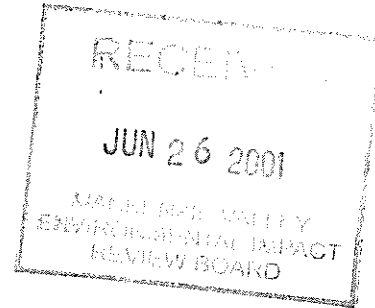




June 21, 2001

Mr. Louie Azzolini
Environmental Assessment Officer
Mackenzie Valley Environmental Impact Review Board
PO Box 938, 200 Scotia Centre, 5102 – 50th Ave.
Yellowknife, NT
X1A 2N7



Dear Mr. Azzolini:

**Re: Environmental Assessment Report
Metallurgical Pilot Plant Program - Prairie Creek Mine
(Water Licence Application MV 2001L2-0003; MVEIRB File EA01-002)**

Please find enclosed our Environmental Assessment Report for the Metallurgical Pilot Plant Program prepared by Canadian Zinc in response to the Terms of Reference issued by the Mackenzie Valley Environmental Impact Review Board dated May 31, 2001.

The submission consists of the following documents: Cover letter, EA report, Safety & Procedures Manual, and Land Overlaps Map. All information is presented in .pdf format accessible by Adobe Acrobat Reader. Also included is a photograph of the Pilot Plant in .jpg format.

For ease of reference we have also included the following, also in .pdf format, which were included in the original application package submitted to the MVLWB on March 5, 2001: Location map, Claims map, Pilot Plant Flowsheet, Pilot Plant Location Drawing, Site Plan and Metallurgical Studies Bibliography.

Headings used in the Terms of Reference have been adopted in this EA Report in **bold print**, while details of the information requested are shown in *italics*. Canadian Zinc's response to each of the specific information requests follows in plain type.

I trust that you will find that all of the information requests have been responded to adequately. Should you have any questions or require any additional information please feel free to contact me at your convenience.

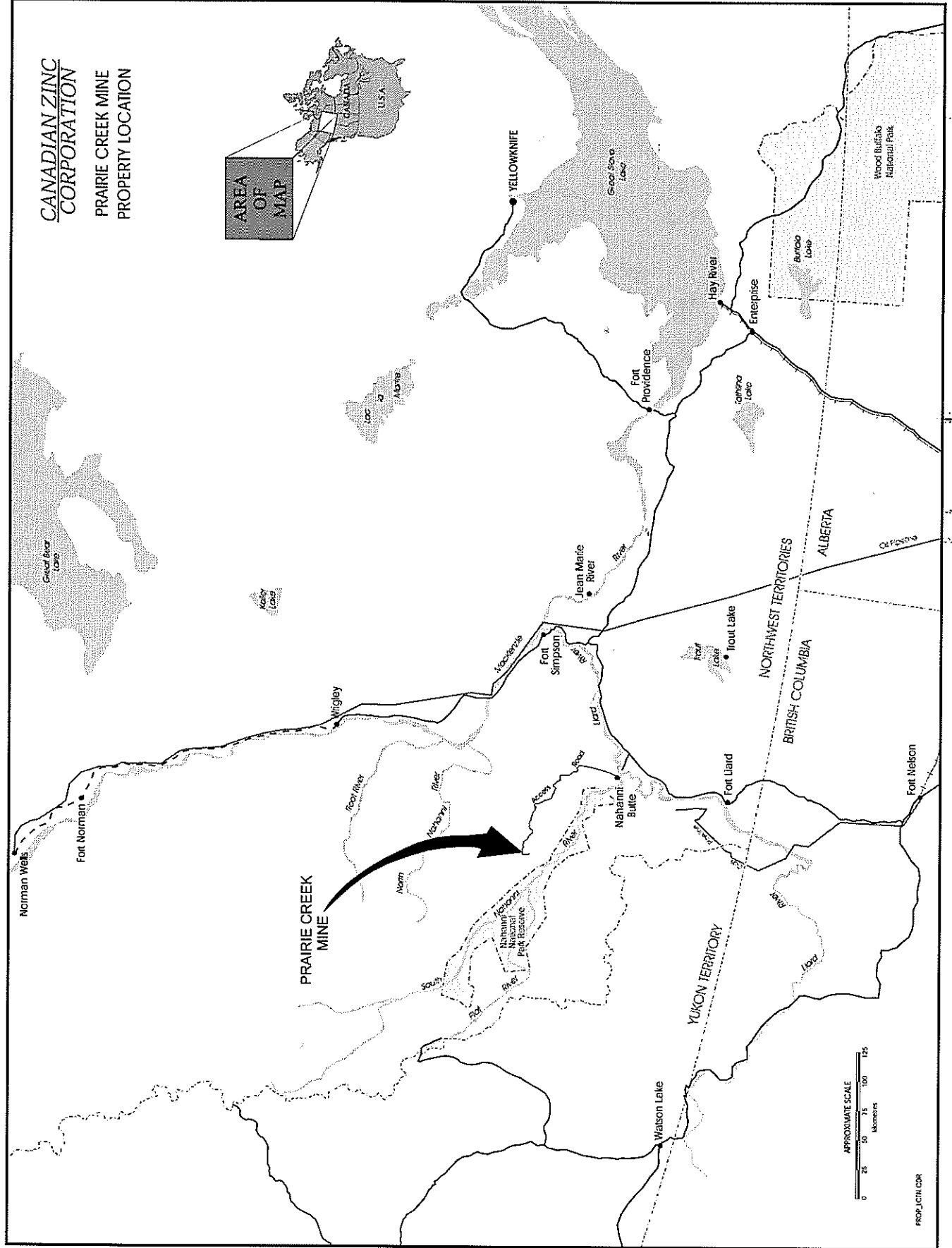
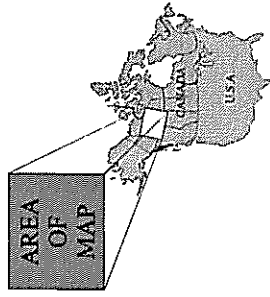
Yours very truly,

CANADIAN ZINC CORPORATION

Original Signed By

J. Peter Campbell
VP Project Affairs

CANADIAN ZINC CORPORATION
PRAIRIE CREEK MINE
PROPERTY LOCATION



APPROXIMATE SCALE
0 25 50 75 100 125
kilometers

CANADIAN ZINC CORPORATION

PRAIRIE CREEK MINE LAND OVERLAPS

UNADJUDICATED CLAIMS

PROVINCIAL AND FEDERAL

LANDS

APPROXIMATE

BOUNDARIES

APPROXIMATE

BOUNDARIES

APPROXIMATE

BOUNDARIES

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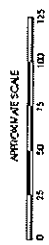
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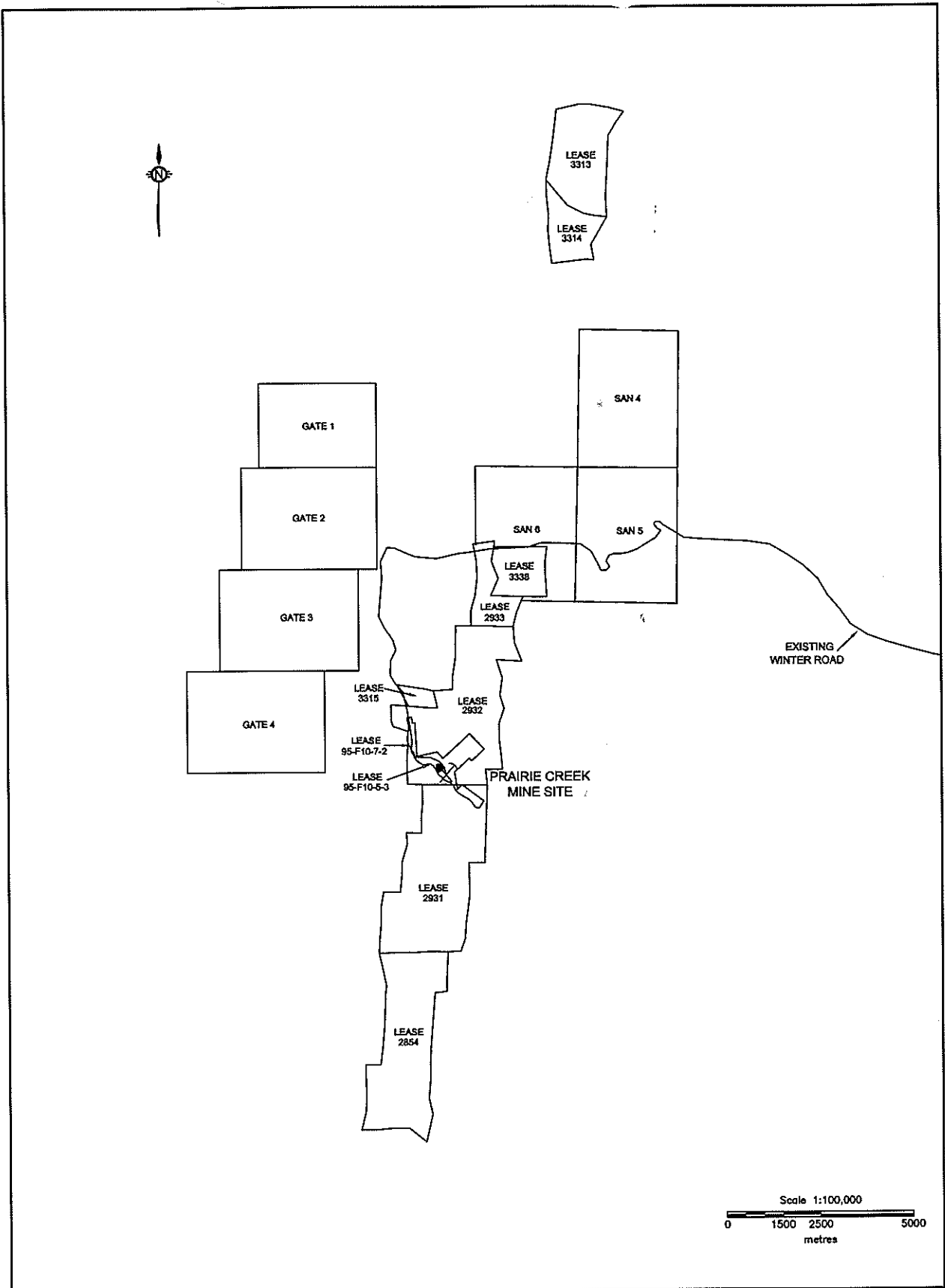
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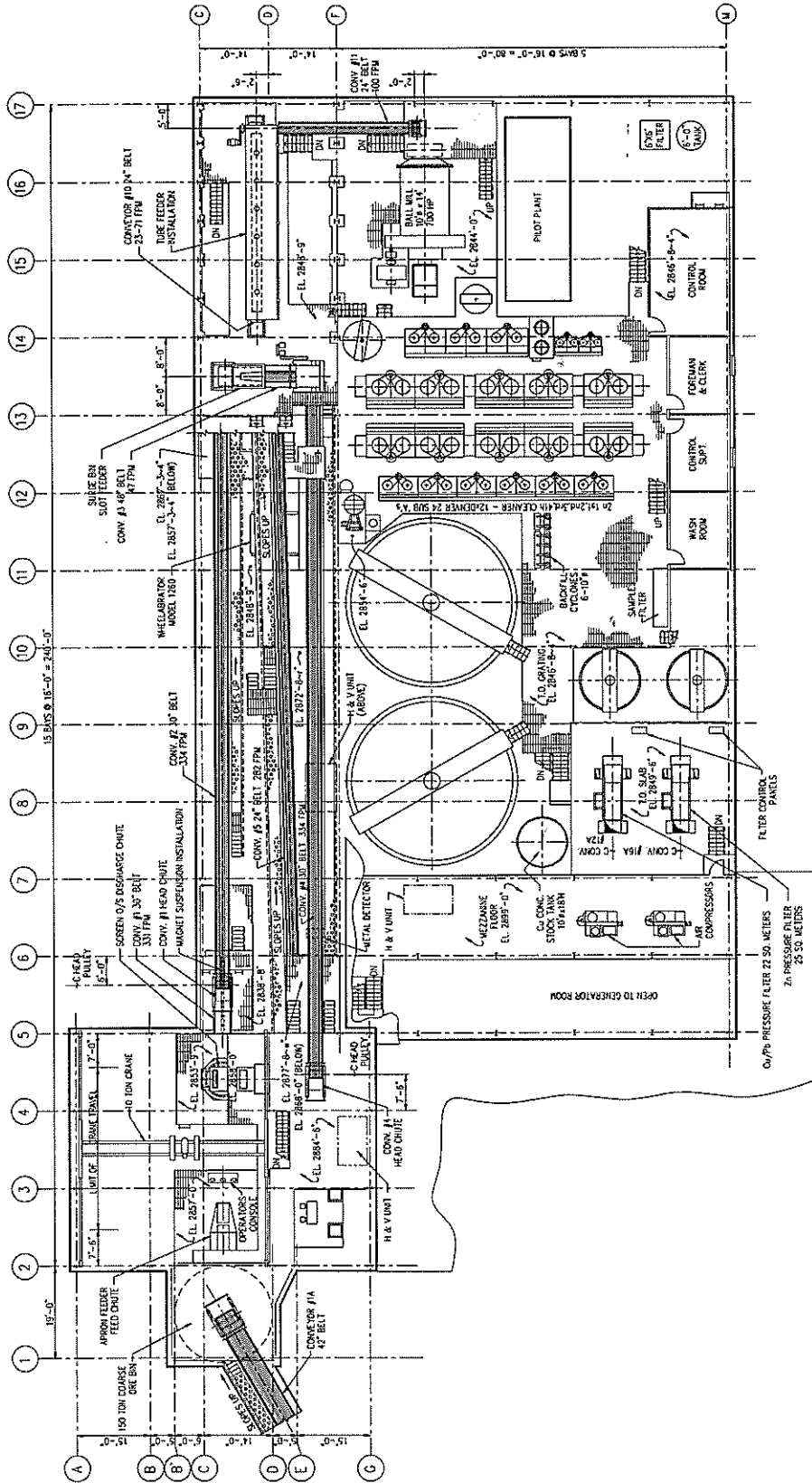
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BOUNDARIES





