3:2 pm FAXED Feb 6 2002

Mackenzie Valley Environmental Impact Review Board
Box 938, 5102-50th Avenue, Yellowknife, NT X1A 2N7

To **The Honourable Robert Nault P.C., M.P Minister of Indian and Northern Affairs Ottawa**

Fax: (819) 953-4941
From: Louie Azzolini, MVEIRB
Pages: 66 including this cover
Date: February 6, 2002
File: EA01-002

Subject: **Report of Environmental Assessment, Canadian Zinc Corporation, Underground Decline and Drilling and Metallurgical Pilot Plant Developments.**

Please find attached the Report of Environmental Assessment (EA) of the *Canadian Zinc Corporation, Underground Decline and Drilling and Metallurgical Pilot Plant Developments*. The Canadian Zinc Corporation, Preliminary Screeners and participants in the EA are provided a copy of the Report of EA.

From.....

MVEIRB
P.O. Box 938
Yellowknife, NT X1A 2N7
Phone (867) 766-7053
Fax (867766-7074

3:25pm FAXED Feb 6, 2002

Mackenzie Valley Environmental Impact Review Board
Box 938, 5102-50th Avenue, Yellowknife, NT X1A 2N7

To Mr. Peter Campbell and Mr. Alan Taylor, Canadian Zinc Corporation

Fax: (604) 688-2043
From: Louie Azzolini, MVEIRB
Pages: 66 including this cover
Date: February 6, 2002
File: EA01-002

Subject: Report of Environmental Assessment, Canadian Zinc Corporation, Underground Decline and Drilling and Metallurgical Pilot Plant Developments.

Please find attached the Report of Environmental Assessment (EA) of the *Canadian Zinc Corporation, Underground Decline and Drilling and Metallurgical Pilot Plant Developments*. The Federal Minister, Preliminary Screeners and participants in the EA are provided a copy of the Report of EA.

From.....

MVEIRB
P.O. Box 938
Yellowknife, NT X1A 2N7
Phone (867) 766-7053
Fax (867766-7074

FAXED Feb 6 2002
TO DETRIBUTION
3:35 pm

Mackenzie Valley Environmental Impact Review Board
Box 938, 5102-50th Avenue, Yellowknife, NT X1A 2N7

To **The Honourable Robert Nault P.C., M.P Minister of Indian and Northern Affairs Ottawa**

Fax: (819) 953-4941
From: Louie Azzolini, MVEIRB
Pages: 66 including this cover
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From.....

MVEIRB
P.O. Box 938
Yellowknife, NT X1A 2N7
Phone (867) 766-7053
Fax (867766-7074

February 5, 2002

MVEIRB file: EA01-002

The Honourable Robert D. Nault, P.C. M.P.
Minister
Indian and Northern Affairs Canada transmittal
MINISTER'S OFFICE
10 Wellington St North Tower
Hull, P.Q., Canada
K1A 0H4

Dear Mr. Nault,

The Mackenzie Valley Environmental Impact Review Board (Review Board) is pleased to convey its *Report of Environmental Assessment on the Canadian Zinc Corporation Underground Decline/Exploratory Drilling and Metallurgical Pilot Plant Developments.* As required by ss.128 (2) of the Act, the *Report of Environmental Assessment* will be provided to the Canadian Zinc Corporation and the preliminary screeners.

Sincerely,

T. Burlingame

Todd Burlingame
Chair

Attachment: Report of Environmental Assessment

February 5, 2002

By Fax 1-604-688-2043

Our File: EA01-002

Mr. Alan Taylor
Vice-President Exploration
Canadian Zinc Corporation (CZN)
Suite 1202
700 West Pender Street
Vancouver, BC V6C 1G8

Dear Mr. Taylor,

RE: Environmental Assessment 01-002 Canadian Zinc Corporation
Underground Decline and Drilling and Metallurgical Pilot Plant Developments

Please find attached the Mackenzie Valley Environmental Impact Review Board's (Review Board) *Report of Environmental Assessment on the Canadian Zinc Corporation Underground Decline/Exploratory Drilling and Metallurgical Pilot Plant Developments*. As required by ss.128 (2) of the *Mackenzie Valley Resource Management Act* (Act), the Minister of Indian Affairs and Northern Development and the preliminary screeners have been provided the *Report of Environmental Assessment*.

Sincerely,

T. Burlingame

Todd Burlingame
Chair

cc: Peter J. Campbell, Vice President Projects

Attachment: Report of Environmental Assessment

Mackenzie Valley Environmental Impact Review Board

Report of Environmental Assessment

On the
Canadian Zinc Corporation
Underground Decline/Exploratory Drilling and Metallurgical Pilot Plant Developments

January 22, 2002

Mackenzie Valley Environmental Impact Review Board
Box 938,
Yellowknife, NT. X1A 2N7

Phone (867) 766-7050
Fax (867) 920-4761
Email board@mveirb.nt.ca
URL www.mveirb.nt.ca

Executive Summary

The Mackenzie Valley Environmental Impact Review Board (Review Board) has reviewed the developments proposed by Canadian Zinc Corp. at the Prairie Creek Mine location. These proposed developments include an underground decline, exploratory drilling and a metallurgical pilot plant.

In its review, the Review Board was guided by the principles outlined in Sections 114 and 115 of the *Mackenzie Valley Resource Management Act* (MVRMA or Act) throughout this environmental assessment (EA). These include the need to protect the environment from significant adverse impacts, and to protect the social, cultural and economic well-being of residents and communities in the Mackenzie Valley.

Having considered the views and concerns of the participants in this process, and the evidence on the Public Registry, the Review Board made its decision according to Section 128 of the *Mackenzie Valley Resource Management Act*.

This assessment considered several issues, including but not limited to:

- the integrity of the tailings facility and the potential impact of its failure on water quality;
- the potential impact of changes to water quality from the development affecting the Bull Trout *Salvelinus confluentus* , which is a vulnerable species; and,
- the potential of the proposed development to affect the ecological integrity of nearby Nahanni National Park, a World Heritage Site.

The Review Board concludes, based on the analysis provided, that the proposed development is likely, in its opinion, to have a significant adverse impact on the environment. Of the issues considered, the Review Board concluded that the mine as proposed would cause a significant adverse environmental effect on water quality as a result of drainage from the rock and ore pile into the pristine waters of the Prairie Creek.

The Review Board makes several recommendations and suggestions to prevent or mitigate predicted impacts. These include the following recommendations:

- That the Canada Zinc Corporation prepare a plan to monitor, evaluate and manage water from the waste rock and ore piles to prevent impacts from runoff on water quality;
- That the Canada Zinc Corporation update its Probable Maximum Flood calculations and adapt the development design accordingly to prevent impacts on water quality due to possible flooding of the tailings pond, by properly managing the risk of washout from a flood; and
- That the Canada Zinc Corporation conduct an engineering assessment on the integrity of the tank farm facility, to prevent impacts on water quality.

The Review Board also suggested that the Federal Minister and the Minister responsible for National Parks decide on the scope and nature of acceptable protection to ensure the ecological integrity of Nahanni National Park, including the possibility of establishing a buffer zone where land use activities are not compatible with the park purpose and management plan.

The Review Board recommends approval of the proposed development subject to the imposition of the

preventative and remedial measures outlined in this report which are necessary to prevent and mitigate significant adverse impacts.

To make its decision, the Review Board relied upon the information in Environmental Assessment Reports submitted by the Canadian Zinc Corporation, the technical reports provided by reviewers, and all the other information on the Public Registry. The Review Board expects Canada Zinc Corporation to fully discharge all of the mitigative measures to which it committed in its submissions to the Review Board. These commitments were placed on the Public Registry. If these mitigative measures are not implemented, the Review Board's conclusions about impact significance will be affected.

Mackenzie Valley Environmental Impact Review Board
January 22, 2002

Table of Contents

Glossary

ADKFN	Acho Dene Koe First Nation
BGC	Bruce Geotechnical Consultants
CPAWS	Canadian Parks and Wilderness Society
CZN	Canadian Zinc Corporation
DCFN	Deh Cho First Nations
DFO	Department of Fisheries and Oceans
EC	Environment Canada
GC	Government of Canada
GNWT	Government of the Northwest Territories
INAC	Department of Indian and Northern Affairs Canada
IR	Information Request
LKFN	Liidlii Kue First Nation
MDAG	Mineral Development Advisory Group
MVEIRB	Mackenzie Valley Environmental Impact Review Board
MVLWB	Mackenzie Valley Land and Water Board
MVRMA	Mackenzie Valley Resource Management Act
NBDB	Nahanni Butte Dene Band
NNPR	Nahanni National Park Reserve
RWED	Department of Resources, Wildlife and Economic Development

1 General Information

This section of the Report of Environmental Assessment summarizes the development proposal under consideration, the roles and responsibilities of the Mackenzie Valley Environmental Impact Review Board (Review Board or Board) and the EA process to which the development proposal was subject.

CZN submitted an application to the Mackenzie Valley Land and Water Board (MVLWB) on March 5, 2001, for a Land Use Permit and Water Licence to support a Metallurgical Pilot Plant program and an Underground Decline Development program, (referred to collectively as the development) at the CZN Prairie Creek mine site. On April 11, 2001, the Nahanni National Park Reserve (NNPR) referred the development to the Review Board for EA citing "the potential to impact the ecological integrity of the park reserve." The CZN Prairie Creek Mine is located adjacent to Prairie Creek, a tributary of the South Nahanni River, 48 km upstream of their confluence and 32 km upstream of the point where Prairie Creek crosses the boundary of the park reserve. On April 15, 2001, the Pehdzeh Ki First Nation (Wrigley) acting as a Local Government of the Settlement of Wrigley also referred the subject developments to the Review Board as per Section 126(2)(c) of the *Mackenzie Valley Resource Management Act* citing significant environmental and public concerns.

Subsequent to the NNPR referral to EA the Review Board prepared a Draft Work Plan and Draft Terms of Reference for the developments. Following a review and comment period, the Work Plan and Terms of Reference were issued in their final form on May 31, 2001. The Work Plan sets out set out milestone dates for completing the various stages of the EA process.

On July 17, 2001, the Review Board considered EA scope of assessment and Work Plan timing issues identified by government expert advisors, the NNPR, and the Canadian Parks and Wilderness Society (CPAWS). The Review Board also considered correspondence provided by CZN in response to EA issues cited by government and non-government parties to the environmental assessment. The Review Board then decided to put the environmental assessment on hold for thirty calendar days beginning July 17, 2000, while it revised the Work Plan.

On August 1, 2001, the Review Board decided to close the Information Request (IR) phase of the EA and set August 17, 2001, as the last day for CZN to respond to the IRs. The Review Board also decided to undertake a site visit on August 30, 2001, and that the public registry would close on August 31, 2001.

This report constitutes the Reasons for Decision of the Review Board and the Report of Environmental Assessment and recommendations required by sections 121 and 128 of the Act respectively.

2 Referral of the Proposed Development to the Review Board

On April 11, 2001, NNPR referred the MVLWB Land Use Permit Application MV2001C0023 to EA based on its authority under section 126(2)(a) of the MVRMA. NNPR cited that the proposed development could effect the ecological integrity of the NNPR, and that potential impacts included effects on transboundary wildlife such as grizzly bears, Dall's sheep and woodland caribou, and effects on water quality and fish habitat in both the Prairie Creek and the South Nahanni River.

On April 15, 2001, the Pehdzeh Ki First Nation, acting as the local government of the Settlement of Wrigley also referred the proposed development to EA under section 126(2)(c) of the Act citing significant environmental and public concerns.

2.1 The Mackenzie Valley Environmental Impact Review Board

The Review Board administers Part 5 of the MVRMA and has decision-making responsibilities in relation to the proposed developments. The Review Board must conduct an environmental assessment of the proposed development in accordance with ss.117(1) and (2) of the MVRMA. The Review Board is also required to prepare and submit its Report of Environmental Assessment in accordance with ss.128(2), a decision under ss.128(1), and written reasons, required by s.121, to the Federal Minister of the Department of Indian and Northern Affairs Canada (INAC). As Part of the EA, the Review Board considered the following documents:

- Canadian Zinc Corporation, Detailed Project Description, Phase II, Prairie Creek Mine Mineral Exploration Drilling Program. March 5, 2001.
- Project Description, Type "A" Land Use Permit Application, Prairie Creek Mine Underground Decline Development and Exploration Drilling. March 5, 2001.
- Canadian Zinc Corporation, Environmental Assessment Report. Phase II Mineral Exploration Drilling Program, Land Use Permit Application MV2001C0022. June 7, 2001.
- Canadian Zinc Corporation, Prairie Creek Mine Site Safety and Procedures Manual. June 2001.
- Draft Guidelines for Environmental Assessment Report: Prairie Creek Project, San Andreas Resources Corporation. June 1995.
- Cumulative Impact Assessment for the Phase II Mineral Exploration Program at Prairie Creek Mine, NWT. Prepared by EBA Engineering Consultants Ltd. June 4, 2001.
- Interim Report: Fisheries Survey of Prairie Creek Watershed. Prepared by Neil J. Mochnacz, Natural Resources Institute, University of Manitoba. August 30, 2001.
- Protecting the Aquatic Quality of Nahanni National Park Reserve, NWT. Government of Canada. December 1998.
- Protecting the Waters of Nahanni National Park Reserve, NWT. Environment Canada. December 1991.

2.2 Consultation

This section summarizes the consultation undertaken in the course of this environmental assessment.

On April 30, 2001,The Review Board issued Draft Terms of Reference and a Draft Work Plan for consultation. The Draft documents were distributed to the: Canadian Zinc Corporation, Nahanni Butte Dene Band, Pehdzeh Ki First Nation, Liidlii Kue First Nation, Village of Fort Simpson, Deh Cho First Nations, Hay River Dene Reserve, Canadian Parks and Wilderness Society, Ecology North, World Wildlife Fund, Sierra Legal Defense Fund, Northern Projects Inc., Cizek Environmental Services, the Government of the Northwest Territories (GNWT) and the Government of Canada (GC), including the Parks Canada Agency.

After considering comments on the Draft Terms of Reference and the Draft Work Plan, the Review Board decided that the EA of the Underground Decline/Exploratory Drilling and Metallurgical Pilot Plant developments would be conducted separately from the Phase II Mineral Exploration Drilling program proposed by CZN. Final Terms of Reference was issued on May 31, 2001. On June 13, 2001, after correspondence with representatives of the Pehdzeh Ki First Nation, the Liidlii Kue First Nation, and the Nahanni Butte Dene Band, the Review Board decided public meetings would not be necessary as part of the EA process.

Following CZNs submission of its Environmental Assessment Report, the Review Board completed a conformity review of the Environmental Assessment Report. It then amended its Work Plan on July 17, 2001, and on August 2, 2001, to enable government reviewers' additional time to consider the information on the Public Registry, and for the Review Board to visit the site of the proposed development.

CZN provided a summary of its consultations with government, regulatory agencies, the Nahanni Butte Dene Band, the Liidlii Kue First Nation, Acho Dene Koe First Nation, and the Deh Cho First Nations. CZN noted the following:

- August 14-16, 2000. Yellowknife meetings with INAC, GNWT/RWED, EC, DFO, MVLWB, MVEIRB, Parks Canada, DCFN (Petr Cizek)
- October 6, 2000. Letter of request to NBDB, LKFN, ADKFN, DCFN for meeting.
- November 21, 2000. Yellowknife meeting with Mineral Development Advisory Group (MDAG) INAC, EC, DFO, GNWT/RWED, WCB, SRHB.
- November 22, 2000. Nahanni Butte meeting with First Nation community and association representatives. NBDB, LKFN, DCFN, CPAWS, Parks Canada.
- January 5, 2001. Letter request to NBDB, LKFN, ADKFN for traditional knowledge
- January 11, 2001. Letter enclosing Draft Application package to NBDB, LKFN, ADKFN & DCFN requesting comments
- February 26, 2001. Telephone conversation with Chief Leon Konisenta (NBDB) advising of intention to submit permit applications.
- February 27, 2001. Letter to NBDB, LKFN, ADKFN & DCFN advising of intention to submit permit applications.

