section of the road corridor, but these ideas have been rejected by AANC due to legislative restrictions. NDDB is willing to operate a checkpoint near to the entry of the access road but, in lieu of restrictions, wants to have strict and clear warnings about the potential consequences of public use of the road. These consequences would need to be agreed to in advance by NDDB and CZN.

NDDB Recommendation

NDDB recommends, in lieu of being able to place public access restrictions on the road, that an NDDB-staffed checkpoint be established near the entry point to the road during winter operations and that the following points be agreed to and posted at this checkpoint:

- Public use of the access road is at one’s own risk;
- No extended stopping or parking is allowed along the access road (so that haul traffic is not restricted in any way);
- Haul trucks and other operational vehicles have the right-of-way at all times;
- No towing or any other vehicle maintenance services will be provided by CZN, its subcontractors, or NDDB; and
- No shooting from, across, or along the road corridor is allowed (for safety reasons).

Other deterrents may be identified over time, including possible harvesting restrictions for non-Aboriginal harvesters.

Potential Significance of Impact

NDDB considers the potential impacts of unrestricted public access to be significant, in that the Nahanni Range is home to healthy populations of Dall’s sheep, boreal and mountain caribou, and moose, all of which are target species for both Aboriginal and non-Aboriginal hunters. NDDB knows that the ban on barren ground caribou hunting north of Yellowknife and Behchoko has led to increased hunting pressure on resident species in the Dehcho region. Rich harvest areas will continue to be targeted if access is not actively deterred.

Other Issues

Socio-Economic

NDDB submitted the results of a Human Resource/Community Economic Development survey to the MVEIRB (Crosscurrent Associates Ltd.; January 2011). That survey report includes a number of socio-economic recommendations, including recommendations internal to NDDB and recommendations for other parties to consider. The recommendations for other parties to consider are as follows:

- Ensure stringent environmental protection measures are put in place and help community members fully understand these measures;
- Support and fund NDDB's training priorities;
- Assist the Band and NDDB members in getting access to capital, partners, and expertise in order to take advantage of business opportunities;
- Support and fund better counselling and healing programs to address substance abuse issues;
- Support and fund money management programs;
- Support cultural and language programs;
- Ensure that community members are allowed time off for the community fall hunt; and
- Operate initially with a 3 weeks in/3 weeks out shift option but assess the effectiveness of this shift rotation on NDDB employees on an annual basis.

NDDB has also successfully negotiated an Impact Benefit Agreement (IBA) with CZN.

If NDDB and other agencies are able to follow through on the NDDB socio-economic recommendations, NDDB is confident that negative socio-economic impacts can be mitigated and that the community will benefit in a meaningful way from the mine operation, particularly in light of the current IBA agreement.

Environmental Monitoring

In the early stages of the EA, NDDB was calling for the community to have a role in independent environmental monitoring with respect to the project. In discussions with CZN, including IBA-related discussions, NDDB has accepted a two-fold monitoring role. First, NDDB expects to be resourced by CZN and/or AANC to fully participate in the Prairie Creek Technical Advisory Committee (TAC) defined in Appendix J of the Responses to the Second Round of Information Requests (March 2011). Second, NDDB will hold CZN accountable to follow through on its commitment to hire one NDDB environmental monitor per shift for both the mine site and access road (see CZN Updated Commitments Table; March 23, 2011).

It would be useful for the MVEIRB to recommend that CZN and AANC or Parks Canada provide the funding necessary for NDDB's full participation in the Prairie Creek Technical Advisory Committee.