<p>GATE 1 LEASE 95-F-10-5-3 LEASE 2933</p> <p>Mineral Claim Surface Lease Mining Lease</p>	Scale: 1:100,000		CANADIAN ZINC CORPORATION	
	Drawing: claims.dwg		PRAIRIE CREEK MINE	
	Revised:		LAND TENURE	
			Date: January, 2001	
			Figure:	



PLAN
(ELEVATIONS AS NOTED)

[illegible]

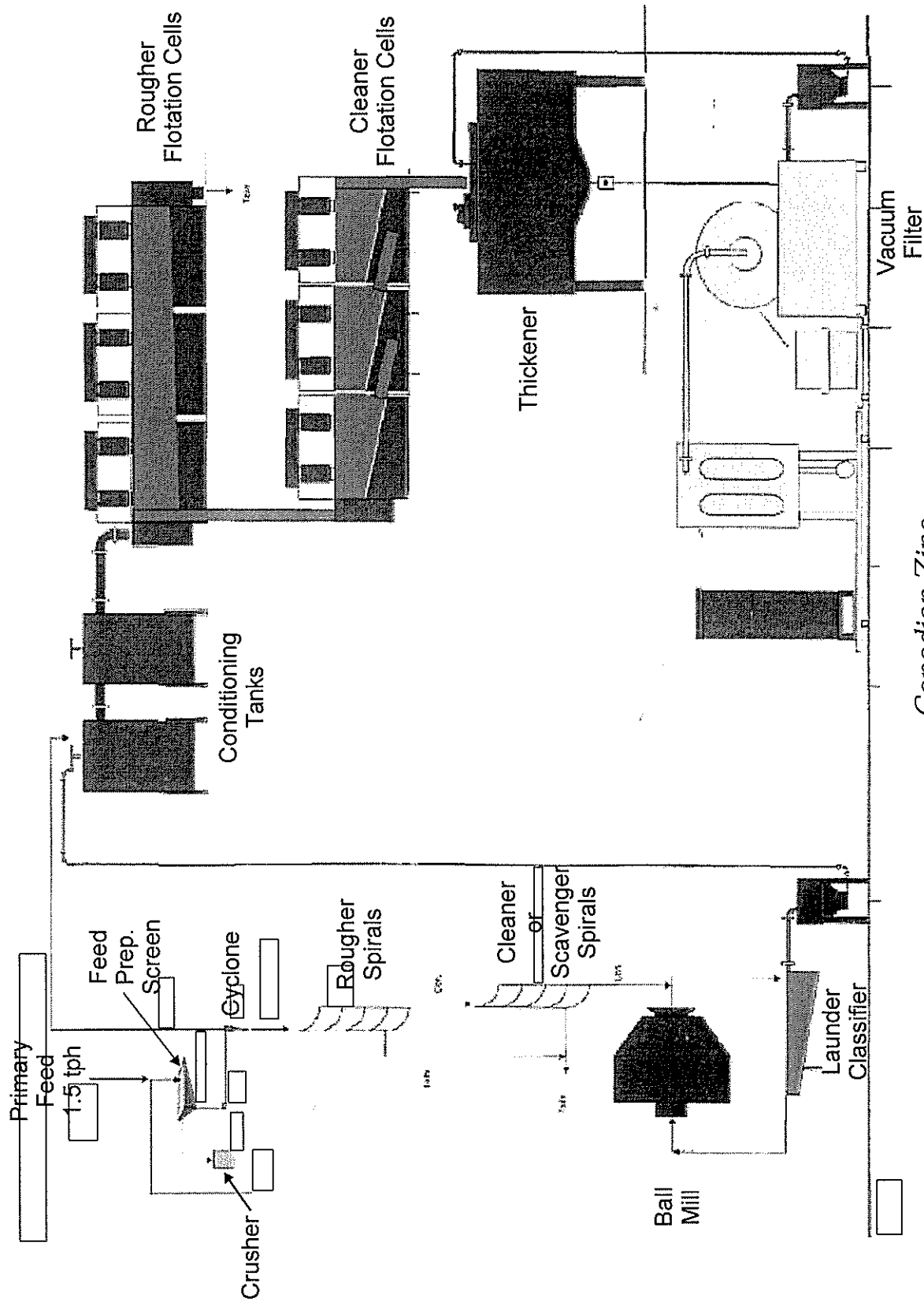
PROJ. No. 2005	DWG. No. 302	Rev.
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C.S.F.M. Engineering Ltd.
VANCOUVER, BC, CANADA

CANADIAN ZINC CORPORATION
PRAIRIE CREEK MINE

CONCENTRATOR
GENERAL ARRANGEMENT
PILOT PLANT





*Canadian Zinc
Corporation*

Proposed Pilot Plant Layout

ENVIRONMENTAL ASSESSMENT REPORT

METALLURGICAL PILOT PLANT PROGRAM

PRAIRIE CREEK MINE

Water Licence Application MV2001L2-0003
MVEIRB FILE 01-002

SUBMITTED TO:

Mackenzie Valley Environmental Impact Review Board
200 Scotia Centre
P.O. Box 938
Yellowknife, NT
X1A 2N7

SUBMITTED BY:

Canadian Zinc Corporation
Suite 1202 – 700 West Pender Street
Vancouver, BC, V6C 1G8

June 21, 2001



June 21, 2001

Canadian Zinc has prepared this EA Report in response to the Terms of Reference established for the Metallurgical Pilot Plant Program dated May 31, 2001. For ease of reference, headings used in the Terms of Reference have been adopted in this EA Report in **bold** print, while details of the information requested are shown in *italics*. CZN's response to each of the specific information requests follows in plain type.

Executive Summary

CZN shall provide an Executive Summary that encompasses the contents of the existing documentation and the information submitted in response to these Terms of Reference.

Canadian Zinc submitted an Application for a Water Licence to the MVLWB on March 5, 2001 to support the operation of a small scale metallurgical pilot plant at the Prairie Creek mine site. The pilot plant program was scheduled to be carried out from May through September, 2001.

A suitable pilot plant was located and purchased from Nottingham University in the United Kingdom. The plant, which is composed of a number of relatively small individual components, is to be shipped by 40 foot container to a nearby community and then airlifted into the mine site in sections. The pilot plant will then be re-assembled and totally contained and operated within the existing mill building at the Prairie Creek mine.

The purpose of the proposed pilot plant program is to confirm, by processing a bulk sample of ore, the estimates of metallurgical performance generated from previous bench-scale testwork conducted on smaller quantities of ore, and to provide accurate information on the quality and quantity of waste products to be produced by the milling process. The former will be used in conjunction with the development of a bankable feasibility study, which will provide a detailed evaluation of project economics and form the basis for making a production decision and attracting project financing. The latter will be used in conjunction with preparation of an environmental assessment report in support of future permit applications for full-scale mining and milling operations and for incorporating environmental considerations into the development design.