The Pehdzeh Ki First Nation indicated that it did not consider the November 22, 2000 meeting, or, the letters of December 27, 2000, and February 27, 2001, to constitute consultation. The Nahanni Butte Dene Band on April 12, 2001, communicated its support for CZNs efforts noting it had signed a cooperation agreement with the company that it expected CZN to honor. Follow-up correspondence from the Nahanni Butte Dene Band dated April 18, 2001, communicated further support for the development.

The Review Board also received the following letters over the course of the EA:

- 5 letters from City of Yellowknife residents concerned about the environmental impacts to "the Nahanni" resulting from the proposed developments
- 25 letters of public concern about the proposed developments from canoeists concerned about the ecological health of the Nahanni Region, and
- 7 letters from students concerned about the impacts of industrial development to the Nahanni region and Nahanni National Park.

3 General Description of the Physical Environment

The following section describes the environmental context of the proposed Phase II Mineral Exploration Drilling program. The information presented is based on the CZN Land Use Permit Application project description.

Prairie Creek Mine is located in the southern Mackenzie Mountains in the southwest corner of Northwest Territories at 61° 33' north latitude and 124° 48' west longitude. The mine site facilities are situated adjacent to Prairie Creek about 43 km upstream from its confluence with the South Nahanni River and 32 km upstream of the point where Prairie Creek crosses the boundary of the Nahanni National Park Reserve. The minesite is located within the Alpine Forest-Tundra section of the Boreal Forest characterized by stunted black spruce with limited undergrowth and open areas dominated by lichen.

The minesite is at an elevation of 850 meters above sea level and is situated in topography characterized by low mountains and narrow valleys with an average relief of 300 meters. Short summers and long winters are typical of the area's sub-arctic climate, where the mean annual temperature is -5°C. Annual precipitation is approximately 40cm, most of which falls as rain. The regional climate can be characterized by information from communities around the Nahanni National Park. At Fort Liard, temperatures have ranged from +34 to −46.7°C; at Tungsten +26.7 to -50.0°C. July and August typically have the highest total precipitation (60-90 mm); February and March the least (20 mm). Spring is generally drier than autumn. Despite the averages cited, occasional large-scale summer storms can provide general and widespread precipitation of two to three days duration. Due to the rapid runoff encountered in mountainous terrain, the South Nahanni and its tributaries are subject to relatively rapid flooding, particularly if such rains coincide with the spring freshet, as occurred in 1999.

4 General Description of the Socio-cultural and Economic Environment

The proposed development is situated within the area claimed by the Nahanni Butte Dene Band of the Deh Cho First Nations as their traditional territory. The nearest settled communities are:

- Nahanni Butte, NT - 90 km to the south-east
- Fort Liard, NT - 170 km to the south
- Fort Simpson, NT - 180 km to the east
- Yellowknife, NT - 480 km to the east

Land and resource management responsibilities for the region outside the boundaries of the Nahanni National Park are shared among the Department of Resources, Wildlife and Economic Development (RWED) of the Government of the Northwest Territories (GNWT) and the Department of Indian and Northern Affairs Canada (INAC). The Deh Cho First Nations (DCFN) claim an aboriginal interest in these lands but they do not manage them. Local First Nations which claim an Aboriginal interest in Deh Cho lands include the Liidlii Kue First Nation (Fort Simpson), Acho Dene Koe First Nation (Fort Liard) and Nahanni Butte Dene Band (Nahanni Butte).

Resource extraction industries in the Deh Cho include forestry and mining activity. The only mine in the Deh Cho is the CanTung mine which is not currently operating. There are forestry operations expanding into the Nahanni Butte region from the south, from Fort Liard to Nahanni Butte along the Liard River valley. The Mackenzie Mountains is a heavily mineralized area and claims are staked for gold, tungsten, silver, lead and zinc. Tungsten, a mine on care-and-maintenance with its adjacent town site is located northwest of the proposed development. An abandoned mine site with buildings on-site and previous road access, exists at Lened Creek in the upper South Nahanni watershed.

The different levels of government account for the majority of employment in the region. Work associated with the oil and gas pipeline, and other resource development provides additional local employment opportunities. Current resource development, particularly oil and gas exploration in the Fort Liard area represents a potential for change in the regional socio-economic environment. Local prosperity and improved road and air access to the Nahanni area may affect the affordability, pattern and frequency of access by traditional users and others. An increase in tourism is anticipated throughout the Deh Cho.

5 Summary of the Environmental Assessment Process

This section provides a description of the proposed development based on the Review Board's Terms of Reference and Work Plan issued on May 31, 2001.

5.1 Principal Development

The two principal developments are:

- Excavation of an underground decline about 600 m in length and underground exploration drilling; and,
- Operation of a metallurgical pilot plant.

5.2 Accessory Developments and Activities

The accessory undertakings associated with the principle development include:

Underground Decline and Drilling

- Airlifting the pieces of the jumbo drill to the mine, reassembling the drill at the mine and transporting the drill to the decline location using existing roads;
- Use of water from Harrison Creek during drilling;
- The use, transport and storage of explosives;
- Opening a portal at the 905 m elevation about 600 m north of the existing mill facility;
- Excavating a 600 m long 3 m wide and 2.3 m high decline at a 15% down gradient;
- Driving the decline using a two-boom air jumbo drill;
- Removing the rock from the decline using 2-yard scoop trams;
- Transporting the rock to a location within the plant site area using a loader and truck;
- Cutting out 9 drill "cutouts" along the decline in support of an underground drill program;
- Drilling in the cutouts using a Boyles electric or hydraulic diamond drill;
- Dewatering the decline and cutouts using sumps and pumps;
- Creating a sump settling pond at the mouth of the portal; and
- Release of water from the settling pond into Harrison Creek.

Metallurgical Pilot Plant

- Transporting and assembly of a "pilot plant" to the minesite and assembling it in the existing mill building;
- Operation of the pilot plant at about 1.5 tonnes per hour;
- Processing a total of 1,000-2,000 tonnes of rock taken from the surface stockpile and possibly rock from the decline development;
- Using between 2,000-4,000 m^3 of water of which half will come from an on-site aquifer using existing on-site wells;
- Release of mine water into the tailings facility;
- Storage of tailings in one of two thickeners inside the mill building; and
- Removal of the concentrated rock in 2 tonne bags by air.

Logistical Support

- Use of existing mine site facilities at Prairie Creek as base camp for operations;
- Use of existing trucking and mining equipment to support the developments;
- Aircraft (largely expected to be fixed wing) support for safety, equipment and personnel transport as required; and
- Storage of mined and milled rock at the mine site.

NNPR suggested that the tank farm facility should form part of the scope of assessment. NNPR advised that CZN acknowledged it would make use of the contents of the fuel storage facilities during the operation of the process equipment for the pilot plant, and that the use of existing facilities was therefore an integral part of operation of the pilot plant and should therefore be considered as interdependent and related and therefore included in the scope of assessment.

The Deh Cho First Nation expressed concern about whether the fuel facilities could safely continue to store fuel at the site, and about on-site water management practices, particularly as it pertained to the drainage of water trapped in the tank farm area into Harrison Creek. The Deh Cho First Nations concluded that fuel for the subject developments would be used from the fuel facilities, thus making the fuel facilities part of the development.

CZN emphasized that the fuel storage tank facility did comply with current legislation. It noted that the fuel storage tank systems were registered on May 21, 1998, in accordance with the Registration of Storage Tank Systems for Petroleum Products and Allied Petroleum Products on Federal Lands Regulations promulgated pursuant to the *Canadian Environmental Protection Act*. CZN also emphasized that the fuel storage tank facility was part of the existing infrastructure at the Prairie Creek minesite and that the applications before the Review Board requested no alterations or additions to these facilities. CZN stated that it was committed to monitoring the condition of the fuel storage tank facility in conjunction with its routine care-and-maintenance activity, and its proposed developments. CZN indicated that it would upgrade the tank farm facility in conjunction with mine re-development. In the meantime, CZN believed it would be inappropriate to override existing legislation and require upgrading of the facility at this time for the purposes of undertaking the proposed developments.

5.2.1 Conclusion

The Review Board evaluated the evidence submitted regarding the existing tank farm facility. It also considered whether the tank farm facility had been subject to assessment of environmental effects by others (e.g. other environmental assessments, federal environmental protection requirements).

The Review Board considered whether the principal developments could proceed without using the tank farm facility, or if approval of the principal development made the use of the tank farm facilities inevitable. The Review Board determined that the Pilot plant and underground decline facilities development required the use of the petroleum products from the tank farm to proceed, or made their use inevitable if the developments were permitted.

The Review Board agreed with CZN that the tank farm facility formed part of the existing infrastructure and, the issue of their ultimate integrity and liability rested with CZN and its board of directors. The

Review Board also agreed with the Deh Cho First Nations that simply registering the subject fuel tanks did not assure any party of their integrity, provide assurances respecting their management, or reduce any reasonably manageable risks to the environment that could result from them. The Review Board also agreed with submissions indicating that the tanks and the fuel were integral to the principal development.

The Review Board therefore determined that for the purposes of this EA that the scope of development would include the petroleum tank farm facility.

5.3 Scope of Assessment

The scope of the assessment is the determination of which components of the environment will be examined during the EA. In determining the scope of the assessment, the Review Board was conscious of its obligation under ss.117 (2) of the MVRMA to consider:

- the impact of the development on the environment, including the impacts of malfunctions or accidents that may occur in connection with the development and any cumulative impact that is likely to result from the development in combination with other developments;
- any comments submitted by members of the public; and
- any other matter determined to be relevant.

After considering the information placed on the Public Registry, the Review Board decided on the following scope of the assessment:

Physical and Biological Environment

Air Quality and Climate
air quality
release of air contaminants (dust, particulate exhaust fumes and other air contaminants)

Terrain
surficial geology
bedrock or soils

Vegetation and Plant Communities
local plant communities
rare or highly valued species
long-term, direct and indirect, habitat loss or alteration

Water Quality and Quantity
water quality impacts including contaminant loading and dispersion (including surface runoff and airborne contaminants)
water quantity impacts

Aquatic Resources and Habitat
aquatic organisms and their habitat

Wildlife and Wildlife Habitat
wildlife
wildlife habitats
migratory birds
vulnerable or endangered Wildlife in Canada, (COSEWIC) list

Noise

Changes to ambient noise levels
Continuous exposure versus acute noise

Human Environment

Cultural and Heritage Resources
Places of cultural, spiritual and/or archaeological significance

Socio-Economics
Income
Employment
Local Business Opportunities
Community Quality of Life

Land and Resource Use
Traditional land use and occupation
Existing land use and occupation
Wilderness outfitting including commercial and sport fishing
Availability, abundance and quality of wildlife, fish and vegetation for harvesting
Recreational activities
Protected areas

Visual and Aesthetic Resources
Visual and aesthetic
Design components that mitigate visual and aesthetic impacts.

Cumulative Impacts

Natural environment
Socio-economic and cultural environment

Other Relevant Matters

Developer Identification and Performance Record
Regulatory Regime
Environmental Assessment Methodology
Public Consultation
Accidents and Malfunctions
Alternatives
Abandonment and Restoration
Follow-up Programs

The Review Board undertook a review of the *Canadian Zinc Corporation, Detailed Project Description, Phase II, Prairie Creek Mine Mineral Exploration Drilling Program, March 5, 2001* to determine which items in the scope of assessment had already been adequately addressed by CZN in its submission to the MVLWB, and which items still needed to be addressed. The result of this review was that CZN was directed to provide the Review Board with additional information in the following areas:

Environmental Assessment Methodology
Environmental Considerations in the Development Design
Accidents and Malfunctions
Alternatives

Potential Impacts and Predicted Residual Impacts after Mitigation on the following environmental components

- Air Quality and Climate
- Terrain including Soil and Bedrock
- Vegetation and Plant Communities
- Water Quality and Quantity
- Aquatic Resources and Habitat
- Wildlife and Wildlife Habitat
- Cultural and Heritage Resources
- Socio-Economics
- Land and Resource Use
- Noise
- Visual and Aesthetic

Cumulative Impacts

- Natural Environment
- Socio-Economic and Cultural Environment

Abandonment and Restoration

Environmental Management Plan

5.3.1 Consideration of previous environmental assessments

In accordance with s.127 of the MVRMA, the Review Board is required to consider any report made in relation to the development proposal under the Canadian Environmental Assessment Act (CEAA) and the Environmental Assessment and Review Process Guidelines Order (EARPGO) before the proclamation of the MVRMA. INAC placed the *Draft Guidelines for Environmental Assessment Report Prairie Creek Project San Andreas Resources Corporation Ltd.* dated June 1995 on the Public Registry. The Regional Environmental Review Committee, Environment and Conservation, Northern Affairs Program, INAC prepared this document which was reviewed as part of this EA.

5.4 Conformity and Technical Review

On June 29, 2001, the Review Board's staff completed the review of the completed Environmental Assessment Report and determined that it conformed to the Terms of Reference issued by the Review Board dated May 31, 2001. It is usually the practice of the Review Board staff to consult with government experts to solicit their opinions and conclusions regarding conformity. The government experts determined that in this EA it was acceptable to have the Review Board's staff review the Environmental Assessment Reports for conformity and to take the conformity decision accordingly.

The analysis included opportunities for regulatory authorities (RAs), expert advisors, First Nations, communities, the public and other interested parties to present their view, their information and anything else they believed would help the Review Board make a better informed decision. The result of this step was to find and focus on unresolved or unclear issues, and to provide the Review Board the additional information that would contribute to its decision.

5.4.1 Analysis of the Environmental Reports

A technical review of CZNs Environmental Assessment Report and submissions placed onto the Public Registry started concurrently with the conformity review. This was completed through the Review Board's Information Request (IR) process.[1] The IRs helped to facilitate the technical analysis of the proposed development by allowing parties to formally request additional information or explanation of the submissions of any other party. Forty-eight IRs were approved and issued by the Review Board and directed to CZN. Three from the GNWT, 10 from INAC, 3 from CPAWS, 26 from NNPR, and 6 from the Review Board.

The Review Board did not approve the issuance of two CPAWS IRs. In the Review Board's view the two IRs, sought information which was not relevant or central to the EA. The Review Board noted that one CPAWS IR appeared to address compliance with an expired surface lease. Compliance with regulatory requirements is not necessarily relevant to an EA proceeding since many regulatory requirements are intended for safety or other reasons unconnected to the environment. In the CPAWS case, the question was focused on compliance with "environmental provisions of the lease" and consequently could have generated relevant evidence. The second part of the question appeared relevant in the context of mitigation measures. INAC and CZN, however, refused to disclose the lease documents. The Review Board noted that government inspection reports were publicly available from INAC and the Mackenzie Valley Land and Water Board and that these documents adequately addressed the developer's compliance record. In the Review Board's view, the lease was not necessary to deal with compliance issues. Furthermore, the Review Board was concerned that an effort to secure the lease would protract the EA beyond what it considered reasonable for a development of the scale and duration of that proposed by CZN.

The Review Board also reviewed the rationale provided by CPAWS with respect to their "need" for the surface lease in relation to security deposits for site reclamation and remediation. The Review Board concluded that this argument was largely speculative. The Review Board also noted that the amount of security appropriate is primarily a regulatory question for the MVLWB and that security requirements would be a part of any water licensing proceeding. The Review Board recognized that security could be considered as potential mitigation and consequently, the security held as compared to total requirements could be relevant information. However, the Review Board was not persuaded by the arguments about public concern and cumulative impacts advanced by CPAWS. The Review Board is required to consider cumulative impacts and public concern nonetheless, with or without the surface lease. CPAWS also did not convince the Review Board that review of the surface lease by itself might make a difference to the Review Board's determination on these matters.

Technical analysis reports were submitted to the Review Board by the Liidlii Kue First Nation, the Deh Cho First Nations, INAC, EC, GNWT, DFO and the Nahanni National Park Reserve.