NDDB Final Recommendations

1. NDDB recommends that the MVEIRB require Canadian Zinc Corporation to enhance its Water Treatment Plant such that it can meet EQCs *most protective* of the aquatic environment.
 - a. If there is a reasonable and justifiable rationale for not enhancing the Water Treatment Plant to meet the most protective EQCs, NDDB recommends that the MVLWB hold off on issuing a Type A Water Licence until there is full consensus between CZN, regulators (Parks Canada, Environment Canada, AANC, and Department of Fisheries and Oceans), and NDDB regarding the water quality management system and criteria utilized such that minimal changes to the aquatic environment can be assured. NDDB would accept a consensually-agreed-upon water quality management system.
2. With respect to post-closure impacts, NDDB recommends that the MVLWB hold off on issuing a Type A Water Licence until there is full consensus between CZN, regulators, and NDDB on the long-term efficacy, stability, and/or impact of the backfill tailings disposal system such that there is no significant long-term bioaccumulation or bio-concentration of contaminants in the downstream environment through groundwater leaching. Consensus must also be reached in relation to post-closure monitoring time frames.
 - a. NDDB further recommends that CZN be required to post a reclamation bond significant enough to carry out post-closure monitoring and mitigation where leaching of metals is predicted to occur.
3. In order to reduce the potential for, or impacts from, spills along the haul road, NDDB recommends that:
 - o More stringent spill prevention and response plans be developed and approved by regulators for the first 54 kilometres of the road prior to final approval of mine operations;
 - o CZN clarify and finalize its road alignment plan for the Silent Hills prior to final approval of mine operations;
 - o The Spills Contingency Plan address the potential for spill events that occur during adverse road or weather conditions;
 - o In the Spills Contingency Plan, CZN holds overall responsibility for spills response whether spills occur from the actions of CZN or subcontracted personnel (individual party liability can be addressed after the fact);
 - o NDDB be consulted and play a meaningful role in Spill Contingency Planning and response; and
 - o CZN table a Mine Economic Feasibility Report with regulators prior to final approval of mine operations to ensure that there is enough profitability in the mine that profit versus safety considerations can be reasonably balanced without affecting mine sustainability.

4. NDDDB recommends that, as a component of its previous recommendation regarding the Prairie Creek Mine water quality management system, particular attention be paid to reducing the presence of mercury and any other element in the mine effluent known to bio-accumulate or bio-concentrate, such that levels of these elements do not exceed existing levels in Prairie Creek at all times.
5. NDDDB recommends that the Draft Wildlife Management Plan be expanded to include more pro-active, science and TK-based monitoring practices, not just incident and sighting documentation, and that this redrafting be carried out by CZN in cooperation with NDDDB, Parks Canada, and the GNWT. The final plan should be reviewed and approved by the proposed Technical Advisory Committee prior to any required regulatory approvals.
6. NDDDB recommends that the GNWT continue to oversee archaeological assessment work and that the required AIA be carried out as planned this summer, with direct NDDDB involvement.
 - a. NDDDB further recommends that any cut and fill activities associated with access road construction in or around the sites of main concern be monitored by an archaeological technician and/or an informed NDDDB member to ensure protection of potential heritage resources.
7. NDDDB recommends that, in lieu of being able to place public access restrictions on the road, an NDDDB-staffed checkpoint be established near the entry point to the road during winter operations and that the following points be agreed to and posted at this checkpoint:
 - o Public use of the access road is at one's own risk;
 - o No extended stopping or parking is allowed along the access road (so that haul traffic is not restricted in any way);
 - o Haul trucks and other operational vehicles have the right-of-way at all times;
 - o No towing or any other vehicle maintenance services will be provided by CZN, its subcontractors, or NDDDB; and
 - o No shooting from, across, or along the road corridor is allowed (for safety reasons).
8. NDDDB recommends that CZN and/or government agencies:
 - o Ensure stringent environmental protection measures are put in place and help community members fully understand these measures;
 - o Support and fund NDDDB's training priorities;
 - o Assist the Band and NDDDB members in getting access to capital, partners, and expertise in order to take advantage of business opportunities;
 - o Support and fund better counselling and healing programs to address substance abuse issues;
 - o Support and fund money management programs;
 - o Support cultural and language programs;
 - o Ensure that community members are allowed time off for the community fall hunt; and

- Operate initially with a 3 weeks in/3 weeks out shift option but assess the effectiveness of this shift rotation on NDDB employees on an annual basis.
9. NDDB recommends that CZN and/or AAND and/or Parks Canada provide the funding necessary for NDDB's full participation in the proposed Prairie Creek Technical Advisory Committee.