The pilot plant will treat between 1.0 to 1.5 tonnes of ore per hour and in so doing will use 2 m³ of water for every tonne of ore, for a water use of up to 3 m³ per hour or 72 m³ per day. The entire pilot plant program will treat up to 2000 tonnes of ore using up to 4000 m³ of water. For comparison purposes, the maximum amount of water used by the pilot plant in one hour, 3 m³, is equivalent to the amount of water flowing past the mine in Prairie Creek in a half to one second during the summer low flow period. Similarly, the maximum total amount of water used by the entire pilot plant program, 4000 m³, is equivalent to the amount of water flowing past Fort Simpson in the Mackenzie River in about one second during the summer low flow period.



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The bulk ore sample will be supplied from the existing ore stockpile located adjacent to the mill and/or from a fresh bulk sample to be collected in conjunction with the development of an underground decline for which a separate application has been submitted. Water will be supplied from the existing wells drawing from the Prairie Creek aquifer, which were developed in 1981 to support the full 1000 ton per day mining and milling operation being constructed at that time.

Process water will be stored in the existing mill thickeners and re-circulated to the pilot plant. Reclaimed process water will make up about half of the feed water requirements. All process water will be tested and treated as necessary prior to being discharged to the existing tailings pond. The tailings pond currently contains about 225,000 m³ of water, which the entire process water volume of 4000 m³ will increase to 229,000 m³ or just under 2%, raising the level of the pond by only about 4 cm and still leaving about 8 m of freeboard.

The amount of water required for operation of the pilot plant, 72 m³ per day, is below the licencing criteria of 100 m³ per day set under Schedule V of the Northwest Territories Waters Regulation as the limit under which water use and deposit of waste is permitted without a licence where there is no potential for significant adverse environmental impacts. Given that the operation will be carried out totally within the existing mill building and there will be no direct discharge of effluent to the environment, and there is no potential for significant adverse environmental impact, this program could conceivably been approved and carried out without the requirement of a water licence.

However, prior to completion of preliminary screening by the MVLWB, the application (MV2001C0022) was unilaterally referred to the Mackenzie Valley Environmental Impact Review Board (the Review Board) on April 11, 2001 by the Nahanni National Park Reserve for further assessment citing "the potential to impact the ecological integrity of the park reserve". The 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.

As a result of the referral, the Review Board undertook to develop a Draft Work Plan and Terms of Reference for the program. 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 sets out milestone dates for completion of various stages of the EA process, with a decision by the Review Board scheduled by August 15, 2001.

Assuming a favourable decision and given the additional time required for Ministerial comment and issuance of the Water Licence by the MVLWB, this would suggest receipt of approval for commencement of the operation by the end of August at the earliest. As a result of the delay, the planned Pilot Plant Program will likely have to be extended into the summer of 2002.



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In setting the Terms of Reference, the Review Board recognized the substantive nature of existing documentation describing the state of the existing environment as supplied in support of the previous Phase I Drilling Program. In accepting this information, the Review Board identified outstanding information requirements in respect of this EA.

Canadian Zinc has responded to these information requests, identifying potential impacts and predicted residual impacts after mitigation as requested for each of the following components of the natural, socio-economic and cultural environment:

- 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

Given the nature of the proposed development and the mitigation measures built into the development design, particularly being that it is of a small scale, short duration, confined to and contained within the existing mill building and with no direct discharges to the environment, Canadian Zinc has concluded that the potential for any significant adverse impact on the environment, even within the immediate area of the minesite, is negligible.



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Introduction

The Prairie Creek Mine is 100% owned and operated by Canadian Zinc Corporation of Vancouver, BC. The mine is located in the southern Mackenzie Mountains in southwestern Northwest Territories in the area claimed by the Nahanni Butte Dene Band of the Deh Cho First Nations as their traditional territory.

The Prairie Creek Mine has been the focus of exploration since mineralization was first discovered on the property in 1928. As a result of this activity the property is now known to contain a significant polymetallic Zinc-Lead-Silver-Copper mineral resource. In addition to this mineral resource, the site also contains approximately \$150 million of minesite infrastructure, in today's dollars, including a 1,000-ton per day mill, a 240 person camp, an administration and service complex and support facilities, all constructed in 1981. Although fully permitted for operation in 1982, the mine did not achieve commercial production due to a sudden collapse in world silver prices. The operating permits and licences then in force have since been allowed to lapse.

Prior to construction of the mine in 1981, a total of over 10,000³ meters of exploration drilling (the majority from surface) and 3,800 meters of underground development had been completed. Approximately 120 diamond drill holes had been completed at the Prairie Creek Mine up to this point. At the time Canadian Zinc became involved in the property in 1991, the ore reserve estimate stood at 1.81 million tonnes grading 10.8% lead, 11.75% zinc, 0.4% copper and 182 g/tonne silver.

Since that time CZN has completed an additional 129 diamond drill holes, for a total of an additional 40,000 meters of surface diamond drilling, core from which is presently stored in racks at the minesite. As a result of these efforts the mineral resource now stands at 11.8 million tonnes grading 10.1% lead, 12.5% zinc, 0.4% copper and 161 g/tonne silver

As a key component of mine development planning, considerable effort has been directed at testwork aimed at defining metallurgical performance in processing the polymetallic ores encountered at Prairie Creek.

The mineral processing philosophy at Prairie Creek has changed over time in conjunction with changes in metal prices, as well as with changes in mineral industry economics generally. When the mine was constructed in the early 1980's, the focus of the metallurgical testwork was on producing a copper/lead concentrate containing the high value silver credits. More recent studies conducted on behalf of San Andreas Resources in the mid-1990's focused on efficient separation of metal values to produce separate zinc, lead and copper concentrates, with silver reporting to the lead and copper concentrates.

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In its preliminary evaluation of the economics of re-establishing mining operations at Prairie Creek, Canadian Zinc identified the need to increase mill throughput in order to benefit from the economies of scale contingent with a higher processing rate, while at the same time avoiding the high capital costs associated with installing additional grinding capacity.

In order to achieve this, Canadian Zinc commissioned several studies designed to evaluate the feasibility of incorporating a gravity pre-concentration step at the front end of the existing mill process. These tests, conducted in 2000, successfully demonstrated the ability of a gravity step to selectively reject, based on specific gravity, up to 65% of the lower density non-mineralized host rock prior to grinding. This is significant in that it will allow the mill to reach a target throughput of 1500 tonnes per day without the requirement for additional grinding capacity and without the need for significant mill expansion. At the same time, this process has the added benefits of reducing energy requirements, water usage and reagent consumption. In addition, preliminary mill re-design to incorporate these changes has included provision for an enhanced state-of-the-art thickened tailings or paste backfill plant which will see the vast majority of the tailings returned underground, thus minimizing the use of the surface tailings impoundment primarily to that of a process water settling and reclaim pond. Combined, these considerations provide significant positive economic and environmental benefits to the operation.

In view of the obvious potential benefits of the proposed changes, it is important that these findings be confirmed at a larger scale. All of the metallurgical testwork conducted to date has been at the bench scale at off-site laboratories on relatively small quantities of up to 100 kg of ore transported out of the site by air. Typically, larger bulk samples are collected and trucked off-site for pilot plant processing. However, given the remoteness of the Prairie Creek mine, the lack of established road access and the presence of the existing on-site milling facility, it makes more sense to conduct the pilot plant operation on-site. The provision of a small scale pilot plant operated on-site for processing up to 2000 tonnes of ore has a number of significant advantages in terms of understanding the metallurgical and environmental aspects of mill processing and tailings disposal. This will provide important information for mine design planning and environmental assessment. It will also provide an opportunity to initiate pre-operational training and mill processing orientation programs for local residents in preparation for full-scale operations.

The pilot plant program will be instrumental in confirming the results of the most recent bench scale testwork conducted on Prairie Creek ore in 2000, and providing additional information on process water quality, tailings chemistry and amenability of thickened or paste backfill to support future application for mine and mill operations.



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The proposed pilot plant program is typical of the technology used at mineral exploration properties throughout the world. The technique represents standard industry practice and has minimal environmental impacts associated with it.

This information, in combination with additional work planned for 2001/2002, including development of an underground decline to support an underground exploration program targeting the deeper Stratabound mineralization underlying the vein mineralization and a further surface exploration drilling program of the Zone 3 vein mineralization, will provide the additional information necessary to complete a bankable feasibility study. The feasibility study will form the basis for making a production decision and attracting the financing necessary to re-activate mining operations at Prairie Creek, which could occur as early as 2003, subject to receipt of the necessary operating permits and licences.

The proposed pilot plant program is considered the final phase of ongoing metallurgical studies, the objective of which is to provide sufficient information to quantify metallurgical performance and other operating parameters for incorporation into a bankable feasibility study scheduled for completion in the last quarter of 2001. In order to meet this schedule, the work was scheduled to be completed over the period from May through September, 2001.

Operation of the pilot plant will require the use of water and the discharge of treated process water. As the pilot plant will process a maximum of about 1.5 tonnes per hour, or 36 tonnes per day, the use of water, at 2 m³ of water per tonne of ore, will be less than 75 cubic meters per day.

The licencing criteria under Schedule V of the Northwest Territories Waters Regulation sets the use of 100 m³ per day as the limit under which water use and deposit of waste is permitted without a licence where there is no potential for significant adverse environmental impacts. As a result, it appears this program could be carried out without a water licence.

Despite this, CZN elected to apply for a Class "B" Water Licence to ensure that regulatory agencies and local communities had an opportunity to have input into the planning stages of the development. Accordingly, such application was submitted to the Mackenzie Valley Land and Water Board on March 5, 2001 in support of this activity at its Prairie Creek minesite proposed for the summer of 2001.

Prior to completion of preliminary screening by the MVLWB, the application (MV2001L2-003) was unilaterally referred to the Mackenzie Valley Environmental Impact Review Board (the Review Board) by the Nahanni National Park Reserve on April 11, 2001 for further assessment citing "the potential to impact the ecological integrity of the park reserve".

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As a result of the referral, the Review Board undertook to develop a Draft Work Plan and Terms of Reference for the program. 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 milestone dates for completion of various stages of the EA process, with a decision by the Review Board scheduled by August 15, 2001.

Assuming a favourable decision and given the additional time required for Ministerial comment and issuance of the Water Licence by the MVLWB, this would suggest receipt of approval for commencement of the operation by the end of August at the earliest, 6 months after submission of the application and 4 months after the proposed start-up date. This would effectively extend the planned 5 month program into 2002. As a result, the pilot plant program may have to be run over two seasons, commencing immediately upon receipt of the permit and running until closing and winterizing of the camp in October, and then recommencing in May, 2002 and running until completion, likely in August, 2002. Alternatively, the entire program may have to be delayed until the summer of 2002.