5.5 Development Impact Boundaries

The Terms of Reference did not specify the spatial or temporal boundaries to be used when considering the

[1] Information requests are an interrogatory in the form of written questions and answers.

maximum zone of influence or the duration and occurrence of impacts of the proposed development. The Review Board expected this determination of appropriate boundaries to be made by the proponent.

CZNs initial scoping of the boundaries of physical impacts suggested that the potential for impacts was very low and that where impacts might occur their magnitude would be very slight. Consequently, the spatial boundaries for the assessment of impacts were initially set within the localized area immediately surrounding the minesite, including the Prairie Creek near the mine. Similarly, CZNs initial scoping of how long the physical impacts would persist in the environment suggested minimal potential for longer-term or residual impacts.

The Review Board is of the opinion that the boundaries established by CZN were acceptable for the purposes of the EA.

5.6 Determining Significance

Section 128 of the MVRMA requires the Review Board to decide, based on the evidence provided, whether or not a development will likely have a significant adverse impact on the environment or result in significant public concern, and report their conclusion to the Federal Minister. In this process, the Review Board had no objection to the proponent or others applying professional judgement in providing their evidence to the Review Board or to the use of previously completed reports. In fact, these process efficiencies were encouraged as long as the basis for the conclusion was documented, the expertise applied was identified and, if possible, the person and/or source of information responsible for the conclusion were identified

In determining impact significance, the Review Board considered the following factors:

- Magnitude
- geographic extent
- timing
- duration
- frequency
- irreversibility of impacts; and
- probability of occurrence and confidence level.

The Review Board gave direction on the matter of significance determination. The Board stated that it preferred to have an EA Report emphasize the reporting of residual impacts using acceptable reporting attributes and to refrain from drawing significance conclusions. In its environmental assessment, CZN generally adhered to the Review Board direction.

The Review Board notes that CZN did not report the impacts of the developments but instead simply explained details of the development itself. For example, CZN reported the impact to the terrain resulting from the decline as negligible because it occurred within 1 Km of the mine, that surficial materials would be stripped, stockpiled and eventually bladed over the disturbed area. The Review Board appreciates that mitigation is often designed into developments. However, explaining mitigation is, in the Review Board's opinion, not a reporting of impacts. Were it not for the effort of government reviewers in their technical review of the development, the Review Board would have found the Environmental Assessment Report unacceptable for its purposes.

Therefore, the Review Board concludes that CZN considered and reported significance factors consistent with its previous EA reports, and that for the purposes of expediting the EA, the Review Board accepted CZN taking its own significance determinations.

6 Review Board Conclusions and Recommendations

All of the information submitted to the Review Board during this EA is on the Public Registry and is available for public access. This report discusses only those issues/items that generated comments from reviewers or were deemed by the Review Board to warrant explanation or analysis in this report.

The discussion in each of the following sections includes:

- a summary of CZNs submissions;
- a summary of comments received from technical reviewers;
- Review Board conclusions; and
- Review Board recommendations, if any.

The Review Board's understanding of its authority to recommend measure is outlined in Appendix A below.

6.1 Air Quality and Climate

CZN noted that the majority of the decline development would take place underground and that the drilling equipment and the ventilation fans would be driven by compressed air; compressed air supplied by a diesel powered compressor located at the portal entrance. The compressor diesel engine would emit hydrocarbon combustion products typical of similar diesel engines operated in highway trucks, graders, front-end loaders, backhoes and other heavy equipment, as well as in generators for supplying electricity in remote communities, such as Fort Simpson and Nahanni Butte.

The drilling process itself would produce little in the way of particulate emissions. Water used as a lubricant in the drilling process would also help reduce the amount of dust created and emitted.

CZN noted that the impacts of the decline development would be additional to similar impacts associated with routine care-and-maintenance and ongoing exploration activity planned for the property. These would entail operation of the site power generator, vehicle operation and aircraft support.

The pilot plant would be wholly contained within the confines of the existing mill building. It is a wet process and has no point source air emissions. The pilot plant would run off power supplied by the same on-site generators used to power site facilities in support of routine care-and-maintenance activities.

6.1.1 Conclusions

The Review Board concludes that the proposed development is not likely to have any significant adverse impact on air quality or climate.

6.1.2 Measures and/or Suggestions

No measures or suggestions.

6.2 Terrain and Soils

CZN noted that the proposed decline development and underground exploration-drilling program would entail minimal disturbance or use of surficial materials, as the majority of the activity would take place underground.

The proposed portal location would be accessible by existing exploration tote roads, and that would minimize disturbance relating to the establishment of roads. Waste rock generated from decline development would be stored within the existing plant site area and all activity would take place within the area of traditional mining activity, and within 1,000 m of the existing mill and associated facilities. New surface disturbance would be restricted to the immediate area of the portal, an area of about 500 m^2. Surficial materials would be stripped and stockpiled adjacent to the portal area.

The pilot plant program would entail no new surface disturbance and no use of surficial materials for construction purposes. The pilot plant program would be conducted wholly within the confines of the existing mill building. The mill building consists of a concrete slab floor surrounded by a perimeter concrete foundation wall.

INAC noted that CZN would generate approximately 5,200 m^3 of waste rock from the decline development. CZN proposed to truck and stockpile the waste rock within the existing plant site area, either adjacent to the existing stockpile, or in the storage yard along the toe of the tailing impoundment dam. INAC noted CZN provided no information on how the waste rock runoff would be managed. INAC cited concern that there was no control structure between the mine site catchment pond and Harrison Creek, and that placing rock at the toe of the dam could interfere with the efforts to restore the tailing facility to acceptable standards and in the control of runoff.

6.2.1 Conclusions

The Review Board agrees with INAC that removal of waste rock from the decline and its placement in the existing plant site area might impact either future restoration efforts and/or result in unmanaged and potentially deleterious runoff. The record, however, discloses little evidence from which the Review Board can determine whether deleterious runoff will occur from the waste rock placement areas. If such runoff problems occur, the Review Board is of the view that it can be managed with existing on site water management systems. The Review Board addresses this matter further in section 6.4.4 below. In the circumstances, the Review Board concludes that there will not likely be a significant adverse environmental impact on terrain or soils.

6.2.2 Measures and/or Suggestions

No measures or suggestions.

6.3 Vegetation and Plant Communities

CZN reported that minimal clearing would be required in order to carry out the proposed decline development and underground exploration-drilling program. The development would be located within

the Alpine Forest-Tundra section of the Boreal Forest characterized by stunted black spruce and limited undergrowth and open areas dominated by lichen. All activity would take place within the area of traditional mining activity and within 1,000 m of the existing mill and associated facilities. CZN reports there were no rare or highly valued species identified from past studies of vegetation and plant communities in the area. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) did not list any plant species as endangered, threatened or of special concern in the area of the Prairie Creek Mine.

6.3.1 Conclusions

The Review Board finds that the disturbance to identified vegetation and plant communities is insignificant, and that with appropriate reclamation likely reversible. In addition, no rare or highly valued vegetation communities and rare species of plants identified would be impacted. Therefore, the Review Board concludes that the proposed developments are not likely in its opinion to have any significant adverse impact on vegetation and plant communities.

6.3.2 Measures and/or Suggestions

None

6.4 Water Quality and Quantity

6.4.1 Water Quality

CZN concluded that the Upper Spar and Chert/Dolostone rock units into which the decline would be drilled and from which the waste rock/ore would originate, have been tested and determined to have low sulphide values and high excess neutralization potential, and would therefore pose no hazard to the environment through runoff associated with sulphide oxidation processes.

CZN reported that all process water from the pilot plant would be retained in available tankage within the mill pending testing and treatment, if necessary, to ensure acceptable quality before its discharge to the existing tailings facility. CZN indicated treatment would be accomplished through lime addition within the mill to precipitate dissolved metals. CZN cited that the existing tailing facility, which covers approximately 10 ha, is currently filled with water to elevation 868m for an average depth of just over 2m and a contained volume of about 225,000 m^3. The crest elevation of the impoundment dike is at 876m. CZN cited that pumping of the entire volume of treated process water to the impoundment would add less than 2% to the volume and result in a rise in pond level of about 4cm.

6.4.1.1 Indian and Northern Affairs Canada

6.4.1.1.1 Impact of Tailings Facility on Water Quality

INAC noted that there was no quantitative information about the water quality in the tailings facility and that CZNs response to INAC IR #3 included a statement that the water quality in the tailings impoundment was *assumed* to "closely reflect that of Prairie Creek and the local hydrologic regime from which the water originated." INAC suggested that the source of the water could also include groundwater seepage from the

impoundment backslope and surface runoff from disturbed land areas.

CZN responded citing that the tailings facility was sampled on August 30, 2001, and that the water quality data indicated that the concentrations of parameters of interest were lower in the pond than the average values for Prairie Creek used in the tailings facility chemistry model provided in response to the IRs. CZN indicated that the model was conservative and confirmed the projections of the model as presented in CZNs response to GNWT-RWED IR #3. CZN added that, as the water level in the tailings pond had not changed significantly since 1994, it supported the conclusion that the integrity of the clay liner remained intact and that no significant seepage was occurring from the impoundment. CZN concluded that it considered groundwater monitoring unwarranted given the magnitude of the proposed development, its relatively sort duration, small volume of process water involved relative to the existing volume of water in the tailings facility, low contaminant levels predicted to be present in the pond, and the absence of any detectable seepage from the pond to date. Finally, CZN noted that any seepage from the pond would follow shallow pathways above the underlying clay layer and would be expected to report to the plant site catchment pond. CZN pointed out that sampling of the discharge from this pond would suffice for capturing all site discharges, including such seepage, before release to the receiving environment.

6.4.1.1.2 Impact of Decline Sump on Water Quality

INAC indicated that CZN did not provide information about the capacity of the sump to be developed at the mouth of the portal some 20 m from Harrison Creek. Since the sump is intended to be a settling pond for minewater before its release, INAC requested that CZN provide appropriate assurances regarding the quality of the water in the settling pond before discharging it into Harrison Creek. INAC was concerned that the mine water could be high in ammonia, total suspended solids and total dissolved metals. INAC noted that as CZN had not adequately addressed environmental problems associated with having ammonia in minewater, and that there was uncertainty regarding the quality of the mine water from the decline. INAC also cited that CZNs responses to RWED's IR#2 and DIAND's IR#8 did not deal adequately with the issue of ammonia in the minewater, and that CZN instead focused on nitrogen loadings.

CZN accepted that while not specifically discussed, drilling wastes were likely to be a component of the minewater discharge as dewatering would occur during active drilling. Underground drilling waste would be similar to surface drilling wastes, which would be typically discharged after settling in surface sumps, with the exception that the volume of return water from underground drilling would be typically greater than surface drilling since a proportion of underground holes would be drilled horizontally or in an upwards direction facilitating the return of the water.

CZN indicated that licencing limits for ammonia could be required, in addition to other components of nitrogen loading. CZN pointed out that settling of minewater prior to discharge without further treatment had been and continued to be standard industry practice and was optimistic that with proper explosive handling practices, minewater would be able to achieve limits set to protect the receiving environment. CZN noted that an alternative was to treat and/or handle the sump water by discharging it to the tailings or catchment pond.

6.4.1.1.3 Impact of the Decline on Water Quality

INAC concluded that measurements of the 870m adit minewater indicated that metals could be an issue and that although the proposed decline would be in non-mineralized alkaline host rock that metal parameters would still need to be considered and contingencies put in place to deal with them should they be found in the mine water. Regarding metal issues in water INAC also noted that CZNs response to DIAND IR#5 stated the water from the 870 m portal had not been sampled and analysed for metals, even though the water source was the mineralised vein structure that "has been closely associated with highly mineralized vein ore." CZN disagreed with INACs comments and asserted that it had in fact provided water quality data for discharges from the 870m portal in response to DIAND IR #5. CZN indicated that it expected consideration of monitoring of discharges to the receiving environment associated with the proposed developments, including locations, frequency, parameters, QA/QC & discharge limits, to be addressed at the regulatory stage and that it would make personnel available to provide input to the setting of discharge limits and design of a monitoring program to ensure protection of the water quality in Prairie Creek and the South Nahanni River.

CZNs response referenced INAC IR #8, wherein it stated that minewater encountered at the 870m adit was "not considered to be representative of the chemistry of the minewater expected to be encountered in the decline." CZN supported its assertion by noting that the 870m adit intersected highly mineralized vein ore at several locations that is a known conduit for water flow. CZN cited that the proposed decline would be driven through dolostone/limestone formations and would only intersect the vein near the end, as the other formations were considered watertight.

INACs response cited that the mine water qualities should not differ substantially since the water was originating from the same source (vein ore) and that consequently there was uncertainty about the decline development minewater quality.

6.4.1.1.4 Impact of Waste Rock/Ore Runoff on Water Quality

INAC expressed concern about runoff from the ore stockpiles and cited CZNs statement that it might process some of the material from the existing 20-year old ore stockpile "thereby reducing the quantity of material as a source of potential contamination." INAC also expressed concern that the level of metal contaminants in the runoff from the older ore stockpile were not provided and that CZN had no plans to install a control structure between the catchment pond, where water from the stockpile collected, and Harrison Creek.

CZNs response to INAC IR#6 (waste rock and ore drainage management) indicated it was not concerned about the quality of runoff from the predicted 5,200 m^3 of waste rock generated from the decline development or the site in general because of the expected low volume of runoff and the results of past ABA tests conducted on the Upper Spar and Chert/Dolostone rock units. CZN added that the site catchment pond had been sampled by INAC as a component of annual site inspections since 1983 and that it considered that the proposed developments would have little potential to significantly alter the levels. Further, CZN noted that the ore stockpile had been there since 1981, and that its presence was unrelated to the current applications, and that there was no ore stockpile planned as part of the proposed development.

6.4.1.2 Environment Canada

6.4.1.2.1 Impact of the Pilot Plant on Water Quality

EC concluded that CZN failed to provide an appropriate prediction of effluent quality from the pilot plant (INAC IR#4). EC noted that CZN deferred response of the IR stating that it was beyond the scope of the current EA. EC disagreed with CZNs claim. EC concluded that effluent quality would dictate disposal methods, as well as define risks associated with releases. EC referenced 1994 bench scale testing done of liquid and solid fractions, which could provide a helpful indication of potential effluent quality. EC noted that for the liquid effluent, metal parameters were generally all above values set for the protection of freshwater aquatic life, but were below limits contained in the Metal Mining Liquid Effluent Regulations. EC cited that once the pilot plant was operating, actual water quality measurements could be taken, and treatment identified, if needed. EC was satisfied that limits could be set for effluent parameters at the regulatory stage, taking into account the receiving water quality, as well as any site sensitivities.

CZN indicated that it did not defer predicting effluent quality but recognized that the information requested would result from the additional test work planned as part of the follow-up program to the proposed pilot plant development. Therefore, CZN claimed that because the information requested by INAC was part of the outcome of the development, it was not considered relevant to an assessment of the potential impacts of the development itself.

CZN referenced the EA report and noted that metal scans of liquid effluent would be conducted as part of the test work program, and that process water would be discharged to the tailings facility. It expected that process effluent would not require treatment before discharge to the pond since the pilot plant would be operated at pH 9.5 – 10, which was expected to precipitate most metals. CZN also held that the tailings solids produced from the operation of the pilot plant would be stored in the mill thickeners until the commencement of operations when they would be combined with the mill tailings for disposal underground as paste backfill, or in the tailings facility. In the event that operations did not recommence the tailings would either remain in the thickeners, or be disposed in an acceptable manner underground, in the tailings facility or land filled.

6.4.1.2.2 Impact of Tailings Facility on Water Quality

EC observed that diluting the test plant process water with the existing contents of the tailings facility to meet discharge criteria was not the best option. EC supported the use of thickener tanks to retain the tailings solids and process water as it would provide CZN the opportunity to assess the logistics and practicality of using paste backfill for tailings disposal. EC noted that the information could also be gained on water use, tailings quality and quantity, and process water quality. EC supported CZNs undertaking to test process water stored inside the mill, and treat if necessary, to ensure acceptable quality prior to discharge to the tailings facility.