Description of the development

Pilot Plant Program Objectives

Preliminary test work and metallurgical review has indicated that installation of a gravity pre-concentration circuit and a thickened or paste backfill circuit will provide a number of significant benefits to the Prairie Creek Mine, such as:

- Increased mill throughput
- Improved metallurgical recoveries
- Improved process water quality
- Reduced power consumption per tonne of ore milled
- Reduced reagent consumption per tonne of ore milled
- Placement of the majority of tailings underground as thickened or cemented fill
- Reduced tailings pond requirements

A small scale pilot plant operation will confirm the process philosophy and highlight any operational constraints that may exist. The pilot plant will be designed in such a way that every aspect of the operation can be investigated and will incorporate gravity and flotation separation as well as having capacity for thickening and filtration. The final design of the main circuit may then be completed with a much higher degree of confidence. As well, the process will result in representative quantities of concentrates being available for potential customers to assess, thus providing reliable estimates of applicable smelter charges.

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The pilot plant program will also allow detailed analysis of the quantity and quality of the water required for the full-scale milling process, the percentage of re-cycle water applicable to the process and the quantity and quality of water required to be treated and disposed of after use in the process plant.

Additionally, the tailings solids produced from the pilot plant operation will be available for paste and thickened backfill testing, which will in turn allow for accurate design and sizing of the full-scale backfill plant for placing the vast majority of tailings underground and of the surface impoundment required for process water settling. Representative tailings solids will also be characterized as to chemical composition and potential reactivity through standard analytical procedures for metal content, acid base accounting and neutral pH metal leaching potential.

The operation of an on site pilot plant at this scale will provide operating and financial certainty for the eventual mine design and flow sheet. Operating costs from a plant of this capacity can be accurately extrapolated so that costs relating to the main plant can be calculated.

The plant will provide the following information for the full feasibility study and environmental assessment:

- Firm metallurgical performance data, including recoveries, grades, grind sizing, cell sizing etc.
- Firm design and throughput data for the eventual mill overhaul.
- Actual concentrate available to potential customers for evaluation and treatment charges estimates.
- Actual reagent usage data scalable to full size operation.
- Actual operating cost data that can be extrapolated to the full size plant.
- Actual water quality and volumetric data for permitting and eventual plant operation.
- Firm data on tailings quantity, quality and suitability for paste or thickened backfill.
- Actual volumes of tailings that can be placed underground and the volume implications for tailings or settlement pond facility required.

In combination, the above information will then be used to build up a complete financial model of the process operation, from which financial returns on investment can then be estimated with a high level of confidence.

Proposed Pilot Plant Description

A suitable pilot plant has been located and purchased from Nottingham University in the United Kingdom. The plant is composed of a number of individual components which will be airlifted into the mine site in sections. The pilot plant will be re-assembled and totally contained within the existing mill building at Prairie Creek.

The milling and classification circuit is a typical Hardinge-type set-up where the grinding mill discharges into a launder, which feeds an inclined 12-inch classifier. Oversize sands are returned to the feed box of the mill for re-grinding. The mill is driven by 'V' belts. A 7.5kW motor supplies the necessary power.

The entire pilot plant will fit into an approximate 40 foot by 16 foot open area of the mill basement adjacent to the existing ball mill. Photographs, a general arrangement diagram and a flowsheet for the pilot plant have been provided.

The Pilot plant set-up will consist of the following:

4 – Gravity Spirals. These will be new production units and will replicate the gravity section of the plant.

1 - Wilfley 500 gravity table. For study of final pre concentration of ore and production of a high-grade lead product by gravity.

1 - Hardinge conical ball mill complete with screw classifier and 7.5 kW motor

1 - 1m x 1m steel conditioner tank powered by a 0.75 kW motor.

1 - bank of 3 Denver pilot scale sub 'A' type flotation cells

1 - bank of 4 Denver pilot scale sub 'A' type flotation cells

1 - Sturtevant rotary crusher

1 - SALA 25mm vertical spindle pump

1 - 1.2m-diameter cone base thickening tank

1 - Denver scaled pilot plant thickener 1.8m diameter x 2 m high on a 2 m support frame powered by a 2 kW motor. standard Denver rake mechanism

1 - Pilot thickening and filtration unit consisting of the following:

1 - Stockdale 1m x 0.5m rotary drum vacuum filter in a 1.5m x 1m bath complete with control skid in stainless steel powered by a 0.75 kW motor

1 - Vacuum module consisting of 1 Nash Huyter vacuum pump, filtrates receiver and filtrates pump all constructed in stainless steel powered by a 5 kW motor with a 1 kW filter air blower fitted with wheels for easy maneuverability.

1 - Motor control centre for the above 2 modules which caters for one mains connection.

The equipment is connected to the MCC with one multi-core cable socket.

1 - Goodwin 24in. X 14in. Roller Crusher. To be used for size reduction to minus 1mm in closed circuit with a small screen.

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Pilot Plant Operating Parameters

The pilot plant is essentially a miniature, scaled-down version of the proposed full-scale mill gravity pre-concentration, grinding, flotation and concentrate filtration process. As stated in the previous section, the pilot plant will be air-lifted in sections into the minesite where it will be re-assembled and totally contained within the existing mill building.

All process equipment will be operated by diesel power generation facilities currently existing at the minesite. Reagents will be taken from existing onsite stockpiles or flown in by aircraft in small batches.

Reagents used successfully in the bench scale testwork and planned for use in the pilot plant, along with their addition rates per tonne of ore, include:

Lime	0 - 3 kg per tonne
Cytec Aerophine 3418A promoter	30 - 60 grams per tonne
Sodium isopropyl xanthate	0 - 60 grams per tonne
Copper sulphate	550 - 600 grams per tonne
Sodium sulphide	50 grams per tonne
Glycol frother (Dowfroth 250)	40 grams per tonne

All of the proposed reagents are standard reagents used at similar operations throughout the world. The nature of these reagents is such that they tend to have a selective affinity for the mineral of interest and as a result report primarily to the concentrates and not to the tailings. Material Safety Data Sheets for each of the proposed reagents were provided along with the application.

The plant will be self-contained and operated in batches at approximately 1.5 tonnes per hour. Process water requirements for the pilot plant will be about 2 m³ per tonne of ore, of which approximately 50% would be fresh and 50% reclaim. On a continuous operating basis, therefore, the pilot plant would use about 3 m³ per hour or 72 m³ per day, half of which would be fresh and half reclaim.

Fresh water will be acquired from the existing water well drawing from the Prairie Creek Valley aquifer. Initially, fresh water would be pumped into one of the two thickeners to a ½ to ¾ full level equivalent to 125 to 200 m³ of fresh water storage. Process water and tailings from the pilot plant would be stored in the other existing onsite 35-foot thickener inside the mill building to simulate tailings production and recycling of process water.

It is expected that the plant will be operated up to several days in a row at 10-24 hours per day over a period of four to five months. Given the present schedule for completion of the EA and issuance of the water licence, this is now expected to occur over two seasons, the fall of 2001 and the summer of 2002.

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Because of the limited size of the pilot plant, only one circuit can be imitated at a time. As a consequence, a variety of streams of material in process will need to be stored while each circuit is tested and reintroduced to the revised circuit as treatment progresses. This will result in a batch type process where the pilot plant is started up and shut down regularly over the test period.

The water recycling system will be flexible so that various close circuits operating within the main circuit can be explored. Efforts will be made as well to operate the pilot plant on a continuous basis in order to explore the build up of reagent complexes in the circuits. Water would be recycled between the two thickeners and the plant to study the changes in water chemistry brought about by the milling process. This information will be invaluable for design of the ultimate water treatment process for the operating mine.

The total tonnage processed will be in the region of 1,000 - 2,000 tonnes of ore taken principally from the surface ore stockpile, possibly supplemented from underground development. Total water use over the whole of the pilot plant program will therefore be in the range of 2000 - 4000 m³ of which half or 1000 - 2000 m³ will be fresh and half or 1000 - 2000 m³ will be reclaim. For comparison purposes, when the Prairie Creek mine was originally permitted for operation in 1982 under Water Licence N3L3-0932, it was authorized to draw up to 1,150 m³ per day from the Prairie Creek Valley Aquifer via the existing on-site wells.

All process water will be retained in available tankage within the mill pending testing to ensure it is of acceptable quality prior to discharging to the existing tailings pond. Treatment, if necessary, will be accomplished through lime addition within the mill to precipitate dissolved metals. The existing tailings pond, 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 m³. The crest elevation of the impoundment dike is at 876m for a freeboard of about 8m. Pumping of the entire volume of treated process water to the impoundment will add less than 2% to the volume and result in a rise in pond level of only about 4 cm. Handling of the process water in this manner will provide for a 50 times dilution of process water within the impoundment and no direct discharge of process water to Prairie Creek.

Tailings solids, consisting of ground up rock the consistency of sand from which the mineralization has been removed, will be stored in one of the two thickeners inside the mill building. Representative samples of the tailings will be assessed for performance in paste or thickened backfill application, as well as for chemical characterization.

The concentrate produced would be stored in 2 tonne bags and transported off-site by air for test marketing purposes.

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Key operating parameters for the pilot plant will include:

- All pilot plant components air portable or currently available on site
- Total of approximately 1000 - 2000 tonnes of ore to be processed from the existing surface ore stockpile, possibly supplemented from underground development
- Pilot plant to treat up to 1.5 tonnes per hour for 10 to 24 hours per day over an operating period of 5 - 6 months
- Water requirement of up to 3 m³ per hour for a total of up to 4000 m³ to be extracted from the Prairie Creek Valley aquifer by existing well
- All tailings to be stored within the mill building in the existing 35-foot thickeners.
- All process water to be held within the mill pending testing and treatment, if necessary, prior to discharge to the existing tailings impoundment
- Concentrate produced will be stored in the mill building in 2-tonne bags or flown off site for test marketing.
- Power will be generated on site using existing diesel supplies and generators.

Personnel

Operation of the pilot plant will require the following personnel:

- 1 metallurgical engineer
- 1 metallurgical technician
- 1 laboratory technician
- 1 certified pipefitter/mechanic
- 1 certified electrician
- 2 - 4 labourers

It is expected that the pilot plant program will be conducted while other activity is ongoing at the site, including development of an exploration decline and exploration drilling. This will likely result in sharing of personnel between programs. Site operations will be supported by a camp cook and a project manager.

The employees will stay in camp at the Prairie Creek Mine site where full accommodations are available. Existing minesite facilities, as have been used to support similar levels of on-site activity over the last number of years, include:

- Fully serviced bunkhouse, kitchen, office and washroom facilities
- Electricity supplied from an on-site diesel powered generator
- Potable water supplied from a well & pumphouse, located approximately 35m N of the main office and service building; the well draws water from a depth of about 60 feet in the Prairie Creek floodplain; potable well water is untreated

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- Sewage disposal is by discharge to and exfiltration from an excavated and covered septic sump constructed in floodplain sands and gravels adjacent to and SW of the main office and service building; sewage disposal is hydraulically down gradient from the water well at a distance of approximately 45m
- Camp refuse is burned in an oil fired incinerator

A qualified person carrying a valid required First Aid Certificate will be based in camp at all times. Communications are via satellite phone/fax and access is presently by air onto a privately owned 1000 metre airstrip from either Ft. Nelson or Ft. Simpson. It is anticipated that the entire program will take in the order of 150 operating days to complete.

Description of the existing environment potentially impacted by the proposed development (e.g. natural and human setting)

The 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 48 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 property is within the area claimed by the Nahanni Butte Dene Band of the Deh Cho First Nations as their traditional territory.

The nearest settled communities within the Deh Cho 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
- Wrigley, NT - 200 km to the north-east
- Jean Marie River, NT - 220 km to the east
- Trout Lake, NT - 230 km to the south-east
- Fort Providence, NT - 380 km to the east
- Kakisa, NT - 400 km to the east
- Enterprise, NT - 480 km to the east
- Hay River, NT - 490 km to the east

The nearest major center is Yellowknife, the capital of the NWT, 550 km to the east. Year round access to the property is by charter aircraft, generally from Fort Simpson, NWT or Fort Nelson, B.C. The mine is serviced by a 1,000 m gravel airstrip that is located adjacent to Prairie Creek approximately 1 km to the north of the mine site.



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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 40 cm, most of which falls as rain. The minesite, including the area of the proposed drilling program, is located within the Alpine Forest-Tundra section of the Boreal Forest characterized by stunted fir with limited undergrowth and open areas dominated by lichen.

The pilot plant program currently proposed is to be carried out entirely within the existing mill facilities, and wholly within the boundaries of the existing surface and mineral leases.

Detailed baseline studies describing the existing environment in the vicinity of the Prairie Creek mine and along the access road corridor were undertaken in 1980-81 as a component of previous environmental assessments conducted in support of operating permits and licences issued at that time. Additional studies were undertaken in 1994 in support of further permitting efforts at that time. These studies, which included field assessments and descriptions of fisheries and aquatic resources, as well as wildlife populations and wildlife habitat, have been used as the basis for the discussions on impacts of the proposed development in the following sections. A bibliography of the reports from these studies, which were filed with the regulatory agencies at the time, was provided with the application for reference purposes.

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Environmental Assessment

This EA report has been prepared in response to the Terms of Reference established for the Metallurgical Pilot Plant Program component of the Water Licence Application for the purposes of assisting in this further assessment. For ease of reference, headings used in the Terms of Reference have been adopted in this EA Report in **bold** print, while details of the information requested are shown in *italics*. CZN's response to each of the specific information requests follows in plain type.

Environmental Assessment Methodology

CZN shall provide a description of the methodology they used during the preparation of their EA Report. This should include, but not be limited to:

- *A description of and the reasoning behind the setting of the spatial and temporal boundaries used; and*
- *A description of how significance was determined.*

Environmental assessment of the development actually commenced at the project concept stage where, as discussed further in the next section, environmental considerations and mitigation measures were built into the development design. These then formed the basis of the original application and appended Project Description Report submitted to the MVLWB on March 5, 2001.

The environmental assessment process includes a risk based approach to evaluating potential impacts on components of the natural environment which considers the magnitude, probability and consequences of any such occurrence. Mitigation measures are incorporated into the development design in order to reduce the respective risk factor(s) to a level whereby the resulting potential for impact is judged to be minimal.

In completing this EA Report, CZN used its expert knowledge of mill processing technology, and of the Prairie Creek mine site generally, as well as professional judgment to further evaluate potential sources for impacts associated with the development beyond those for which mitigation measure have already been built into the design.

In so doing, the Company considered the scope and scale of the proposed development in terms of the size, location and duration of the operation in relation to those components of the environment as identified by the MVEIRB in their scoping of the assessment as set out in Sections 6 and 7 of the Terms of Reference. The information contained in the comprehensive database of existing baseline studies were reviewed in identifying those components of the existing environment in the vicinity of the Prairie Creek mine with the potential to be impacted by the development.



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Given the small scale of the proposed development and the nature in which it is to be carried out, initial scoping suggested that the potential for impacts was very low and where impacts might occur their magnitude would be very slight. As a result, the spatial boundaries for the assessment of impacts were initially set within the localized area immediately surrounding the minesite, including Prairie Creek in the vicinity of the mine. The assumption being that if impacts were negligible on a localized scale they would be even less so within larger spatial boundaries. Similarly, temporal boundaries were initially set for the duration of the operation, again because initial scoping suggested minimal potential for longer-term or residual impacts, with the assumption again being that if short term effects were minimal, longer term effects would be even less so.

The results of the assessment confirmed this approach, suggesting that the potential for adverse impacts associated with the development were negligible. Expanding temporal or spatial boundaries beyond those considered in the initial environmental assessment was therefore considered unnecessary.

In its Report of Environmental Assessment on CZN's Phase I Mineral Exploration Drilling Program (May 5, 2001), the Review Board gave direction on the matter of significance determination. The Board stated that it would prefer to have an EA Report emphasize the reporting of residual impacts using acceptable reporting attributes such as magnitude, geographic extent, timing, duration, frequency, irreversibility of impacts and probability of occurrence and confidence level and "refrain from drawing significance conclusions".

In its environmental assessment, CZN considered such attributes in evaluating the potential for a quantifiable impact to occur. Where the potential for such impacts was identified, the task of quantifying the impacts within appropriate temporal and spatial boundaries would be undertaken.

In practice, the assessment identified no residual impacts and determined the potential for such impacts associated with the development to be negligible, eliminating the need to attempt further quantification of the impacts.

Environmental Considerations in the Development Design

CZN shall describe how environmental considerations were incorporated into the design of the developments.

Environmental considerations form an integral part of project planning for any development at a mining property. The pilot plant program is no exception and the final design of the proposed development incorporates a number of such considerations. These are discussed in detail in the description of the development and are summarized as follows:

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- The pilot plant is to be located and operated totally within the confines of the existing mill building. The concrete floor slab is sloped inward to collection sumps allowing for containment and easy recovery of any spills
- All process water will be contained in existing tanks within the mill and tested prior to being discharged to the existing tailings pond. This will allow for confirmation of process water quality and treatment, if necessary, prior to discharge to the tailings pond
- All process water will be contained in the tailings pond with an available 50:1 dilution with the existing contained volume of water
- There will be no direct discharge of process effluent to the receiving environment
- All tailings solids will be retained in the mill thickeners

Accidents and Malfunctions

CZN shall report on the probability, potential magnitude, potential environmental impacts and contingencies to deal with possible development accidents and malfunctions. The submission shall include the Spill Contingency Plan and/or Emergency Response Plan that CZN would use in the event of a problem.

The probability, risk and potential magnitude of an accident or malfunction associated with the proposed development are deemed to be very low. Principal possible failure mechanisms with associated risk assessment factors are as follows:

Failure Mode	Initiating Event	Probability	Magnitude	Consequence
Process water loss	Overflow, Line rupture	Low	Small Max. 300 gals	Low Relatively small volume; Spill likely contained entirely in mill sump; Worst case loss of portion to plantsite area/catchment pond
Reagent spill	Container leak	Low	Small Minor quantities used	Low As above

Canadian Zinc has a Spill Contingency Plan developed for the Prairie Creek mine which has been filed with Indian and Northern Affairs Canada. The Company maintains a supply of spill clean-up materials at the site including a variety of absorbent materials and ready access to large inventory of heavy equipment, tools and supplies at the site. Canadian Zinc's Emergency Procedures Manual has been provided in conjunction with this EA Report.

Alternatives

CZN shall provide an explanation and evaluation of the alternatives to the principal and accessory parts of the developments. This evaluation should include the "do nothing" scenario. This evaluation should also include a thorough discussion of the comparative impacts of the alternatives along with the rationale for selecting the proposed developments.

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The operation of a pilot plant for processing a bulk sample of ore to determine metallurgical performance represents standard industry practice in the exploration and development of base metal and other mineral deposits. It has been, and continues to be used commonly throughout the Northwest Territories, throughout Canada and throughout the World for this purpose.

Security Exchange Commission rules and regulations, which apply to all public mining companies, set rigorous standards for release of information pertaining to projections of operational efficiencies. These apply to statements concerning projected mineral recoveries and typically require strict adherence to quality assurance standards and the subsequent interpretation of data by a qualified individual.

The proposed program is the preferred alternative as it will achieve all of the objectives necessary for the full feasibility study and environmental assessment, without creating any adverse impacts on the environment. The pilot plant program will provide the following information:

- Firm metallurgical performance data, including recoveries, grades, grind sizing, cell sizing etc.
- Firm design and throughput data for the eventual mill overhaul.
- Actual concentrate available to potential customers for evaluation and treatment charges estimates.
- Actual reagent usage data scalable to full size operation.
- Actual operating cost data that can be extrapolated to the full size plant.
- Actual water quality and volumetric data for permitting and eventual plant operation.
- Firm data on tailings quantity, quality and suitability for paste or thickened backfill.
- Actual volumes of tailings that can be placed underground and the volume implications for tailings or settlement pond facility required.

In combination, the above information will then be used to build up a complete financial model of the process operation, from which financial returns on investment can then be estimated with a high degree of confidence.