CZN cited that its proposal for discharging process effluent to the tailings facility was not presented as a means of simply diluting process water to meet discharge criteria. CZN cited that it was chosen on the basis of allowing for complete containment of the process effluent with no discharge, and therefore no loadings to the receiving environment, as opposed to treating and discharging directly to the receiving environment within set discharge limits which would still result in some level of loadings. CZN did not

believe that discharge limits to the tailings facility, an engineered containment facility, were necessary or appropriate. CZN calculated that at 1 m3 per tonne of ore, the maximum amount of process water generated would be 4,000 m^3. It also noted that since the plant would be operated on approximately half reclaim and half fresh water, the actual amount of process water to be discharged would likely be closer to 2,000 m3. CZN further cited that that option of discharging minewater to the tailings facility was in fact discussed in the Decline EA Report as a mitigation measure should the minewater not be suitable for direct discharge to the receiving environment.

6.4.1.2.3 Impact of Camp Water Discharges on Water Quality

EC expressed concern that inappropriate or harmful substances could be included with sewage flows (such as cleansers, oils, solvents) whether inadvertently or routinely. EC noted that sewage is currently disposed to a sump in the flood plain of Prairie Creek, where it exfiltrates through the gravel substrate and enters groundwater. EC encouraged CZN to plan for eventual installation of a sewage treatment system, effecting at least primary treatment before disposal of effluent to the sump.

CZN replied noting that it practiced proper handling of waste products and actively discouraged disposal of solvents, oils or other such substances to sewage or greywater, and that these practices would continue.

6.4.1.3 Government of the Northwest Territories – Department of Resources Wildlife and Economic Development

6.4.1.3.1 Impact of Tailings Facility on Water Quality

RWED expressed concern about the potential impact of the tailings facility on water quality in Prairie Creek. It noted that the report provided by BCG included in the responses to information requests dated August 17, 2001, concluded that the probability of seepage from the tailings facility to Prairie Creek was low. Nevertheless, RWED noted that a natural fluctuation in tailings facility levels of up to 1 meter had been observed and that there was ongoing concern that water from the tailings facility was entering Prairie Creek.

CZN responded to issues about the possible discharge of effluent from the decline and metallurgical pilot plant into the tailings facility by noting that the tailings method of effluent disposal would eliminate the need for a direct discharge of effluent from the proposed developments and any associated loadings to the receiving environment. CZN also cited that the resultant water quality in the pond would be expected to meet discharge standards and therefore pose no hazard to the environment either in the short term or over the longer term. CZN expressed concern that the alternative to its proposal would be to treat the water at source and discharge directly to the receiving environment after meeting discharge limits to be set at the regulatory stage.

6.4.1.3.2 Impact of Mine Site on Water Quality

RWED noted there were current on-site water management practices that could cause contamination of Prairie Creek and/or Harrison Creek. RWED documented that all the water flowing across the development site reported to a settling pond on the Southern corner of the site where it then discharged to Harrison Creek without any prior testing. This issue was also raised by INAC.

CZN indicated that it supported monitoring requirements and the institution of reasonable limits for site

discharges consistent with regulatory practice at the regulatory stage. CZN also indicated that baseline water quality data had been provided and would be available for consideration at the regulatory stage, and that the company would be available to provide input to the design of the monitoring program, and provide such baseline information as was available and relevant to these efforts.

6.4.1.3.3 Impact of the Tank Farm Facility on Water Quality

RWED also observed that there was a risk of contaminating Prairie Creek or Harrison Creek. RWED cited that oil containers within the bermed tank farm had been leaking and that although most of the oil in the containers had been transferred to a new tank, some hydrocarbon contamination appeared to have occurred. RWED noted that the water that accumulated in the fuel containment berm during the spring was being discharged to an adjacent area potentially causing hydrocarbon contamination at the discharge point. RWED added that the discharge was not being testing to determine whether it contained hydrocarbon residues.

6.4.1.4 Liidlii Kue First Nation

The Liidlii Kue First Nation expressed concern about possible impacts to the quality of water because the First Nation was downstream of the proposed developments, and in particular because the harvesters and traditional knowledge land users would be impacted by changes in the delicate ecosystem of the area.

6.4.1.5 Canadian Parks and Wilderness Society

6.4.1.5.1 Impact of the Tank Farm Facility on Water Quality

CPAWS observed hydrocarbon stains during the site tour on August 30, 2001, around the entire circumference of at least one fuel tank and in the area around the 45-gallon drums stored within the bermed perimeter with the fuel storage tanks. CPAWS expressed concern that water accumulating within the bermed perimeter was being decanted directly into Harrison Creek. CPAWS noted that during the August 30, 2001, site visit that CZN acknowledged it transferred the water trapped within the tank farm facility directly into Harrison Creek without testing it. CPAWS did not accept CZNs rationale that since hydrocarbons floated, any hydrocarbons in the water would not be removed from the bermed area because not all the hydrocarbons floated at the surface of the water column. CPAWS cited that not all hydrocarbons floated, and that in fact, some entered into the lower portions of the water column and would likely be released into the environment during decanting and potentially accumulate in creek bed sediments.

CPAWS concluded that if hydrocarbons were visible and measurable in a body of water, the deposit of that water into a water body would constitute a deposit of a deleterious substance under the Fisheries Act. CPAWS submitted that sediment samples be taken in Harrison Creek immediately downstream of where the berm water has been released, to determine if there has been a violation of the Fisheries Act.

6.4.1.6 Nahanni National Park Reserve

6.4.1.6.1 Impact of the Tank Farm Facility on Water Quality

NNPR reported that at the August 28, 2001, site visit and tour CZN officials pointed out that rainwater and snow melt which had been contained inside the berm surrounding the fuel oil storage area had been pumped into Harrison Creek, which drains immediately into Prairie Creek. NNPR cited evidence of petroleum product contamination on the side walls of the berm, and on the ground, especially near the drum storage area and at the base of the fuel tanks. NNPR noted that CZN officials pumped the water into Harrison Creek without testing it for petroleum product contamination. As petroleum products could have adverse impacts on aquatic biota, Parks Canada Agency was concerned that the practice could result in the release of petroleum products that could adversely affect fish and other aquatic life in the Prairie Creek and South Nahanni watersheds. While NNPR noted CZNs claim that a zero discharge limit was unreasonable, NNPR referenced Appendix B, Section B.5.6 of the Canadian Council of the Ministers of Environment (CCME) *Environmental Code of Practice for Aboveground Storage Tank Systems Containing Petroleum Products*, wherein it states that: "Oil/water separators do not remove the soluble fraction of oil that is in the water or storm runoff. Therefore, it should be noted that even if an oil/water separator produces an effluent that has an oil and grease content that is below provincial or territorial discharge limits, the effluent may still be acutely toxic to fish." NNPR concluded that under Section 36(3) of the Fisheries Act, no person is allowed to deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions. Accordingly, NNPR suggested it was reasonable for CZN to test the water collected inside the berms of the fuel storage facility for toxicity before it was discharged to Harrison Creek or Prairie Creek.

NNPR also expressed concern about CZNs aboveground storage tank systems citing their age, generally observed condition, size, location and environmental risk and impacts associated with their malfunctioning. NNPR cited that it would be prudent and reasonable to require CZN to meet more than the minimum requirements for the storage tanks and to upgrade the existing tanks to meet current standards as set out in Part 4 of the Code[2].

CZN noted that the fuel storage tank facility did comply with current legislation and that the fuel storage tank systems were registered on May 21, 1998, in accordance with the *Registration of Storage Tank Systems for Petroleum Products and Allied Petroleum Products on Federal Lands Regulations promulgated pursuant to the Canadian Environmental Protection Act.*[3] CZN also cited that the fuel storage

2 CCME Environmental Code of Practice for Aboveground Storage Tank Systems Containing Petroleum Products, states in that existing aboveground storage tank systems be upgraded to the standards of Part 3 of the Code within 10 to 15 years, the primary purpose of the Code is to promote "environmentally sound management of aboveground petroleum product storage tank systems through the application of uniform performance standards throughout Canada". The Code further provides minimum requirements for the prevention of losses of petroleum product from aboveground storage tank systems that may lead to environmental problems.

3 As of August 1, 1997, managers of storage tank systems have had to register all their outdoor aboveground storage tank systems that have a single or combined capacity of 4,000 litres or more. The systems must be registered with the appropriate federal department (AFD), which is defined as "the department, board or agency of the Government of Canada, a corporation named in Schedule III of the Financial Administration Act, that owns, leases, or otherwise controls, the federal land, on which a storage tank is located." An AFD has to maintain a registry and provide annual reports to Environment Canada. The minimal information that the AFD has to provide to Environment Canada is described in Canadian Environmental Protection Act; Registration of Storage Tanks Systems for Petroleum Products and Allied Petroleum Products in Federal Lands Regulations. Schedule II of the Registration Regulations.

tank systems were in existence before the CCME Environmental Code of Practice for Aboveground Storage Tank Systems Containing Petroleum Products being published in August 1994. The Code requires existing systems to be upgraded to meet the requirements for new systems within 15 years from the date the authority having jurisdiction adopts giving CZN until at least 2008 to upgrade the facility. CZN also cited that hydrocarbon staining noted within the fuel storage facility berm resulted from historical waste oil barrel storage, the majority of which has been cleaned up by CZN.

CZN added that the fuel storage tank facility was part of the existing infrastructure at the Prairie Creek minesite and that the applications before the Review Board requested no alterations or additions to these facilities. CZN indicated that it continued to monitor the condition of the fuel storage tank facility in conjunction with routine care-and-maintenance activity, and would do so as well in conjunction with the proposed developments. CZN indicated that the facility would be upgraded in conjunction with mine re-development. In the meantime, CZN believed it would be inappropriate to override existing legislation and require upgrading of the facility at this time for the purposes of undertaking the proposed developments.

NNPR indicated that CZN appeared reluctant to work in cooperation with NNPR, EC and other mining interests to develop a water quality monitoring program. NNPR contended that the water quality as it enters Nahanni National Park should be pristine and that Parks Canada was responsible for maintaining the Nahanni wilderness as "an essentially unaltered, primitive and unpolluted corridor." CZN acknowledged that the setting of "reasonable" discharge limits and that the design of a monitoring program was reasonable and point out that CZN was prepared to participate with the MVLWB and other regulatory authorities at the regulatory stage to achieve these objectives. CZN again noted that the proposed discharge to the tailings facility was proposed as a mitigation measure to eliminate the need for a direct discharge of effluent from the proposed developments and any associated loadings to the receiving environment. The resultant water quality in the pond was expected to meet discharge standards and therefore pose no hazard to the environment either in the short term or over the longer term. CZN indicated that the alternative was to treat the water at source and discharge it directly to the receiving environment after meeting discharge limits to be set at the regulatory stage.

6.4.2 Water Quantity

CZN reported that the decline development would likely require dewatering during its development and during the exploration drilling depending upon the extent and nature of watercourses intersected. CZN also reported that dewatering of the workings would be accomplished using underground sumps and pumps. CZN would develop a final sump near the mouth of the portal to act as a finishing settling pond for mine water before release to Harrison Creek. CZN expected the quality of the water to be pumped from the underground workings to be typical of the local groundwater regime that is hydraulically connected with the Prairie Creek Aquifer. CZN noted that after finishing the underground exploration program, dewatering would be discontinued and the workings would be allowed to flood to the natural groundwater level. The portal entrance would be secured as required.

CZN reported that fresh water for use in the metallurgical pilot plant process would be acquired from one of the existing water wells drawing from the Prairie Creek Valley aquifer. The wells were designed to

support full mill operations and one was currently used to supply potable water to the camp in support of routine care-and-maintenance activity. The subject aquifer was investigated and well pump tests conducted at the time the wells were developed in 1982. The aquifer was described as being confined in a sand and gravel layer 13 feet in thickness (3.9m). The well is 66 feet deep, 8 inches in diameter, and screened from 53 to 66 feet. The pump test was run continuously over a two-month period in April and May of 1982 over which time the aquifer yielded approximately 140,000 m^3 at a pumping rate of about 2.0 m^3 per minute. Total water use over the whole of the pilot plant program would be in the range of 2,000 – 4,000 m^3 of which half or 1,000 – 2,000 m^3 would be fresh and half or 1,000 – 2,000 m^3 would be reclaim. CZN concluded that the well and aquifer would therefore have significant over-capacity relative to the requirements of the pilot plant.

6.4.2.1 Indian and Northern Affairs Canada

6.4.2.1.1 Impact of Water Quantity in the Tailings Facility

INAC noted concerns regarding the tailings facility, and in particular, CZNs claim that "It [was] important to recognize that the pond has been in place and containing roughly the equivalent amount of water for the past 20 years without any indication of failure or deterioration of stability, and without incurring significant erosion of the rip-rap armour by Prairie Creek". INAC indicated that this statement was at variance with the Bruce Geotechnical Consultants (BGC) letter dated August 16, 2001, and its report of December 18, 2000. INAC indicated that geotechnical engineering studies conducted on the tailings facility in 1994 and 1995 reported: that water levels in the tailings facility had a natural fluctuation of about 1 metre; slumping of the backslope above the tailings facility; sloughing of the gravel cover on the pond side of the downstream embankment; and, occurrence of erosion on the river side of the embankment, where the riprap was not placed.

INAC also noted that acceptable baseline information regarding the accurate water level in the tailings facility was unavailable, and that doubts existed about what the actual water level in the tailings facility was, and concurrently, the risk to public and environmental safety in the absence of such information. INAC referenced the BGC letter regarding where it estimated the water level in the tailings facility to be at 869.5m on the drawings (dated November 30, 2000). INAC technical reviewers noted a 1.5m discrepancy in the reported tailings impoundment water level (868m vs. 869.5m) between CZN IR responses and the level reported by BGC in 1994. INAC suggested that the discrepancies amounted to significant volumes of water, 150,000 m^3 (1.5 metres) that had to be accounted for in order to determine the integrity of the tailings facility. INAC noted that a verification of reported water levels was required, and explanation required for the short fall of water if there was in fact a shortfall, as the evaporation/precipitation ratio was not high enough to account for that much water loss.

CZN responded citing that the level of the pond was surveyed on September 8, 2001, and was found to be at 869.5 m, the same as that determined by BGC in 1994. CZN claimed this supported the observation that the tailings facility level had not changed significantly over the intervening period and that the clay liner remained intact and significant seepage was not occurring. CZN also cited that the tailings facility water level estimate of 868m as provided in the EA Report was taken from an earlier report (Hardy, 1983). CZN further cited that that this level was used to provide a conservative estimate of the contained volume of

water in the pond for the purposes of calculating available dilution ratios for discharges to the pond. Confirmation of the pond level at 869.5m equated to an additional 150,000 m^3 of water to the previous estimate of 225, 000 m^3, increasing the available dilution ratio for the pilot plant process effluent from over 50:1 to almost 100:1. CZN also inferred that the evidence confirmed that the pond could accept all potential discharges associated with the developments and remain within the "safe" level of 1m as evidenced by historical fluctuations.

6.4.2.1.2 Impact of Tailings Dam Geotechnical Integrity on Water Quantity

INAC technical review also raised concerns about the geotechnical integrity of the tailings dam. INAC noted that the BGC stated that the tailings facility containment structure [was] adequate for the proposed use, provided levels [did] not rise more than about 1m above the 1994 level. BGC further cautioned against pumping down the water level to make room for the planned discharges without additional geotechnical assessment, because of "potentially adverse uplift pressures on the basal clay liner." INAC concluded that the water level was already 1.5 metres below the 1994 level, and that BGC had recommended against pumping it down even 70 cm from the 1994 level. INAC also cited in its technical report that CZN had not substantiated its claim that no seepage was occurring at the tailings facility and that CZNs formula showing that water inputs less evaporation equaled the change in storage did not add up. As CZN had not reasonably demonstrated that there was no seepage occurring, seepage had to be occurring through either the embankments or the base to justify the reported water levels in the tailings facility.