Alternatives to conducting the metallurgical pilot plant program by the preferred on-site method as proposed include:

1. Conducting smaller bench-scale metallurgical testwork off-site
 - Tests would be conducted on small quantities of ore (10-100kg) transported to off-site laboratories by air
 - Such tests would duplicate similar tests previously conducted
 - No potential for adverse impacts on-site as program would be conducted elsewhere



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- No employment or training opportunities as program would be conducted elsewhere
- Minimal economic spin-off benefits

Such bench scale tests would not achieve the objectives of the proposed program due to small scale of tests (ie, insufficient quantities of tailings, concentrate and process water to provide representative samples); for these reasons this is not a viable alternative

2. Conducting similar pilot plant metallurgical testwork off site

- Testing of bulk sample (1000-2000 tonnes) at an off-site laboratory
- Shipment of bulk sample by air would be cost prohibitive
- Shipment of bulk sample by ground would require re-establishing 165 km access road in to mine
- Re-establishing 165 km access road for one time use also cost prohibitive
- Re-establishing 165 km access road for one time use has more potential for impacts than on-site pilot plant development
- No employment and training opportunities associated with pilot plant operation
- Employment, training and economic spin-off benefits would only occur from access road development
- Off-site testing would not allow for use of site water in the process, an important consideration in that site water quality can affect metallurgical and environmental performance

Due to the remoteness of the mine site and the lack of available road access, the logistics and costs associated with transporting such a large bulk sample off-site would be prohibitive. Testwork would not generate as representative results due to inability to duplicate site conditions (ie. use of site water); for these reasons this is not a viable alternative

3. Not conducting further metallurgical testwork (the "Do-nothing" alternative)

- Reliance would have to be placed and production decision based on existing testwork
- No potential for adverse impacts on-site as program would not be conducted
- No employment or training opportunities as program would not be conducted
- No economic spin-off benefits as program would not be conducted

The current level of information on metallurgical performance is insufficient to support feasibility level design and cost engineering; and therefore insufficient to support an informed production decision; for these reasons this is not a viable alternative

As a result of the forgoing, Canadian Zinc has proposed the on-site pilot plant development as the preferred alternative in that it will provide the required information without causing any adverse impacts on the environment.



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Air Quality and Climate

CZN shall report the impacts on air quality. This will include a discussion of measures considered to minimize the release of air contaminants (such dust, exhaust fumes, pilot plant emissions and other air contaminants).

The pilot plant, which will be wholly contained within the confines of the existing mill building, is a wet process and has no point source air emissions.

The pilot plant will run off of power supplied by the same on-site generators used to power site facilities in support of routine care and maintenance activities. The generators are similar in form and function to those used for supplying electricity in remote communities such as Fort Simpson and Nahanni Butte. Routine preventive maintenance will be employed to ensure the generators are operating efficiently to minimize fuel consumption and emissions.

The impacts of activity in support of the proposed development will be consistent with similar impacts associated with routine care and maintenance and ongoing exploration activity planned for the property. These will entail operation of the site power generator, vehicle operation and aircraft support. No residual impacts are expected to result from the operation.

As a result of the foregoing, the potential for impacts of the proposed development on air quality are expected to be negligible.

Terrain

CZN shall report the impacts on the environment when surficial geology, bedrock or soils are disturbed, or used for construction purposes.

The pilot plant program will entail no new surface disturbance and no use of surficial materials for construction purposes.

The pilot plant program will 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.

The pilot plant components will be transported by fixed wing aircraft to the existing 1000m gravel airstrip located adjacent to Prairie Creek 1 km north of the minesite facilities. Once off-loaded the components will be transported by truck on existing roads to the mill building for assembly.

As a result of the foregoing, the potential for impacts of the proposed development on the environment resulting from disturbance or use of surficial geology, bedrock or soils are expected to be negligible.



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Vegetation and Plant Communities

CZN shall report the impacts on local plant communities, highlighting rare or highly valued species, and long-term, direct and indirect, habitat loss or alteration.

The pilot plant program will 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.

No rare or highly valued species have been identified from past studies of vegetation and plant communities in the area. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) does not list any plant species as endangered, threatened or of special concern in the area of the Prairie Creek Mine.

As a result of the foregoing, the potential for impacts of the proposed development on local plant communities resulting in habitat loss or alteration are expected to be negligible.

Water Quality and Quantity

CZN shall report the impacts on the quality and quantity of surface and ground waters. This analysis shall include predictions of the chemical, physical and toxic characteristics of any discharges that may effect the immediate or downstream environment as well as predictions on water usage and discharge quantities.

Fresh water for use in the pilot plant process will 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 is currently used to supply potable water to the camp in support of routine care and maintenance activity.

The aquifer was investigated and well pump tests conducted at the time the wells were developed in 1982. The aquifer is described as being confined in a sand and gravel layer 13 feet in thickness. The well is 66 feet deep and 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 m³ at a pumping rate of about 2.0 m³ per minute.

Total water use over the whole of the pilot plant program will be in the range of 2000 – 4000 m³ of which half or 1000 – 2000 m³ will be fresh and half or 1000 – 2000 m³ will be reclaim. The well and aquifer therefore have significant over-capacity relative to the requirements of the pilot plant.

For comparison purposes, when the Prairie Creek mine was originally permitted for operation in 1982 under Water Licence N3L3-0932, it was authorized to draw up to 1,150 m³ per day from the Prairie Creek Valley Aquifer via the existing on-site wells.



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Initially, fresh water would be pumped from the well into one of the two 35 ft. diameter thickeners in the mill to a $\frac{1}{2}$ to $\frac{3}{4}$ full level, equivalent to 125 to 200 m³ of fresh water storage. Fresh water would be fed to the pilot plant from the fresh water storage thickener. Process water and solids ("tailings") from the pilot plant would then be discharged to the second thickener, which would simulate a "tailings pond". Process water from this second thickener would then be recycled to the pilot plant to simulate reclaim from the tailings pond during full-scale operations. All process water will be retained in available tankage within the mill pending testing and treatment, if necessary, to ensure it is of acceptable quality prior to discharging to the existing tailings pond. Treatment would be accomplished through lime addition within the mill to precipitate dissolved metals.

The existing tailings pond, 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 m³. The crest elevation of the impoundment dike is at 876m for a freeboard of about 8m. Pumping of the entire volume of treated process water to the impoundment will add less than 2% to the volume and result in a rise in pond level of only about 4cm. Handling of the process water in this manner will provide for a 50 times dilution of process water with water currently retained within the impoundment and no direct discharge of process water to Prairie Creek.

The pilot plant program will be conducted wholly within the confines of the existing mill building and there will be no discharges to surface or groundwater as a result of surface runoff or airborne contaminants.

As a result of the foregoing, the potential for impacts of the proposed development on surface and groundwater quality and quantity are expected to be negligible.

Aquatic Resources and Habitat

CZN shall report the impacts on aquatic organisms and their habitat, taking into account predicted water quality and quantity impacts.

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. As well, Harrison Creek commonly dries during the low flow late summer season and flows subterranean, and 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.



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Fish utilization of Prairie Creek appears to be confined largely to the headwaters and the mouth. The headwaters appear to be utilized by Dolly Varden (or Bull Trout) and Rocky Mountain Whitefish. Arctic Grayling do not appear to move upstream in Prairie Creek beyond the lowest reaches near the mouth. Use of Prairie Creek in the vicinity of 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.

The pilot plant program will 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. The foundation slab slopes inward in order to contain all spills which can then be reclaimed from floor sumps. The plantsite area is separated from Harrison Creek by a rock berm and all drainage from the plantsite area reports to a catchment pond.

In view of the foregoing and since, as stated above, the potential impacts to water quality and quantity are expected to be negligible, so the potential for impacts of the proposed development on fisheries or other aquatic resources are also expected to be negligible.

Wildlife and Wildlife Habitat

CZN shall report on the impacts (both direct and indirect) on wildlife and wildlife habitats, including migratory birds. Special consideration shall be given to species listed as vulnerable or endangered on the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) list. This analysis shall include a discussion of habitat fragmentation resulting from the developments and associated impacts.

The pilot plant program will be conducted wholly within the confines of the existing mill building. Other activity undertaken in support of the pilot plant program, such as aircraft support, personnel and equipment transport etc. will be typical of ongoing care and maintenance activity.

The principal wildlife species in the vicinity of the minesite are Dall Sheep. Varying numbers, including rams, ewes and lambs frequent the airstrip, mill and campsite areas. Dall Sheep are generally observed daily in these areas by site personnel in the course of carrying out their duties. These groups have been routinely observed to be generally unperturbed by ongoing site activity, showing little avoidance behavior in response to aircraft landing or taking off, vehicle traffic or other human activity typically being conducted on a day to day basis around the minesite.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) lists only two species in the area of the Prairie Creek Mine. These are the Grizzly Bear (*Ursus arctos*) and the Wolverine (*Gulo gulo*), both of which are listed in the Special Concern category.



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In areas removed from the minesite, COSEWIC lists the Anatum Peregrin Falcon (*Falco peregrinus anatum*), the Woodland Caribou Boreal population (*Rangifer tarandus caribou*) and the Wood Bison (*Bison bison athabasca*), all of which are considered Threatened.

Field studies of wildlife populations and wildlife habitat in the area of the Prairie Creek Mine and the access road were conducted by Beak Consultants in 1980-81 and again by Rescan in 1994. The studies identified no critical habitats in the area of the minesite.

Grizzly bears have been infrequently encountered in the surrounding area of the mine. No denning areas have been identified in the immediate area of the minesite, including the area of the proposed development. Care is taken in the handling and disposal of refuse, with all kitchen and food wastes incinerated prior to disposal, in order to avoid attracting bears or other animals to the campsite. No incidents relating to problem bears in the camp have occurred in recent years as a result of these precautions. All personnel undergo safety orientation training prior to commencing work at the minesite, as set out in CZN's safety procedures and guidelines manual, which includes provision for animal attack prevention training.

Wolverine have been observed in the area surrounding the Prairie Creek mine on only a very few rare occasions over the past 20 years. As a result, the proposed development is expected to have negligible impact on wolverine populations.

Previous wildlife studies have identified potential caribou habitat and caribou populations in areas well removed from the minesite to the north and east in the Mackenzie mountains. As the minesite area itself is not classified as prime caribou habitat and caribou are only rarely observed in and around the minesite, no impact is expected on caribou populations.

Previous wildlife field studies have specifically targeted potential Peregrine falcon nesting habitat. However, none have been identified in the area of the minesite. As a result, no impacts are expected on Peregrine falcon populations. Similarly, no impacts are expected on migratory bird populations as limited usage of the minesite area by such populations has been identified.

Wood bison populations are located 90 km or so to the south and east of the minesite in the vicinity of Nahanni Butte, and will not be impacted by the proposed development.

In view of the foregoing the potential for impacts on wildlife and wildlife habitat associated with the development are expected to be negligible.



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Cultural and Heritage Resources

CZN shall report the impacts on cultural and heritage resources.

An archaeological database search was conducted on August 18, 2000 through the Canadian Museum of Civilization in support of Land Use Permit Application MV2000C0030 submitted by Canadian Zinc.

The database search area encompassed the entire minesite area, as well as the entire access road corridor from the Prairie Creek mine to the Liard River. To accomplish this, the search parameters were defined by geographical coordinates to cover a block extending from 61° 00' to 61° 45' N. latitude and from 122° 45' to 125° 00' W. longitude.

No archaeological sites were identified within the minesite area proposed for use under this Land Use application. The closest identified sites are south of the South Nahanni River near the mouth of the Meilleur River, 35-40 km south of the minesite.

In view of the foregoing, the potential for impacts of the proposed development on cultural and heritage resources is expected to be negligible.

Socio-economics

CZN shall report the impacts on the economy, having regard to direct, indirect and induced impacts on income and employment.

The proposed development is part of the process of establishing and confirming the feasibility of the Prairie Creek property, which has been ongoing since mineralization was first discovered in 1928.

The main objective of the current program is to provide sufficient information to quantify metallurgical performance and other mill processing and operating parameters. This information, in combination with additional work planned for 2001/2002, such as an underground decline and surface exploration drilling program, will form the basis for a bankable feasibility study originally scheduled for completion in the last quarter of 2001. With a bankable feasibility study demonstrating a positive return on investment, CZN believes it will be able to attract the necessary financing to support re-development of mine operations leading to production by 2003, subject to receipt of the necessary operating permits and licences.

In the short term, the proposed development will create positive economic impacts for local communities in terms of employment opportunities and contracted support and supply services. CZN employed two local residents of Nahanni Butte for the majority of the 2000 summer season. Similar opportunities are anticipated in 2001 in support of this and other planned programs.



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The proposed development is expected to employ about 7-9 persons, including a metallurgical engineer, metallurgical technician, laboratory technician, certified electrician, certified mechanic/pipefitter and 2-4 labourers. It will also provide an opportunity to initiate pre-operational training and mill processing orientation programs for local residents in preparation for full-scale operations.

Fixed wing aircraft and, possibly, helicopter support will provide opportunities for charter companies in Fort Simpson and Fort Liard. Consumables will also be sourced from local suppliers and flown into site. Project management will necessitate travel for head office and other personnel, resulting in positive economic impacts for commercial airlines servicing Yellowknife and Fort Simpson, as well as hotels and restaurants in Yellowknife, Fort Simpson and other local communities.

In the long term, the proposed development is necessary to support plans for mine re-development. Positive economic impacts of future mining operations to local communities, the Northwest Territories and Canada are substantial and have been estimated as follows.

The mine will employ up to 170 persons directly at the minesite plus an additional 60 under various contracts for at least 18 years based on the current mineral resource. Using a standard multiplier of 2:1 this would be predicted to create another 460 jobs elsewhere in the NWT and Canada.

Annual payroll, including benefits, will be in the order of \$14.3 million. Payments to government, including corporate income tax, employee income tax and royalty payments are estimated at \$15.4 million. Third party contracts for catering, air transport, incoming freight and outgoing concentrate total an estimated \$10.5 million. Mill supplies and general consumable, including fuel, total \$8 million annually. Road construction and annual operating costs, including the Liard ferry crossing, total \$17 million and \$1 million respectively. The capital cost of the ferry and approaches is an additional \$1 million.

The existing resource has been established over only about 2.1 km of mineralized strike length of 16 km, suggesting the potential to define additional mineral resources and extend the mine life, and economic benefits associated therewith, well beyond current projections is excellent. As well, much thicker stratabound mineralization discovered in 1992 to be underlying the known vein mineralization is currently underexplored and holds the potential to significantly increase the mineral resource of the property, thereby extending the projected mine life.

The Prairie Creek Mine is located on land claimed by the Nahanni Butte Dene Band of the Deh Cho First Nations (DCFN) as their traditional territory. The DCFN are engaged in ongoing negotiations with the Government of Canada and the Government of the Northwest Territories in what is referred to as the Deh Cho Process.

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The negotiations are currently at the Interim Measures and Agreement In Principle stage. The outcome of the negotiations is expected to be a Final Agreement that will provide, amongst other things, for the implementation of a Deh Cho form of government to oversee the delivery of programs and services to residents within the DCFN territory. It is expected that the negotiations will take some five to seven years to complete.

In 1996, the Company and the Nahanni Butte Dene Band successfully negotiated and executed the Prairie Creek Development Cooperation Agreement. The overall intent of the Agreement was to establish and maintain a positive and cooperative working relationship between the Company and Nahanni in respect of the further development and operation of the mine, while at the same time supporting an economically viable and environmentally sound operation and maximizing economic opportunity and benefits to Nahanni and other Deh Cho First Nations. This Agreement foresaw the many benefits which could accrue to the Nahanni Butte Dene Band and the DCFN in conjunction with development of the road and mine, and made provision for maximizing opportunities to realize these benefits. To this end, the Agreement provides employment and contracting opportunities as well as equity participation for the Nahanni Butte and the DCFN. The negotiation of this Agreement by Nahanni Butte was supported by the DCFN by Tribal Council Resolution and the final agreement itself was endorsed by Nahanni Butte Band Council Resolution.

In the Agreement, Nahanni proclaimed its support for the mine and the establishment of the access road in recognition of the significant benefits to Nahanni and the DCFN communities as a whole, and undertook to assist the Company in procuring permits, approvals and licences necessary to bring the mine into production, as well as grants, guarantees or other financial assistance from Government towards the establishment of the access road.

Some specific considerations as set out in the Agreement pertaining to economic opportunities relating thereto are as follows:

- Nahanni shall enjoy preferential access to economic opportunities including open book negotiated contracts
- CZN shall have a minimum target of 20% employees from DCFN communities
- CZN shall require non-First Nation contractors to have a target of not less than 20% employees from DCFN communities
- Nahanni will receive a 5% equity interest of profits before taxation, but after recovery of prior capital and development costs
- Nahanni will be granted an option to purchase either a 10% or 15% working interest in the Project for \$6 or \$9 million, inflation adjusted on completion of a Feasibility Study, but before construction
- Following the commencement of commercial production, Nahanni and the Project will fund equally between them:



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- The establishment of The Prairie Creek Education Centre in Nahanni Butte at a cost of up to a maximum of \$150,000 and the annual operating costs up to a maximum of \$50,000. This centre will focus on adult literacy programs and special needs education for children; and
- A Scholarship Trust Fund of \$20,000 per annum initially, increasing to \$30,000 per annum following the payback of all capital costs.
- Upon commencement of construction of the Access, the Project will contribute \$25,000 per annum to a Trust Fund to provide compensation to traditional harvesters who are negatively affected by the Project and the Access.

CZN is committed to continuing to work closely with the Nahanni Butte Dene Band and the DCFN to fulfill the provisions of the Development Cooperation Agreement and ensure that First Nations communities in the area have ongoing input into the re-development plans for the mine.

Land and Resource Use

CZN shall report the impacts on the use of land, water and renewable resources, including:

- *Traditional land use and occupation;*
- *Existing land use and occupation;*
- *Hunting, trapping, and outfitting;*
- *Recreational, commercial and sport fishing;*
- *Availability, abundance and quality of wildlife, fishing, gathering, recreational;*
- *Commercial land and water-based areas; and*
- *Protected areas.*

The pilot plant program will be conducted wholly within the confines of the existing mill building. No uses, other than mining, have been made of the land or resources in this area in recent history.

The Prairie Creek mine is located 90 km from the nearest settled community of Nahanni Butte. There is no road access into the property other than the old winter road alignment which dates back to 1982. Access is by air only, to a private airstrip controlled by the Company. There are no other existing land occupations nor commercial land or water based activities in the vicinity of the mine. Similarly, no observed traditional use or trapping activity has been observed in the minesite area in recent history.

South Nahanni Outfitters hold the outfitting licence for the area. Hunting activity generally takes place in the fall in areas well removed from the mine and should not be impacted by the proposed development.

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The Prairie Creek mine is located adjacent to Prairie Creek, 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 prior to reaching its confluence with Prairie Creek, of which 235 km are within the Park Reserve.

The watershed of the South Nahanni River is 37,000 km², of which 4,766 km² are contained within the Nahanni National Park Reserve. By comparison, the watershed of Prairie Creek above the minesite is 495 km². In accordance with the relative sizes of their respective watersheds, water flow in the South Nahanni averages 75 times that of Prairie Creek and ranges from 50 to 180 times as much.

The Nahanni National Park Reserve was created in 1972, following a canoe trip down the river by Pierre Elliot Trudeau, specifically for the purpose of setting aside the South Nahanni River for wilderness recreational purposes. Exploration activity at Prairie Creek had been ongoing for many years and underground development was well advanced at this point in time.

The South Nahanni River, regularly used for canoeing trips during the summer months, represents the nearest water use downstream of the Prairie Creek mine. Wilderness river tours are supported by a number of outfitting companies from as far away as Ontario. Parks Canada reports that there were 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. As the proposed development is not expected to affect water quantity or quality at the minesite, it is similarly not expected to impact on water quality or quantity within the Park Reserve or on these downstream users.

In 1996, the Company 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 on behalf of its membership "does fully ratify and endorse the Prairie Creek Development Cooperation Agreement" in which the Nahanni Butte Dene Band proclaimed its support for the Prairie Creek mine and the establishment of an all weather access road to the mine in recognition of the significant benefits to Nahanni Butte and the DCFN communities as a whole.



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More recently, the Deh Cho First Nations have put forward a proposal at the Treaty 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 would remain in effect until superceded by the provisions of the Deh Cho Final Agreement.

The Nahanni Butte Dene Band issued a Band Council Resolution on May 18, 2000 in support of protecting the South Nahanni watershed, stating that "the Nahanni National Park Reserve was created without the consent or participation of the Deh Cho First Nations" and that the "Final Agreement should provide for the recognition of Deh Cho First Nations jurisdiction over the entire Nahanni watershed, including the Park or Park Reserve." On January 1, 2001 the Nahanni Butte Dene Band issued another Band Council Resolution rescinding its support of the Protected Areas Strategy for the Nahanni National Park Reserve Watershed.

As the Prairie Creek Development Cooperation Agreement provides for a positive and cooperative working relationship between the Company, Nahanni and the Deh Cho First Nations in respect of developing and operating an environmentally sound operation at Prairie Creek, which will not have significant adverse environmental effects on the ecological integrity of the South Nahanni River or the Nahanni National Park Reserve, the separate goals of the local communities in achieving economic self-sufficiency and protecting the environment seem justifiably quite compatible.

In view of the foregoing, the potential for impacts of the proposed development on the use of land, water and renewable resources are expected to be negligible.

Noise

CZN shall report the impacts on the environment resulting from changes to ambient noise levels, including both continuous and acute exposure.