During the August 28, 2001, site visit, INAC observed the sloughing on the pond side of the embankment. INAC also observed that in the BGC report, erosion of the embankment, on the riverside is identified and shown to be several metres downstream of the actual tailings impoundment, and that this area was apparently not rip-rapped during construction activities in 1982, and that active erosion was evident with the presence of loose gravel and the lack of vegetation.

CZN referenced the BGC reports citing instabilities of the tailings facility noting they were references to historical occurrences which took place shortly after construction in 1982, and that since that time, the facility had remained stable and its condition had not significantly changed. CZN agreed with INACs observation of sloughing on the interior side of the dam and reiterated that the sloughing was initially assessed by Golder and Hardy geotechnical engineers in 1982, and again in 1994-95, by BGC, at which time it was determined to have achieved a stable configuration. CZN indicated its personnel continued to inspect the tailings facility on a routine basis as part of the ongoing care-and-maintenance activity at the mine site, and that the condition of the facility had remained fundamentally unchanged since the BGC site investigation of 1994-95.

INAC also reported seeing significant erosion of the riprap armour on the embankment upstream of the erosion area identified by BGC, on the riverside of the tailings impoundment. INAC reported that the riprap showed significant evidence of erosion at the inside bend of the embankment where Prairie Creek's flow crossed over from the right side of the channel to the left side where the entire river flow was deflected by of the riprap, and that there was evidence of large boulders being shifted by the river's flow.

CZN reported that BGCs detailed site assessment in 1994-95, had reported varying degrees of erosion of

the riprap berm along the toe of the tailings dam adjacent to Prairie Creek. CZN added that it was continuing to monitor the condition of the tailings impoundment facility, including the subject areas in conjunction with its ongoing care-and-maintenance activity, and that in September 2001, CZN personnel inspected the tailings impoundment facility and reviewed their findings with BGC. CZN concluded that no significant changes in the condition of the riprap armour had been noted in recent years, and none of the erosion was considered significant enough to affect the stability of the dam or require any maintenance or enhancement. CZN added that significant quantities of riprap protection remained in place and continued to provide adequate protection along the length of the dam including at the point of maximum deflection of Prairie Creek, where additional and coarser rip rap protection was provided at the time of construction.

6.4.2.2 Environment Canada

6.4.2.2.1 Impact of Tailings Dam Geotechnical Integrity on Water Quantity

EC observed that rip rap on the outside of the tailings facility has been eroded by the stream flow such that only the larger rocks remained where the higher stream velocities hit the dam (south-east portion). EC questioned whether additional armour materials were needed to maintain this structure in the long term. EC indicated the area of erosion was noted in BCG report, but that remedial measures were not discussed.

CZN noted that ECs consideration of erosion of the riprap berm by Prairie Creek along the outside toe of the impoundment dam was part of the assessment of the facility undertaken by BGC in 1994, and that it was taken into account in the determination that the dam would be stable in its present configuration and suitable for the intended purposes. CZN indicated that it continued to monitor the condition of the tailings impoundment facility in conjunction with ongoing care-and-maintenance activity. CZN also indicated that personnel inspected the tailings impoundment facility most recently in September 2001, and had reviewed their findings with BGC. CZN observed that erosion of the riprap berm along the toe of the dam adjacent to Prairie Creek had not changed significantly in recent years. Significant quantities of riprap protection remained in place and continued to provide adequate protection along the length of the dam including at the point of maximum deflection of Prairie Creek where additional and coarser riprap protection was provided at the time of construction. CZN further cited that its geotechnical-engineering consultants remained confident that tailings facility is stable in its present form and suitable for the intended use.

CZN agreed that further consideration of the need for additional armoring would be needed to support full-scale use of the facility for tailings disposal, and would be done in conjunction with the rehabilitation engineering studies as part of project feasibility, and for inclusion in the EA Report to be prepared in support of an application for full-scale operations.

6.4.2.3 Department of Fisheries and Oceans Canada

6.4.2.3.1 Impact of Tailings Dam Geotechnical Integrity on Water Quantity

DFO indicated that its observations of the stability of the tailings facility did not concur with the assessment presented by CZN in its response to DIAND IR #1 and GNWT IR #3. DFO noted that CZN claimed that the pond had been in place for 20 years "...without incurring significant erosion of the rip-rap armour by Prairie Creek." DFO noted that it did observe erosion in two places along the lower one-third portion of the tailings

facility. DFO also noted that it was apparent that an outer layer of the armouring had collapsed into Prairie Creek and that large boulders, presumably originally placed as a base to the armour layer, were laying exposed and separated in the creek at the toe of the slope. DFO indicated that the information provided by CZN regarding the structural integrity of the tailings facility was apparently derived from site visits conducted in 1994, by BGC and that erosion of the rip-rap appeared more recent. It was DFOs opinion that the tailings facility could not reliably serve the purposes it was designed for and that the nature of its integrity was questionable for the purposes CZN was requesting.

CZN indicated that varying degrees of erosion of the riprap berm along the toe of the tailings dam adjacent to Prairie Creek were reported by BGC in its detailed site assessment in 1994-95. CZN also cited that significant quantities of riprap protection remained in place and continued to provide adequate protection along the length of the dam including at the point of maximum deflection of Prairie Creek where additional and coarser rip rap protection was provided at the time of construction. CZN concluded that its geotechnical-engineering consultants (BGC) remained confident that the tailings facility is stable in its present form and suitable for the intended use. CZN added that no significant changes in the condition of the riprap armour were noted in recent years and that CZN personnel would continue to monitor the condition of the tailings impoundment as part of routine care-and-maintenance activity, and in conjunction with the proposed developments.

6.4.2.4 Nahanni National Park Reserve

6.4.2.4.1 Impact of Tailings Dam Geotechnical Integrity on Water Quantity

NNPR concluded that CZN did not know how much water it would discharge into the tailings facility, and that there was uncertainty about how much water could be safely placed in the existing tailings facility. NNPR was also apprehensive about the alternative described by CZN about having inspections of the facility carried out by CZN personnel because it did not provide the mitigation necessary that the tailings facility was stable in its present form. That is, inspections were a regarded as a necessary activity, but not considered mitigation, but rather a monitoring mechanism.

6.4.2.4.2 Impact of Water Quantity in the Tailings Facility

NNPR noted CZNs claim that the metallurgical pilot plant development would discharge approximately 4,000 m^3 which would increase the level in the tailings facility by about 4 cm. NNPR referenced the EA Report for the underground decline development and exploration drilling wherein there was no discussion of disposing of the water from the subject development in the tailings facility. However, NNPRs technical review showed that in correspondence between BGC and CZN dated August 16, 2001, there was discussion of the possible discharge of combined process and mine water to the tailings facility in the amount of 70,000 m^3, raising the current level by 70 cm.

NNPR was concerned about the increased level of discharge and the difference in dilution provided in the tailings facility. NNPR cited that CZN originally claimed it would provide a 50 to 1 dilution factor. NNPR indicated that the 50 to 1 dilution available in the impoundment applied if 4,000 m^3 of process water was discharged to the tailings facility. If 70,000 m^3 of combined process and mine water was discharged to the pond, the dilution factor would be reduced to approximately 3 to 1.

CZN suggested the decline development would not generate volumes of waste water inferred by others. CZN noted that information it provided on minewater flows from the 870m portal were inferred[4] to the proposed decline without considering the rock formations in which the decline would be developed. CZN also cited that it provided the estimate as a worst case, and that actual minewater from the decline would be considerably less. CZN also reiterated that its proposal to use the tailings facility was a mitigation measure to ensure containment of discharges within an engineered, impervious containment facility to eliminate the need for discharge to the receiving environment and that the alternative would be to set discharge limits and allow for direct discharges to the receiving environment meeting these limits.

6.4.2.5 Deh Cho First Nations

The Deh Cho First Nations indicated that CZN estimated it would produce 66,000m^3 of mine water from the decline development, or more than 100 m^3 of mine water per day, and that because minewater would constitute the direct or indirect deposit of a waste to surface waters the underground decline would require a Class "B" Water Licence.

CZN cited that a Water Licence would be issued to account for all discharges associated with the proposed developments, including minewater from the decline at the regulatory stage. It also noted that linking of Water Licences and Land Use Permits would presumably be consistent with regulatory practice and that it was prepared to work closely with the MVLWB and regulatory authorities to meet their needs in this regard.

The Deh Cho First Nations indicated its significant concern about the ability of the tailings facility to safely accommodate possible combined discharges from the metallurgical pilot plant and minewater from the underground decline. The Deh Cho First Nations also expressed concern about the uncertainty regarding the volume of mine water that could be produced and CZNs ability to appropriately manage the waste from the subject waters in a manner that did not result in impact to the environment.

CZN stated that its geotechnical engineers considered the tailings dam stable and suitable for the proposed use. CZN also emphasized that the 1 m increase in level considered to be "safe" given visual evidence that levels had fluctuated this amount in the past was presented as conservative given that the measured freeboard was 7.5 m and that a 1 m rise would still leave a 6.5 m freeboard. CZN was of the opinion that that the level could be raised substantially without compromising the integrity of the facility. If not allowed to use the tailings facility CZN indicated it would propose to treat, as necessary, and discharge directly to

4 INAC was informed that the water from the 870 m portal was flowing at 60 L/min (Malcolm Swallow), while in the EA report that discharge was reported at 2 to 10 L/sec (i.e. 120 to 600 L/min). INAC and RWED both noted that the subject water drains across the project site to the catchment pond adjacent to Harrison Creek. They also cited concern about the quality of the water as it was not being tested before its release to the creek, that the control structure on the catchment pond outlet culvert was open during the site visit, and that water was flowing into Harrison Creek and Prairie Creek. CZN cited that estimates of 2 to 10 lps from the 870m portal reported in the EAR, and in its response to INAC IR #8 were taken from INAC inspection and sampling reports in 1983 and were assumed to be representative of flows at that time. CZN claimed that monitoring recently initiated by CZN from the 870m portal recorded discharges of about 80 lpm. CZN communicated that it considered the existing 870m portal and associated workings are not related to the proposed developments under the current applications.

the receiving environment, subject to such limits as set under the water licence, rather than prematurely undertake such costly rehabilitation measures at this time.

6.4.3 Conclusions

6.4.3.1 Impact of the Mine and Minesite on Water Quantity and Quality

The Review Board finds that there are general water management issues that remain unresolved, particularly the design of an appropriately sized sump at the portal mouth and its concurrent monitoring, and issues regarding the stockpiling of waste rock/ore at the mine site and runoff. The Review Board finds that the use of sumps is a generally accepted practice and that current regulatory mechanisms effectively manage sumps. CZN did not provide any evidence that its current mine site water management practices as they apply to the proposed waste rock/ore pile will prevent adverse impacts on the quantity or quality of water. The evidence available indicates that drainage from the minesite is likely to affect water quality. Given the pristine nature of the water resources in the vicinity of the minesite , the Review Board concludes that the proposed waste rock/ore pile is likely to result in a significant adverse impact on the environment and that measures are needed to prevent such Impacts.

Cumulative environmental impact issues pertaining to water, and in particular the accumulation of discharges from previous developments, on-gong care-and-maintenance activities, and the subject developments are addressed in the cumulative effects section of the REA.

6.4.3.2 Impact of the Tailings Facility on Water Quantity and Quality

The Review Board finds CZN provides a reasonable argument for use of the tailings facility, particularly as a means of managing water from the subject developments, and of reducing risks of impact to the environment. The Review Board also finds CZNs proposal environmentally responsible. The Review Board also accepts that there is uncertainty about the surface and subsurface integrity of the tailings facility and that there remain substantive water balance and engineering questions sufficient to warrant the treatment of the tailings facility as a significant environmental risk for the purposes of the subject development until demonstrated otherwise.

The Review Board accepts that the subject tailings facility was never used for the disposal of wastes since its construction. The Review Board notes that evidence confirming the tailings facility was not leaking was not provided and the water balance provided by CZN proved inconclusive. Therefore, the Review Board concludes that it must apply the precautionary principle and conclude that any releases to the tailings facility must be treated in the same manner as releases directly to the environment.

The Review Board finds that the tailings facility is constructed on a creek, adjacent to a mountain whose base has subsequently sloughed into the tailings facility. The Review Board also finds that there are unknown surface and subsurface risks associated with the tailings facility. The Review Board also finds that monitoring of the tailings facility will not in and of itself suffice as mitigation of potential environmental impacts, should the proposed development use the current tailings facility. The Review Board also finds that previously noted structural failures associated with the unused tailings facility raise doubts about its integrity and its engineering design parameters. The Review Board therefore finds there is

significant uncertainty about the surface and subsurface integrity of the tailings facility. The Review Board also finds that there is a significant likelihood of an adverse impact on the environment should the tailings facility become compromised because of the subject developments. Therefore, the Review Board concludes that the tailings facility should not be used in the subject developments until a registered professional engineer determines that the tailings facility is stable in its current configuration for its proposed use. If such certification is not forthcoming, CZN should make whatever changes are necessary to ensure environmental protection before using the facility.

6.4.3.3 Impact of the Fuel Storage Tanks on Water Quantity and Quality

The Review Board finds that there is notable concern about how the tank farm facility is being managed, and in particular, the integrity of the tanks themselves. The Review Board finds the concerns legitimate given the location of the tanks (adjacent to Harrison Creek and Prairie Creek) and the noticeable staining around the base of the tanks as observed during the site visit. The Review Board decided that the petroleum tank facility is part of the scope of development. The Review Board also appreciates CZNs assertion that the subject tank farm facility would not be altered by the proposed developments. The Review Board also appreciated CZN assertions that existing care-and-maintenance requirements are laid out in CZNs lease with the government of Canada. However the developer refused to file the lease on the Public Registry and has not advised the Review Board of any terms and conditions in the lease which would deal with this concern. The Review Board has no evidence about these mitigation requirements. Therefore, the Review Board concludes that a qualified engineer certified to practice in the NWT should inspect the tank farm before it is used in these developments. That report should certify the tanks as safe and environmentally acceptable before they are used in the developments.

6.4.3.4 Impact of Berm Water Disposal on Water Quantity and Quality

The Review Board finds there is a broad-spectrum of concern from government experts, First Nations and CPAWS about the hydrocarbon staining in the tank farm area, and in the area where the 45-gallon drums are stored in the berm with the fuel storage tanks. The Review Board finds that the management practice of decanting water that could contain hydrocarbons from within the berm to an area outside the berm into Harrison Creek without prior testing worrying. The Review Board concludes that CZN has taken steps to remediate potential on-site environmental hazards but that the practice of decanting water from within the tank farm facility without testing it to see if there are any hydrocarbons is a deficiency that CZN should remedy.

6.4.4 Measures and/or Suggestions

The Review Board finds that the proposed use of the tailings facility will likely cause a significant adverse impact on the environment and recommends the following measures.

- That CZN provide the MVLWB a geotechnical assessment and an engineering certification as to the suitability of the tailings facility.
- That CZN provide the MVLWB an assessment and an engineering certification as to the suitability of the tank farm facility.
- That CZN prepare a MVLWB approved contingency and monitoring plan for the waste rock/ore piles that includes, but not necessarily limited to, the catchment basin into which the water flows.

To prevent adverse impacts from becoming significant, the Review Board recommends the following measures:

- That the MVLWB obtain from Parks Canada and Environment Canada their minimum water quality monitoring program objectives and requirements for its Water Licencing purposes. The water quality monitoring program should include the on site settling pond and the point where Harrison Creek discharges to Prairie Creek.
- That the MVLWB give serious consideration to including the water quality parameters and established objectives found in the report entitled "Protecting the Aquatic Quality of Nahanni National Park Reserve, N.W.T.", Environment Canada, December 1998 on page 71 in its water licence conditions .
- That CZN submit the following information as part of its regulatory submission to the MVLWB:
    a. Detailed metal scans of the liquid effluents from the pilot plant;
    b. A plan for the ultimate treatment and disposal of the liquid effluents; from the pilot plant and
    c. A plan for the disposal of the tailing wastes generated by the pilot plant.
- That CZN conduct testing of water collected inside the tank farm berm for petroleum product contamination/ toxicity, before discharge it to any surface water, and that if the analysis shows that there are petroleum products in any amount, that CZN treat the water before discharging it into Harrison and Prairie Creek.
- That CZN provide the MVLWB an accurate verifiable estimate of the discharge volume from the 870 m portal.
- That CZN implement a water quality testing regime for water coming out of the mine portals, flowing into the catchment pond and accumulating in the fuel storage berm area before discharging the water into the receiving environment.
- That CZN submit evidence to the MVLWB that has the financial assets and/or a financial institution letter of credit and have the ability to carry out the requirements of the Water Licencing for the proposed development.

6.5 Aquatic Resources and Habitat

CZN submitted that fisheries studies by Beak consultants in 1980-81 and Rescan in 1994 identified limited fisheries habitat potential in Harrison Creek, a tributary of Prairie Creek which flows adjacent to the mill, with steep gradients restricting fish movement upstream of the mouth. CZN also cited that Harrison Creek commonly dries up during the low flow late summer season and that any flows at that time are subterranean. Thus the creek provides no over-wintering habitat due to low winter flows and shallow depths. As a result, fish utilization appears restricted to the mouth where 7 slimy sculpin were captured in 1980, and 2 dolly varden, 10 mountain whitefish and 8 slimy sculpin were encountered in 1981. No fish were observed in Harrison Creek in 1994.

CZN also claimed that fish utilization of Prairie Creek appeared to be confined largely to the headwaters and the mouth. The headwaters appeared to be utilized by dolly varden (or bull trout) and rocky mountain whitefish. CZN indicated that arctic grayling did not appear to move upstream in Prairie Creek beyond the lowest reaches near the mouth. CZN concluded that use of Prairie Creek near the minesite, or downstream

of the minesite above the mouth appears limited to that of a movement corridor, as suitable holding pools and spawning areas have not been identified within these reaches.

CZN indicated that the pilot plant program would be conducted wholly within the confines of the existing mill building separated from Harrison Creek by a rock berm and that all drainage from the plant site area would report to a catchment pond. CZN concluded that since it concluded that the potential impacts to water quality and quantity would be expected to be negligible, so would the potential for impacts of the proposed development on fisheries or other aquatic resources.

CPAWS contended that CZN water management practices included decanting water from within the tank farm facility berm that had visible hydrocarbons. CPAWS indicated that the subject decanting of the water with visible petroleum on it from the tank farm berm constituted a deleterious substance under the Fisheries Act.

NNPR expressed concern about CZNs onsite water management practices. It noted that release of petroleum products could happen and that an adverse affect on fish and other aquatic life in the Prairie Creek and South Nahanni watershed would be likely. NNPR Referenced the report by Neil Mochnacz entitled Interim Report: Fisheries Survey of Prairie Creek Watershed. That report indicated that bull trout were considered a species that could be at risk of extirpation in the Northwest Territories and were candidates for a detailed risk assessment. The interim report noted that bull trout, arctic grayling and sculpin occurred within the Prairie Creek watershed, and bull trout had been reported upstream and downstream of the mine site. The author concluded that Prairie Creek had a large portion of suitable habitat for bull trout and arctic grayling and that because the river did not freeze completely that it could be considered as year round habitat. The report concluded that bull trout were extremely vulnerable to impacts that comprise habitat quality, and availability, especially spawning and rearing habitat.

DFO concluded that armoured surface of the tailings facility forming the right upstream bank of Prairie Creek constituted fish habitat and any work involving the armouring would require a subsection 35(2) Fisheries Act authorization. DFO added that that to preclude an imminent environmental liability that maintenance and/or enhancement of the tailings facility armouring be considered before the containment of any mine/exploration production material, or discharge into it.

CZN responded that further assessment of possible remediation was not considered necessary indicating that no significant changes in the condition of the riprap armour had been noted in recent years. CZN added that its geotechnical consultants remained confident that the dam continued to be stable in its present form, and cautioned that casual observations by personnel not specifically trained in geotechnical engineering not be substituted for that of the expertise and judgment of trained professional engineers such as represented by BGC.

6.5.1 Conclusions

The Review Board finds that bull trout are especially vulnerable to impacts that compromise habitat quality, and availability, especially spawning and rearing habitat, and that bull trout have been reported upstream and downstream of the subject developments. The Review Board accepts that Prairie Creek

provides suitable habitat for bull trout and arctic grayling, and that because the river does not freeze completely that it can be considered as year round habitat. The Review Board acknowledges that bull trout are considered a species that could be at risk of extirpation in the Northwest Territories and are candidates for a detailed risk assessment. The Review Board concludes that bull trout are a valued ecosystem component of Prairie Creek and that it is important that current water quality and habitat objectives be maintained. The Review Board concludes that the proposed development might impact the bull trout population of the Prairie Creek.

6.5.2 Measures and/or Suggestions

The potential impact on the bull trout population as a result of the change in water quality should be mitigated through the application of measures recommended by the Review Board in Section 6.4.4

6.6 Wildlife and Wildlife Habitat

CZN concluded that given the short-term, localized and contained nature of the proposed developments that their impact on wildlife and wildlife habitat would be negligible. CZN noted that the decline development would be conducted mostly underground and the pilot plant program would be conducted wholly within the confines of the existing mill building, and that other activity undertaken in support of the pilot plant program, such as aircraft support, personnel and equipment transport etc. would be typical of ongoing care-and-maintenance activity.

In general, RWED had no major concerns about the proposed developments given the existing infrastructure at the mine site and the limited scope of the operation. Rather, RWEDs concerns were related to the ancillary activities that would take place in support of the operations. RWED noted that with an increased number of people on site to support the developments, there would an increased risk for wildlife/human interactions and that although wildlife encounters had been low over recent years, an increased human population in the area could result in an increased number of carnivores frequenting the site.

CZN cited the EA Report and its IR responses noting that the *Prairie Creek Safety and Procedures Guidelines* contained provisions for bear safety training and attack response, and that the lack of any incidents of human/wildlife interactions since CZN began its involvement with the Prairie Creek property in 1992, proved the guidelines were effective. CZN contended that the standard clause typically contained in Land Use Permits "to use food handling and garbage disposal procedures that do not attract bears" constituted sufficient regulation of the matter. CZN also cited that responsibility for wildlife matters in the NWT, outside of National Park Reserve, rested with RWED, and that because Prairie Creek Mine was located well outside the boundaries of NNPR, standard procedures for dealing with problem wildlife would involve contact with the local Renewable Resource officer.

CPAWS expressed concern about reports that a Dall's sheep was shot on the airstrip at the mine site. CZN cited that an outfitter's client had apparently shot a sheep and left a gut pile on the runway. CPAWS appreciated that CZN posted no hunting signs but noted despite the warning signs; increased access to an area often results in increased hunting pressure, possibly creating significant impacts on the local wildlife populations. CPAWS submitted that a legally designated No Hunting or Fishing zone should be

established around the Prairie Creek mine site, suggesting that this would discourage further incidents as the one described above, and allow for prosecution of any offenders.

NNPR noted that that CZNs reference to the presence of a male grizzly bear, a sow and a cub, and that the frequency of visit from the male grizzly bear had created enough familiarity to name the animal. NNPR cited that the grizzly bear population was designated as a population of special concern under the Species at Risk program in several of its ranges, including the Northwest Territories and Yukon Territory. NNPR added that transmitters tracking grizzly movements have shown that male grizzlies sometimes travel as far as 250 km, as the crow flies, over the course of a year and that it was probable that the subject population of grizzly bears would also include Nahanni National Park Reserve in its home range.

The Canadian Wildlife Service had not identified any concerns with migratory birds in connection with the proposed projects.

6.6.1 Conclusions

The Review Board appreciates that the Minister of Canadian Heritage is specifically responsible for the protection of species in National Parks that are facing threats to their populations, and that the grizzly bear is listed as a species of special concern. The Review Board also finds that the jurisdiction for the management of wildlife outside of Nahanni National Park rests with the GNWT. The Review Board does not find any evidence that the proposed development will have any significant adverse impact on wildlife or its habitat.

6.6.2 Measures and/or Suggestions

To prevent adverse impacts, the Review Board suggests following measures:

- That CZN develop and implement a bear response plan with RWED and NNPR to enable personnel to adequately respond to problem bear situations.
- That CZN prepare and submit a plan to RWED and NNPR to protect the mineral lick located near the minesite to ensure that wildlife can continue to use it with a minimum amount of disturbance.

The Review Board also submits the following suggestions for the consideration of affected parties.

- The MVLWB consider the imposition of a security deposit of sufficient magnitude to finance the reclamation of the present minesite.
- That CZN prepare and submit to RWED and NNPR a suitable wildlife movements and interactions monitoring program effective for the duration of the developments.
- That CZN maintain a wildlife-sighting log.
- That CZN incinerate garbage daily.
- That CZN provide contractors education about proper waste management, especially drillers who are working away from the mine site as food wastes attract wildlife and could result in serious injury or death to mine employees.
- That CZN store chemicals that can attract wildlife such as reagents, and even old batteries coolants (glycol) indoors in a secure facility as they could taint the local food supply and/or cause sever injury or death to wildlife.

- That CZN install an electric bear fence around the main accommodation and kitchen complex to ensure worker and wildlife safety, and that the fenced in area including, if feasible, an area for waste incineration.

6.7 Land and Resource Use

CZN indicated that access to the developments was by air only, to a private airstrip controlled by the company, and that there were no other existing land occupations nor commercial land or water based activities near the mine. Similarly, CZN had not observed traditional use or trapping activity in the minesite area in recent history. The South Nahanni Outfitters hold the outfitting licence for the area and CZN indicated that hunting activity generally takes place in the fall in areas well removed from the mine and should not be impacted by the proposed development.

CZN communicated that the Prairie Creek mine is located 32 km upstream of the point where it crosses the boundary of the Nahanni National Park Reserve, and 48 km upstream of the point where Prairie Creek joins with the South Nahanni River. The South Nahanni River is 500 km in length, of which 300 km are contained within the Nahanni National Park Reserve. The confluence of Prairie Creek and the South Nahanni River is 65 km upstream of the point where the South Nahanni River leaves the Nahanni National Park Reserve crossing its downstream boundary. The South Nahanni River flows for 402 km before reaching its confluence with Prairie Creek, of which 235 km are within the Park Reserve.

CZN noted that the watershed of the South Nahanni River is 37,000 km2, of which 4,766 km2 are contained within the Nahanni National Park Reserve, and that the Nahanni National Park Reserve was created in 1972 for wilderness recreational purposes. CZN added that exploration activity at Prairie Creek has been ongoing for many years and underground development was well advanced, and that the South Nahanni River is regularly used for canoeing trips during the summer months and represented the nearest water use downstream of the Prairie Creek mine. Wilderness river tours are supported by a number of outfitting companies. CZN reports that Parks Canada recorded 58 such private trips on the river in 1999. The nearest downstream community is Nahanni Butte, located at the confluence of the South Nahanni and Liard Rivers, 146 km downstream of the minesite. The population of Nahanni Butte is approximately 117 people and water for domestic purposes is supplied by well.

In 1996, CZN and the Nahanni Butte Dene Band successfully negotiated and executed the Prairie Creek Development Cooperation Agreement. The Nahanni Butte Dene Band issued a Band Council Resolution on November 28, 1996, stating that the Band fully ratified and endorsed the Prairie Creek Development Cooperation Agreement

CZN concluded that the Prairie Creek Development Cooperation Agreement provided for a positive and cooperative working relationship between the Company, Nahanni Butte and the Deh Cho First Nations. CZN indicated that based on the evidence presented, the potential for impacts of the proposed development on the use of land, water, and renewable resources was expected to be negligible.

CPAWS cited that it was opposed to the subject developments because they compromised the wilderness values and designations of this area. CPAWS was of the opinion that mining activity from Prairie Creek (and other mining initiatives which may occur in the area) would put the wilderness values at risk, and

therefore were not appropriate land use in the area. CPAWS stated that the Prairie Creek mine site was located in an area of globally significant wilderness values and natural features that were recognized and protected by several national and international conservation designations.

CPAWS outlined the conservation designations in the area which included: Nahanni National Park, which is also a UNESCO World Heritage Site; the South Nahanni river, within the Park Reserve, as being a Canadian Heritage River, and the South Nahanni watershed as a candidate protected area.

CPAWS reaffirmed the global value of Nahanni National Park noting it was internationally recognized as a World Heritage Site for its globally significant natural features and wilderness values, on par with other World Heritage Sites such as the Great Barrier Reef, the Galapagos Islands and the Grand Canyon. Nahanni National Park was designated under two different criteria; as "an outstanding example representing significant ongoing ecological processes or biological evolution" and for its "superlative natural phenomena, formations or features or areas of outstanding natural beauty."[5]

CPAWS noted that in the United States, Yellowstone National Park's World Heritage Site designation was recently put on the 'in danger' list because of a proposed gold mine immediately upstream from the park boundary (Parks – The international journal for protected area managers, Vol. 7, No. 2, June 1997, pages 27-31). UNESCO has stated concerns about the environmental impacts of the Prairie Creek mine, as outlined in a front-page article in the Edmonton Journal on July 12, 2001.

CPAWS also submitted that the South Nahanni River was designated a Canadian Heritage River to recognize its natural and recreational resources, as the river "provides a wilderness river experience which is unique in Canada, in a setting of world-class, natural beauty." A Canadian Heritage River designation is meant to ensure that rivers of outstanding natural, historic or recreational value are recognized and managed in a manner which conserves their distinctive values, while allowing for public use and enjoyment of the rivers (http://www.chrs.ca/Rivers/SouthNahanni/SouthNahanni_e.htm).

CPAWS summed up its submission and encouraged that the Review Board use the precautionary principle when making its decision.[6]

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5 A site described in paragraph 44(a) of the UNESCO Operational Guidelines for the Implementation of the World Heritage Convention [criteria and the conditions of integrity required for World Heritage Site] indicates that World Heritage sites should have adequate long-term legislative, regulatory, institutional or traditional protection. The boundaries of that site should reflect the spatial requirements of habitats, species, processes or phenomena that provide the basis for its nomination for inscription on the World Heritage List. The boundaries should include sufficient areas immediately adjacent to the area of outstanding universal value in order to protect the site's heritage values from direct effects of human encroachment and impacts of resource use outside of the nominated area. The boundaries of the nominated site may coincide with one or more existing or proposed protected areas, such as national parks or biosphere reserves. While an existing or proposed protected area may contain several management zones, only some of those zones may satisfy criteria described in paragraph 44(a); other zones, although they may not meet the criteria set out in paragraph 44(a), may be essential for the management to ensure the integrity of the nominated site; for example, in the case of a biosphere reserve, only the core zone may meet the criteria and the conditions of integrity, although other zones, i.e. buffer and transitional zones, would be important for the conservation of the biosphere reserve in its totality (http://www.unesco.org/whc/toc/mainf13.htm.)

6 The precautionary principle means err on the side of caution. If there are outstanding concerns or a lack of information, or two contrasting opinions with no definitive evidence of which is correct, we urge the Board to make the decision which will result in the

CZN indicated that it was aware and respectful of the national and international designations afforded to the South Nahanni River and the Nahanni National Park Reserve, and was committed to developing and operating the Prairie Creek mine in such a manner so as not to impair or otherwise impact on their recognized wilderness values. CZN noted that the Prairie Creek Mine was not located within Nahanni National Park Reserve or within candidate areas for park expansion. CZN added that when the Prairie Creek Mine was originally constructed and permitted for operations in 1982, the same values that exist today were key considerations in the EA conducted before the NWT Water Board, and that terms and conditions were set in the Water Licence then issued authorizing operations with the specific and stated intent of ensuring that "the quality of Prairie Creek water entering Nahanni National Park is unaltered"

CZN cited there were many examples of similar mining operations being conducted in an environmentally responsible manner without impairing the wilderness values of such adjacent areas. CZN cited the CanTung mine operated for 24 years from 1962 to 1986, adjacent to the Flat River a tributary of the South Nahanni River further up in the watershed with no identified impacts on water quality or other wilderness values. CZN also noted that visitors to the Nahanni National Park continued to enjoy an unimpaired pristine wilderness experience throughout this period with a mine operating in the watershed.

CZN expressed significant concern that a determination that no development should take place within the watershed of a National Park or Park Reserve would represent a major policy change for the Federal Government. CZN noted that in its "Green Plan," the Federal Government adopted the Brundtland Commissions recommendation on working towards setting aside 12 per cent of Canada's landmass as protected areas. When complete, the National Parks system itself would protect about 3% of Canada's land mass. A determination that the watersheds of these protected areas must also be off-limits to development in order to further protect these already protected areas would increase the effective percentage of protected areas well beyond what was ever intended or planned for.

The NNPR informed the Board about the recently revised *National Parks Act* and its declaration that the maintenance of ecological integrity through the protection of natural resources would be the first priority of the Minister in the consideration of park zoning and visitor use, and that this purpose of National Parks was echoed by the report of the Panel on the Ecological Integrity of Canada's National Parks, which stated that "conserving, restoring and maintaining ecological integrity is the core of Parks Canada's mandate."[7] More recently, the Deh Cho First Nations put forward a proposal at the negotiations table, pursuant to the Draft Interim Measures Agreement, for the withdrawal of land within the South Nahanni River watershed from further mineral staking, industrial development and exploration. The Interim Measures Agreement

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least amount of potential harm to the natural environment.

7 Nahanni National Park retains a Category II World Conservation Union (IUCN) standing. The World Conservation Union is an international, non-governmental organization, that provides the World Heritage Committee with technical evaluations of natural heritage sites and, through its worldwide network of specialists, reports on the state of conservation of listed properties. A National Park is an ICUN category II area managed mainly for ecosystem protection and recreation. The category II is specifically defined as an area of land and/or sea, designated to (a) protect the ecological integrity of one or more ecosystems for present and future generations, (b) exclude exploitation or occupation inimical to the purposes of designation of the area and (c) provide a foundation for spiritual, scientific, educational, recreational and visitor opportunities, all of which must be environmentally and culturally compatible.

would remain in effect until superceded by the provisions of the Deh Cho Final Agreement. INAC informed the Review Board in its response to an IR that Canada was currently engaged with the Deh Cho First Nations and the Government of the Northwest Territories in a process aimed at resolving land, resource and self-government issues in the Deh Cho Region. INAC indicated that "following the signing of the Interim Measures Agreement (IMA) Canada would enter into land withdrawal negotiations with the Deh Cho First Nations for the purposes of addressing issues such as land withdrawals within the South Nahanni River Watershed. *However, at this time, Canada has no position or policy regarding which areas the parties may agree to withdraw.*"[8] (emphasis added).

CPAWS emphasized that the Nahanni watershed was the subject of negotiations for interim land withdrawals between the Deh Cho First Nations and the Government of Canada, through the Deh Cho Process. CPAWS added that that interim protection measures were not limited to land withdrawals, and that they could also be used within the land use permitting process in order to protect the cultural and ecological values of an area. CPAWS quoted the Panel on the Ecological Integrity of Canada's National Parks where it recommended that Parks Canada "reach agreement with the provinces, territories and other federal departments to use their legislative powers to withdraw candidate national park sites from development as early as possible to preserve their ecological integrity during the planning process. For example, with respect to the boreal forest, urge the responsible governments not to issue timber or other development permits in candidate park sites on federal lands" (as recommended by the Senate Subcommittee on the Boreal Forest in Competing Realities: The Boreal Forest at Risk, 1999).

CPAWS cited that National Parks are widely understood and acknowledged as places meant to protect Canada's natural heritage. CPAWS added that the recently revised National Parks Act declared that the "maintenance of ecological integrity through the protection of natural resources as the first priority of the Minister in the consideration of park zoning and visitor use" (section 8(2)). Further, CPAWS indicated that the Panel on the Ecological Integrity of Canada's National Parks stated that "conserving, restoring and maintaining ecological integrity is the core of Parks Canada's mandate" (page 1-2).

CPAWS concluded that Nahanni National Park would be impacted by what occurred in the Greater Nahanni Ecosystem, whether or not it occurred within the current Park Reserve boundaries. Government of Canada experts employed by the Nahanni National Park also cited that the South Nahanni watershed and a small portion of the Liard River basin adjacent to the confluence with the South Nahanni River were areas of pressing concern for the preservation and protection of the ecological integrity of the Nahanni National park. Parks Canada has designated the subject area the Greater Nahanni Ecosystem for the protection of the ecological integrity of the NNPR. Parks Canada indicated that "...as the park covers only one-seventh of the South Nahanni watershed, the majority of the waters flowing through the park originate outside its borders, and any upstream activities have the potential to impact water quality in the park" (Ecological Integrity [Buffer Zones], page 4).

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[4] Department of Indian Affairs and Northern Development. January 29, 2001. IR-Canadian Zinc. Note the Deh Cho Interim Measures Agreement has now been signed.

6.7.1 Conclusions

The Review Board acknowledges that the Panel on the Ecological Integrity of Canada's National Parks recommended that Parks Canada should reach agreement with the provinces, territories and other federal departments to use their legislative powers to withdraw candidate national park sites from development as early as possible to preserve their ecological integrity during the planning process. The Review Board also finds that when the Government of Canada accepted and put Nahanni National Park forward as a candidate World Heritage Site it was aware of the possible future need to protect the features which contributed to that status.

The Review Board recognizes that Parks Canada's efforts to protect the ecological integrity of the Park Reserve are reasonable and consistent with the recently revised *National Parks Act* wherein Parliament declares that the "maintenance of ecological integrity through the protection of natural resources as the first priority of the Minister in the consideration of park zoning and visitor use" (section 8(2)).

The Review Board also appreciates the concern and frustration communicated by CZN. It appears to the Review Board that mining and other development in areas adjacent to the Nahanni National Park may be adversely affected by the lack of certainty which would be achieved from an articulated government policy about land use and development in areas adjacent to the NNPR. The Review Board is aware of CZNs position that the mine was subject to environmental review in the early 1980's and that nothing had changed to warrant a different conclusion about its environmental impacts. CZN also cited the example of the CanTung mine in the same watershed which has not affected water quality in Nahanni National Park.

However, contrary to CZNs assertion, the Review Board finds that context for this development has changed over the past 20 years. This change of context includes the revision of the *National Parks Act*, and the designation the South Nahanni River within the Nahanni National Park Reserve as a Canadian Heritage River by the Canadian Heritage Rivers Board, in January 1987.

The Review Board notes the conflicting land use and management policy currently being provided by the Government of Canada and in particular, Parks Canada and INAC. The Review Board is also concerned that unalterable land use decisions may result in significant adverse impacts should such decisions be found to compromise the nationally and internationally valued Nahanni National Park World Heritage Site.

The Review Board concludes that the EA process under the MVRMA is not the appropriate forum for a resolution of land use and policy conflicts that are best resolved by the Government of Canada. The Review Board is concerned that the absence of comprehensive land management in the area around the Nahanni National Park, a World Heritage Site, may undermine the conditions of integrity as set out in the UNESCO Operations Guidelines and the revised *National Parks Act*.

6.7.2 Measures and/or Suggestions

The Review Board suggests that the Federal minister and the Minister responsible for the Parks Canada Agency consider the following steps in order to resolve this policy problem:

- That the Federal Minister and the Minister responsible for National Parks decide on the scope and nature

of acceptable protection required to ensure the ecological integrity of Nahanni National Park, including the possibility of establishing a buffer zone where land use activities are restricted to those compatible with the park purpose and management plan. The Deh Cho First Nations should be consulted as part of this policy discussion.

6.8 Cumulative Impacts

CZN stated that the proposed metallurgical pilot plant program would be carried out entirely within the confines of the existing mill facility located adjacent to and on the northwest side of the Harrison Creek about 150 m upstream of its confluence with the Prairie Creek. CZN noted the area was separated from the Harrison Creek channel by a constructed berm and that all runoff from the plant site area reported to a catchment pond to the northwest and adjacent to the confluence of Harrison and Prairie Creeks.

CZN indicated that fresh water for use in the pilot plant process would be acquired from one of the existing water wells drawing from the Prairie Creek Valley aquifer. The wells were designed to support full mill operations and one well was currently used to supply potable water to the camp in support of routine care-and-maintenance activity.

CZN also concluded that the decline development's small area of disturbance relative to available habitat and the limited use of the mine site and surrounding area by wildlife species, impacts, including cumulative impacts, associated with the proposed development were predicted to be negligible.

CZN cited that although it had no quantitative information on the precise nature of the socio-economic benefits, and opportunities that would be generated by the existing and potential renewable and non-renewable development in the Deh Cho/Nahanni Butte area. CZN assumed it was reasonable that the local communities and the Deh Cho Territory would be equally well positioned to gain substantial benefits from the combination of other mining developments and Park Reserve-related activities that would be expected to take place in the Deh Cho, as well as with oil and gas activity in the Fort Liard area. CZN concluded that the anticipated cumulative socio-economic benefits would be expected to grow with time.

CZN indicated that the most significant current developments identified within the South Nahanni watershed, other than the Prairie Creek mine were the CanTung tungsten mine at Tungsten, NWT. The CanTung property is located about 190 km in a straight-line west-northwest of the Prairie Creek mine. The CanTung Mine is preparing to resume production early in 2002. CZN indicated that data collected since 1986, have continued to demonstrate that high standards of water quality have been maintained. CZN referenced an intensive *Environmental Water Quality Monitoring and Assessment Program* of the South Nahanni River Basin undertaken by Environment Canada in association with Parks Canada since 1988. The results of the program reported by Environment Canada in *Protecting the Waters of Nahanni National Park Reserve, NWT* (December 1991) *and Protecting the Aquatic Quality of Nahanni National Park Reserve, NWT* (December 1998). CZN noted that both of the reports identified no impacts on water quality within the Park Reserve or the South Nahanni River associated with the presence and operation of the CanTung mine and the Howards Pass prospect, or the Prairie Creek Mine, and that the waters of the South Nahanni River remained pristine. Based on the foregoing analysis CZN concluded that potential for cumulative impacts on water quality associated with past and proposed activities at the Prairie Creek mine,

combined with those at CanTung Mine and the Howards Pass prospect, were expected to remain very low. NNPR cited that the ongoing activities at the mine site (referred to in the CZN submissions as ongoing care-and-maintenance), were undoubtedly connected with the proposed developments, as they used the same infrastructure, and would affect the same area of land and water. NNPR added that they were interlinked and could not be artificially separated from one another, as their impacts could combine accumulate and result in significant environmental impacts. CPAWS added that because the existing infrastructure would be used for the activities proposed under the current applications, the existing risks – including from malfunctions and accidents - should be mitigated before undertaking any new activities.

NNPR submitted that the cumulative effects resulting from the existing infrastructure at the Prairie Creek mine site had the potential to cause significant adverse environmental impacts on Parks Canada's mandate to protect the ecological integrity of Nahanni National Park. NNPR expressed concern that the cumulative impact to the population of grizzly bears in the vicinity of the mine site from the combined processing activity and the use of existing mine infrastructure to support the subject development proposals. NNPR noted that the frequency of visits from the male grizzly bear had created enough familiarity to name the animal. NNPR cited that the Minister of Canadian Heritage was specifically responsible for the protection of species in national parks. NNPR added that since the grizzly bear was listed as a species of special concern and was facing threats to their populations, measures be taken to prevent the grizzly bears near the mine from becoming habituated, since that would create a hazard for staff and requiring its destruction.

The Deh Cho First Nations communicated its "significant public concern" about whether the cumulative effects of the CZN development, the Tungsten development and the Howard's Pass project would impair water quality in the watershed. The Deh Cho First Nations cited that CZN had not provided estimates of total combined discharges of these subject developments under exploration and/or production and their impacts on water quality. Concern was also expressed about the apparent lack of a cumulative effects assessment of the combined discharge of waste from the pilot plant and the decline developments into the tailings facility, and the cumulative effects of the combined socio-economic impacts from the subject developments.

EC concluded that considering the level of activity, the cumulative effects assessment provided in the EAR was reasonable.

6.8.1 Conclusions

The Review Board is of the opinion that CZN has conducted an acceptable cumulative impact assessment and that there will not be significant cumulative impacts.

6.8.2 Measures and/or Suggestions

The Review Board has no recommendations or suggestions to make concerning cumulative impacts.

6.9 Effects of the Maximum of Probable Floods on the Development

CZN cited that the tailings impoundment dam was designed and constructed to withstand a Probable Maximum Flood (PMF) and that the PMF calculation did not rely on, or require, streamflow measurements and that the PMF would have been determined from long term regional climatological data. CZN noted

that the PMF was a worst-case event, several times the flood level of a 1 in 100, or a 1 in 200 year event, and was generally considered unlikely to occur. CZN further cited that the riprap berm along the toe of the dam was constructed to an elevation 3 feet above this calculated PMF level for Prairie Creek. CZN believed the impoundment had clearly withstood all flood events over the past 20 years and that based on its analysis, CZN concluded that revised flood estimate calculations based on additional streamflow data available from 1982 to 1990, were not considered necessary or warranted prior to issuance of the Water Licence for the proposed developments.

INAC officials reported that the size of the logs stranded on the gravel bars across from the tailings impoundment indicated that Prairie Creek has experienced some very large flows. INAC also noted that CZNs PMF calculation was completed using data from 1975 to 1980, at the Prairie Creek flow gauge, and that an additional 10 years of data, to 1990, were available, including a weather station at the Virginia Falls hydrometric gauge that could provide additional data on which to assess possible flood events. NNPRs technical review concurred with INAC. In that Review NNPR noted that that the determination of the flood potential appeared to have been based on the Ker Priestman report entitled "Environmental Evaluation for Cadillac Explorations Limited Prairie Creek Project, NWT." using modelling on the years 1975-1980, with the proviso that the "estimation of flood flows by statistical methods from data with a short period of record is uncertain at best".

6.9.1 Conclusions

The Review Board finds that the tailings facility impoundment has in fact withstood all flood events over the past 20 years. The Review Board also finds that it is reasonable and prudent to apply the accumulated data, especially if that data could improve a development's environmental performance or avert significant impacts to the environment. The Review Board therefore concludes that a revised flood estimate calculation based on additional streamflow data available from 1982 to 1990 is warranted before the issuance of any water licence that includes the use of the tailings facility.

6.9.2 Measures and/or Suggestions

To prevent significant adverse impacts, the Review Board recommends the following measures:

- CZN shall update its PMF calculations for flood elevations using at least the data available from 1975 to 1990, including data from the weather station at the Virginia Falls hydrometric gauge.
- CZN shall have a professional engineer certified to practice in the Northwest Territories ascertain and report on the geotechnical stability of the tailings facility using the most recent and appropriate waters data from Water Survey of Canada.

6.10 Accidents and Malfunctions

CZN concluded that the probability, risk and potential magnitude of an accident or malfunction associated with the proposed developments were deemed very low. CZN cited that it has a spill contingency plan developed for the Prairie Creek mine that was filed with INAC, and that CZN maintained a supply of spill clean-up materials at the site as well as easy access to a large inventory of heavy equipment, tools and supplies at the site.

NNPR indicated that since proposed developments would use petroleum products from the existing tank farm facility, that CZN was obliged address any outstanding tank farm deficiencies to avoid any accidental releases of petroleum products. NNPR added that particular volume of diesel fuel and other petroleum products stored at the mine site that an accidental release could result in the contamination of Harrison Creek, Prairie Creek and the South Nahanni River, significantly affecting the ecological integrity of Nahanni National Park Reserve.

CPAWS cited the draft reclamation report submitted by CZN (October 11, 2001), noting that PCBs and reagents (which CPAWS understood to be cyanide) were currently stored at the mine site. CPAWS suggested that those materials were examples of the risks CZN inherited at the mine site. CPAWS inferred that the storage of these materials on site could result in environmental impacts, if they were accidentally released into the environment and that it appeared that the subject materials were not stored in a bermed area, and that any spill would likely result in contamination the surrounding environment. CPAWS recommended the ultimate removal of the materials by air as reported in the draft reclamation report to reduce environmental risks.

6.10.1 Conclusions

The Review Board accepts that the there are inherent risks associated with the storage and transport of petroleum products, and that the impact of an accident or malfunction associated with the tank farm facility may be particularly acute given its location. The Review Board also finds that the CPAWS and NNPR concerns address issues that pertain to the regulation and management of the mine site in general, and not the proposed developments. The Review Board concludes that there are no likely significant adverse environmental impacts are going to result from accidents or malfunctions.

6.10.2 Measures and/or Suggestions

The Review Board has no recommendations or suggestions to make concerning accidents and malfunctions.

6.11 Abandonment and Restoration (A&R)

CZN concluded that the decline and pilot plant developments would entail little in the way of reclamation and closure requirements and that the tailings from the test plant would be disposed in an acceptable manner underground, in the tailings pond or land filled. CZN indicated the disturbed area of the decline development would be re-established and that the waste rock pile would form part of the operational plant site area and would, with time, be leveled and used as a storage lay down area.

EC concluded that CZNs discussion of abandonment and restoration measures was very limited, as would be expected for a program of the scale proposed. EC did indicate that the pre-existence of infrastructure was a factor that confused the planning to some extent, as CZNs tenure involved what could be viewed as a transient use of long-standing facilities. EC did conclude that at a minimum, planning needed to cover those activities carried out by CZN and used in support of the proposed developments. For example, while CZN did need to plan for removal of the full camp, CZN should remediate the areas used for sewage and solid waste disposal and its A&R plan should include disposal of the tailings solids in the thickener tank, and of the liquid fraction whether stored in the other thickener tank or in the tailings pond. EC

acknowledged that CZN had effected improvements at the site in the areas of reagent storage and cleanup of waste oil and batteries, as well as general housekeeping. EC did however note that CZN would be responsible for final disposal of any new reagents and wastes associated with their projects, and that would need to be outlined in the A&R plan.

CZN agreed that A&R plans and considerations should be restricted to activities relating to the proposed developments and not to the entire site and existing infrastructure.

RWED appreciated that CZN was making efforts to progressively reclaim the environment. However, RWED noticed that some hydrocarbon contamination of the ground had occurred, and that other items required prompt attention in order to ensure the sound operation of the site. RWED noted that paints and solvents were being stored in an abandoned trailer and that if they were no longer required for site maintenance, that the items should be removed from the site to an appropriate hazardous waste disposal facility. Similarly, a cache of chemical reagents, including some known to be toxic, such as sodium cyanide and copper sulphate, were being stored outdoors under a tarp that appeared to have formerly been part of the tailings pond liner. It also appeared likely that these reagents were exposed to the elements for some period of years and that some ground staining from the copper sulphate were observed. RWED concluded that these chemicals should be removed from the site, and a ground clean up initiated if required, and that if they were not removed from the site that the chemicals should be stored in a secure building that prevented exposure to the elements.

As a point of clarification, CZM noted that the reagent storage area was constructed with a clay liner. CZN added that the storage area was contoured to prevent the release of contaminants to the receiving environment and was inspected and maintained on a regular basis as part of the ongoing care-and-maintenance activity at the site.

Finally, RWED anticipated that the MVLWB would consider the establishment of a security deposit of sufficient magnitude to finance the reclamation of the environmental liabilities on the site, should the project proceed to the regulatory phase.

6.11.1 Conclusions

The Review Board finds that that CZNs A&R plans should adequately cover those activities carried out by CZN and its contractors, and used in support of the proposed developments. The Review Board also finds that current A&R matters identified by expert contributors are beyond the scope of the EA, but are certainly of sufficient as to warrant suggested follow-up on the part of INAC. The Review Board concludes that reclamation and closure requirements will not result in significant adverse environmental impacts.

6.11.2 Measures and/or Suggestions

The Review Board makes the following suggestions concerning A&R impacts:

- That INAC and/or CZN remove the cache of chemical reagents from the mine site, or, relocate the cache of chemical reagents into a secure enclosed building to prevent their exposure to the elements

and undertake and a ground cleanup

7 Review Board Environmental Assessment Decision

Having considered the views and concerns of the participants in this process, and the evidence on the Public Registry, the Review Board made its decision according to Section 128 of the *Mackenzie Valley Resource Management Act*. The Review Board concludes, based on the analysis provided, that the proposed development is likely, in its opinion, to have a significant adverse impact on the environment.

The Review Board recommends approval of the proposed developments subject to section 128(b)(ii) of the Mackenzie Valley Resource Management Act, and sections 24.3.5(a) of the Gwich'in and 25.3.5(a) of the Sahtu land claims respectively. Appendix A below explains the Review Board's authorities in this regard. The Review Board considers it necessary to impose remedial measures to prevent significant adverse impacts.

To make its decision, the Review Board relied upon the information in Environmental Assessment Reports submitted by the Canadian Zinc Corporation, the technical reports provided by reviewers, and all the other information on the Public Registry. The Review Board expects CZN to fully discharge all of the mitigative measures to which it committed in its submissions to the Review Board and placed on the Public Registry. If these mitigative measures are not implemented, the Review Board's conclusions about impact significance will be affected.

The Review Board's recommended measures are listed in Attachment 1. CZN commitments are listed in Attachment 2. If these measures and commitments are not implemented (or replaced with more stringent mitigative measures), then the Review Board's conclusions about impact significance will be affected.

For the consideration of the affected parties, the Review Board has made suggestions in this Report of Environmental Assessment. These suggestions are listed in Attachment 3.

Attachment 1
Recommended Measures Made by the Review Board to prevent significant adverse impacts

Recommended Measure	Page Number Reference
2. That CZN provide the MVLWB a geotechnical assessment and an engineering certification as to the suitability of the tailings facility.	38
3. That CZN provide the MVLWB an assessment and an engineering certification as to the suitability of the tank farm facility.	38
4. That CZN prepare a MVLWB approved contingency and monitoring plan for the waste rock/ore piles that includes, but not necessarily limited to, the catchment basin into which the water flows.	38
5. That the MVLWB obtain from Parks Canada and Environment Canada their minimum water quality monitoring program objectives and requirements for its Water Licencing purposes. The water quality monitoring program should include the on site settling pond and the point where Harrison Creek discharges to Prairie Creek.	39
6. That the MVLWB give serious consideration to including the water quality parameters and established objectives found in the report entitled "Protecting the Aquatic Quality of Nahanni National Park Reserve, N.W.T.", Environment Canada, December 1998 on page 71 in its water licence conditions.	39
7. That CZN submit the following information as part of its regulatory submission to the MVLWB: a. Detailed metal scans of the liquid effluents from the pilot plant; b. A plan for the ultimate treatment and disposal of the liquid effluents; from the pilot plant and c. A plan for the disposal of the tailing wastes generated by the pilot plant.	39
8. That CZN conduct testing of water collected inside the tank farm berm for petroleum product contamination/ toxicity, before discharge it to any surface water, and that if the analysis shows that there are petroleum products in any amount, that CZN treat the water before discharging it into Harrison and Prairie Creek.	39
9. That CZN provide the MVWLB an accurate verifiable estimate of the discharge volume from the 870 m portal.	39
10. That CZN implement a water quality testing regime for water coming out of the mine portals, flowing into the catchment pond and accumulating in the fuel storage berm area before discharging the water into the receiving environment.	39
11. That CZN submit evidence to the MVLWB that has the financial assets and/or a financial institution letter of credit and have the ability to carry out	39

11. That CZN submit evidence to the MVLWB that has the financial assets and/or a financial institution letter of credit and have the ability to carry out the requirements of the Water Licencing for the proposed development.	39
12. That CZN develop and implement a bear response plan with RWED and NNPR to enable personnel to adequately respond to problem bear situations.	42
13. That CZN prepare and submit a plan to RWED and NNPR to protect the mineral lick located near the minesite to ensure that wildlife can continue to use it with a minimum amount of disturbance.	42
14. CZN update its Probable Maximum Flood (PMF) calculations for flood elevations using at least the data available from 1975 to 1990, including data from the weather station at the Virginia Falls hydrometric gauge.	50
15. CZN have a professional engineer certified to practice in the Northwest Territories ascertain and report on the geotechnical stability of the tailings facility using the most recent and appropriate waters data from Water Survey of Canada.	50

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

1. CZN has committed to having the geotechnical assessment carried out and providing an engineering certification as to the suitability of the tailings facility before commencement of any discharges to the impoundment, and has agreed to such commitments being made a condition of the Water Licence. CZN is prepared to carry out the developments without utilizing the tailings impoundment and mitigating impacts to water quality through treating discharges using appropriate standard and proven technology, and discharging to meet water quality criteria as set under the Water Licence.

2. CZN has committed to include a re-evaluation of the PMF potential of Prairie Creek in the above-noted geotechnical assessment of the tailing impoundment

3. CZN supports the establishment of a No Hunting Zone around the mine property as a means of ensuring worker safety

4. CZN does not allow personal firearms on the property for recreational or hunting purposes; as a result, increases in the numbers of site personnel have no impact on increased hunting pressure.

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

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

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

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

Attachment 3
Suggestions Made by the Review Board

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

APPENDIX A

Subsection 128(1) of the MVRMA outlines the Review Board's options upon completion of an EA as follows:

128(1) On completing an EA of a proposal for a development, the Review Board shall,

- (*a*) where the development is not likely in its opinion to have any significant adverse impact on the environment or to be a cause of significant public concern, determine that an environmental impact review of the proposal need not be conducted;
- (*b*) where the development is likely in its opinion to have a significant adverse impact on the environment,
  - (i) order that an environmental impact review of the proposal be conducted, subject to paragraph 130(1)(*c*), or
  - (ii) recommend that the approval of the proposal be made subject to the imposition of such measures as it considers necessary to prevent the significant adverse impact;
- (*c*) where the development is likely in its opinion to be a cause of significant public concern, order that an environmental impact review of the proposal be conducted, subject to paragraph 130(1)(*c*); and
- (*d*) where the development is likely in its opinion to cause an adverse impact on the environment so significant that it cannot be justified, recommend that the proposal be rejected without an environmental impact review.

Paragraph 128(1)(b) and subparagraph (ii) on their face, appear to limit the Review Board's authority to recommend measures to mitigate impacts to situations where the Review Board has found a significant adverse environmental impact. The language in these provisions also seems to require that any recommendations made must be directly linked to the finding of a significant adverse environmental impact. A strict interpretation of this paragraph would prevent the Review Board from recommending measures intended to prevent adverse environmental impacts from becoming significant. In other words, a strict reading of paragraph 128(1)(b) and subparagraph (ii) would indicate that if an adverse environmental impact is not significant then the Review Board has no authority to recommend measures to reduce the significance of that impact (this is called the restrictive interpretation below). This result is not in keeping with good environmental impact assessment practice. In the Review Board's opinion, one of the important benefits of an EA is the opportunity to minimize all identified adverse impacts through the imposition of mitigative or remedial measures. Consequently, the Review Board rejects that narrow and restrictive interpretation of 128(1)(b). There is clear authority outlined below for a more liberal and remedial interpretation of paragraph 128(1)(b) and subparagraph (ii).

The Review Board suggests that the treatment of measures recommended under paragraph 128(1)(b) must be kept in mind as our analysis is considered. Any measures recommended by the Review Board under paragraph 128(1)(b) are considered by the federal and responsible Ministers under paragraph 130(1)(b) of the MVRMA If these authorities adopt the recommended measures, they must carry them out, as must the Land and Water Boards under Section 62 of the Act. Thus, the EA process is linked to the regulatory process and regulatory authorities must carry out any measures that have been recommended by the Review Board to minimize adverse environmental impacts and have been adopted by the appropriate

decision-makers. The result is the "integrated system of land and water management" referred to in the MVRMA and required by the Gwich'in and Sahtu land claims.

The interpretation of paragraph 128(1)(b) will determine whether the Review Board has the authority to recommend measures to mitigate any adverse environmental impacts that are not now, but might become, significant, or only those impacts that have already been determined to be significant. This distinction is important and strikes at the heart of the EA process under the MVRMA. If the restrictive interpretation were to pertain, the EA process would, in the Review Board's view, be much less effective and could fall short of the goals articulated in paragraphs 115 (a) and (b) of the MVRMA. Those paragraphs speak to the need to protect the environment and the social, economic and cultural well-being of residents of the Mackenzie Valley. In the Review Board's opinion the level of protection resulting from an environmental assessment will fail to achieve these statutory goals if only significant adverse impacts on the environment can be mitigated. The Review Board also points out that paragraph 115(b) requires the protection of the social, economic and cultural well-being of Mackenzie Valley residents and does not limit action in this regard to situations where significant adverse impacts on the environment have been predicted.

The Review Board has considered this interpretation issue carefully and has decided that it has the authority to recommend measures both to reduce a significant adverse environmental impact below the level of significance based on subparagraph 128(1)(b)(ii) of the MVRMA and to prevent an adverse environmental impact from becoming significant based on the land claim provisions cited below.

The authority to recommend measures to prevent environmental impacts from becoming significant is based in section 24.3.5 (a) of the *Gwich'in Comprehensive Land Claim Agreement* and in section 25.3.5 (a) of the *Sahtu Dene and Metis Comprehensive Land Claim Agreement.* These sections are identical so we will only reproduce the language from the Sahtu claim below:

25.3.5 (a) Subject to 25.3.3(a), a development proposal shall be assessed by the Review Board in order to determine whether the proposed development will be likely to have a significant adverse impact on the environment or will likely be a cause of significant public concern. In making its determination the Review Board may consider terms and conditions to the proposed development which would prevent significant adverse impact on the environment and may recommend the imposition of such terms and conditions to the Minister. Such terms and conditions shall be subject to review pursuant to 25.3.14. (emphasis added)

This provision clearly allows the Review Board to recommend terms and conditions (measures) to the Minister that are intended to "prevent significant adverse impact on the environment". This authority goes beyond the strict interpretation of paragraph 128(1)(b) discussed above. It does not require that an impact already be determined to be significant before the Review Board can recommend measures. Instead, the Review Board can recommend measures to prevent an impact that is not yet significant from becoming so. Paragraph 128(1)(b) of the MVRMA is not, in the Review Board's opinion, in this regard, consistent with these paragraphs of the Gwich'in and Sahtu land claims. The interpretation of paragraph 128(1)(b) should be more liberal to make it consistent with these land claim provisions and consistent with section 115 of the MVRMA as well.

Section 3.1.18 of the Sahtu land claim specifies that the Agreement may be used as an aid to interpretation where there is any doubt in respect of any legislation implementing the provisions of the Agreement. Section 3.1.22 of the Sahtu land claim and Section 5 of the MVRMA specify that when there is an inconsistency or conflict between any law and a land claim agreement that the land claim agreement applies to the extent of the inconsistency or conflict. This legal hierarchy is clear. The land claim provisions are paramount. Consequently, the Review Board has decided that it has the authority to recommend measures both to reduce significant adverse environmental impacts below the level of significance and to prevent adverse environmental impacts from becoming significant. This finding is in keeping with good EA practice and is consistent with both the Gwich'in and Sahtu land claims.

When measures are recommended either to reduce a significant impact below the level of significance or to prevent an impact from becoming significant, the Review Board expects that any of the recommended measures adopted by the appropriate decision-making authorities will be implemented. For greater certainty, the interpretation adopted of paragraph 128(1)(b) only expands the interpretation of the Review Board's authority under that paragraph. This does not change the responsibilities of the federal and responsible Ministers under section 130 in terms of their treatment of any recommendation made by the Review Board.

Where the Review Board has identified matters that are worthy of consideration by the proponent, the federal and responsible Ministers, or others, but do not involve the need for measures to address an adverse impact, it has referred to its concerns as "suggestions" for their consideration. The Review Board understands that any positive response to such suggestions would not be binding. In this way the text of this Report of EA distinguishes between measures, which the Review Board intends to be binding on the developer and others, and suggestions, which are for consideration but which, if accepted, are not binding under part 5 of the MVRMA.