For the most part, the pilot plant components are run by small electric motors and make little noise. Only the crushing and grinding components, which run intermittently to supply feed for the gravity and flotation circuits, make any appreciable noise. The pilot plant will be operated wholly within the confines of the existing mill building. The mill was designed and constructed to house a full-scale operation of which the pilot plant is only a fraction of the size and as a result generates only a fraction of the noise. The mill has a concrete slab floor surrounded by a concrete foundation wall. The mill superstructure is comprised of a structural steel I-beam frame with galvanized steel cladding. The existing building structure will serve to minimize the effects of ambient and acute noise levels outside.

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An additional source of noise associated with carrying out the program relates to the operation of the generator which will supply power to the pilot plant. The generator is typically operated 24 hours per day, in any event, in support of ongoing care and maintenance activities. Carrying out the proposed program will not alter the operation of the generators. Routine maintenance will be employed to ensure the generator is running efficiently.

In view of the foregoing, the potential for impacts of the proposed development associated with ambient noise levels are expected to be negligible.

Visual and Aesthetic Resources

CZN shall report the impacts on visual and aesthetic resources.

The pilot plant program will be wholly contained and conducted within the confines of the existing mill building, and will not be visible from the outside.

The Prairie Creek minesite is very remote and not generally visible from any location except by low flying aircraft operating in and around the Prairie Creek Valley.

In view of the foregoing, the potential for impacts of the proposed development on visual and aesthetic resources are expected to be negligible.

Cumulative Impacts

CZN shall provide a cumulative impacts assessment. This should include, but not be limited to:

- *An identification of cumulative impacts as well as a determination of significance;*
- *Methods used for the cumulative impacts assessment;*
- *Time and spatial boundaries and supporting rationale;*
- *Location and timing of all projects included in the assessment;*
- *Discussing and attempting to quantify the potential cumulative impacts, including a determination of significance;*
- *Discussing uncertainties in the assessment; and*
- *Identifying mitigation measures that will be applied.*

CZN is reminded that socio-economic impacts as well as environmental impacts are to be included in the cumulative impacts assessment.

The following cumulative impacts assessment (environmental and socioeconomic) has been adapted by CZN for the Metallurgical Pilot Plant Program from the previous assessment completed by EBA Engineering Consultants Ltd. for the Phase II mineral exploration program at the Prairie Creek Mine property submitted to the MVEIRB June 7, 2001.

Methodology

The assessment of potential cumulative impacts was conducted in general conformance with the Interim Guide for Addressing Cumulative Environmental Effects in Environmental Assessments Under the Mackenzie Valley Resource Management Act (September, 2000). The assessment includes:

- definition of cumulative impacts;
- scoping of the assessment;
- analysis of the impacts;
- identification and incorporation of mitigation;
- significance determination; and
- follow-up.

Definition of cumulative impacts

Part 5, Section 117 (2) of the Mackenzie Valley Resource Management Act (MVRMA) specifies that:

Every environmental assessment and environmental impact review of a proposal for a development shall include a consideration of:

- a) the impact of the development on the environment, including the impact of malfunctions of 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; and*
- b) the significance of any such impacts.*

Canadian Zinc's approach to assessing possible cumulative impacts employed the following basic premises:

- There must be an environmental, biophysical, social or cultural impact related to the proposed Metallurgical Pilot Plant program.
- The impact must be demonstrated to operate cumulatively, additively or synergistically, either within the context of Canadian Zinc's development activity at the Prairie Creek mine, or with impacts from other projects or activities.
- The other projects or activities considered exist or are likely to be carried out and are not hypothetical.

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Scoping the assessment

Selection of Components for Assessment

The foregoing sections of the EA Report for the Metallurgical Pilot Plant Program have provided information on the existing environment and assessed the potential for impacts of the proposed program on the environmental, socioeconomic and cultural resources of the development area. The components considered included:

- Air Quality, Noise and Climate;
- Terrain;
- Vegetation and Plant Communities;
- Water Quality and Quantity;
- Aquatic Habitat;
- Wildlife and Wildlife Habitat;
- Land and Resources Use;
- Visual and Aesthetic Resources;
- Cultural and Heritage Resources; and
- Economy.

As reported, the proposed pilot plant program is to be carried out entirely within the confines of the existing mill facility with no direct discharges to the environment.

The impact assessment predicts that adverse residual impacts of the Pilot Plant program on all of the biophysical resources, cultural and heritage resources, visual and aesthetic resources and land and resources use were expected to be negligible.

These results are consistent with the short-term, highly localized nature of the proposed program and the fact that all of the activities would occur within the footprint of existing mining activity at the Prairie Creek Mine.

Based on these predictions alone, there is theoretically little basis for proceeding further with a conventional cumulative impact assessment. Nevertheless, recognizing the direction given by the Review Board, and concerns raised by certain stakeholders related to potential cumulative effects on regional water quality, and socioeconomic matters, these issues will be examined further in the following assessment.

*Time and Spatial Boundaries**Time*

Exploration activities in the Prairie Creek area date back to 1928 when mineralization was first discovered. Exploration continued at various times throughout the years to present, and in 1981 a complete mine was constructed and permitted. However, the mine did not achieve commercial production, was closed, and has remained in a "moth-balled" state.

At this time, it is anticipated that the proposed Metallurgical Pilot Plant Program will be completed over the next two summer seasons. Residual impacts extending beyond this timeframe are expected to be negligible and limited to possible minor chemical alterations to water quality within the existing tailings pond.

In the longer term, assuming that the mine is restarted, the projected mine life will be at least 18 years, based on the current mineral resources. In this case the existing tailings pond will be used as a process water settling and reclaim pond, with the majority of tailings solids planned to be disposed of underground as a thickened or paste backfill. Thus, the cumulative effects assessment covers all activities that have taken place at Prairie Creek from the late 1920s to the year 2020.

Space

The spatial boundaries for the water quality portion of the assessment will begin with consideration of Harrison Creek, with a catchment area of about 7.5 km². The assessment will subsequently examine possible water quality implications for downstream Prairie Creek, with a catchment area above the minesite of 495 km² and the much larger South Nahanni River Watershed which encompasses 37,000 km².

For socioeconomic assessment purposes the local region is represented by the boundaries of the Deh Cho First Nation Territory. Economic impacts will be projected as appropriate to include the Northwest Territories and Canada.

Other Projects Considered

For the purposes of this cumulative effects assessment, other projects considered in the analysis include recognized mining activities that have or may take place within the southern Nahanni Watershed, and the Nahanni National Park Reserve (Figure 1). The mining activities considered are the CanTung tungsten mine and Copper Ridge Explorations' Howards Pass zinc project. Brief Descriptions of these activities follow.

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CanTung Tungsten Mine

The CanTung mine, operated by North American Tungsten Corporation, is situated in the Mackenzie Mountains about 190 km in a straight line west-northwest of the Prairie Creek Mine. The CanTung property drains into the Flat River, a major tributary of the South Nahanni River. It flows into the South Nahanni within the limits of Nahanni National Park Reserve, approximately 100 km upstream of where Prairie Creek enters the river.

Exploration activities and mining at CanTung have taken place since the early 1960's. Mining began in 1962 but the mine was closed down in 1986 due to poor economic conditions, and the property has been on care and maintenance since then. Currently, as a result of dramatically improved economics, North American Tungsten is planning to restart the mine and initiate production by the end of 2001. The mine has a projected mine-life of 3 years and will operate under an existing water licence regulated by the Mackenzie Valley Land and Water Board.

Howards Pass Project

The Howards Pass zinc prospect is located in the Yukon portion of the Mackenzie Mountains near the upper end of the South Nahanni River Watershed, about 250 kilometres northeast of the Prairie Creek property.

Howards Pass is currently owned by Copper Ridge Explorations Inc., was first discovered in 1972 and was actively explored through to 1981. More recently in 2000, an eight hole core drilling program was completed by Copper Ridge. The Howards Pass project is estimated to have a calculated resource of 110 million tonnes grading 7.7% combined zinc plus lead, much of which is believed to be amenable to open pit mining. However, considerably more drilling will be required outside of the high grade core of the main deposit to upgrade the resource to a mineable reserve and to permit development plans to proceed.

Nahanni National Park Reserve

Nahanni National Park Reserve comprises 4,766 km² and encompasses 300 km of the South Nahanni River Valley. The Prairie Creek mine is located outside the Park Reserve boundary adjacent to Prairie Creek, a tributary of the South Nahanni River, around which the Nahanni National Park Reserve was created. The mine is located 32 km upstream of the point where Prairie Creek crosses into the Park Reserve and 48 km from the confluence of Prairie Creek and the South Nahanni River. At its closest point, the mine is 14 km from the nearest Park Reserve boundary, but separated from the Park Reserve by a range of mountains rising up to peaks of 1,750 m in height. The lowest pass through these mountains is about 1,340 m, about 365 m above the South Nahanni River at "the Gate".



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Nahanni National Park Reserve was set aside as a Park Reserve by Order in Council in 1972 and gazetted as a Park Reserve in 1978. Parks Canada subsequently nominated Nahanni National Park Reserve for inclusion on the World Heritage List under the UNESCO World Heritage Convention and that portion of the South Nahanni within the Park Reserve for designation as a Canadian Heritage River under the Canadian Heritage Rivers System. The former was achieved in 1978 and the latter in 1987. Parks Canada is proposing expansion of the Park Reserve into 3 new areas totaling an additional 4,175 km², which would bring the total area of the Park Reserve to 8,925 km².

The Park Reserve has proven itself to be a popular destination as a wilderness river canoeing and kayaking experience. In 1999-2000, 7,281 person-visits were recorded in the Park Reserve. Wilderness adventure trips generally range from 7 – 21 days and cost in the order of \$3,000-5,000. Several wilderness tour companies based in Ontario, Yellowknife and Whitehorse operate in the area.

ANALYSIS OF POTENTIAL CUMULATIVE IMPACTS

The scoping portion of the cumulative impact assessment identified one biophysical component (water quality) and one socioeconomic component (economy) that warranted more thorough analysis. The following presents the cumulative impact assessment for each of these two issues.

Water Quality

The proposed Metallurgical Pilot Plant program will 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 Prairie Creek. The plantsite area is separated from the Harrison Creek channel by a constructed berm. All runoff from the plantsite area reports to a catchment pond to the northwest and adjacent to the confluence of Harrison and Prairie Creeks.

Harrison Creek is a small tributary of Prairie Creek with a catchment area of about 7.5 km² as compared to the catchment area of Prairie Creek above the minesite at 495 km². The average annual flow of Harrison Creek has been estimated at 3.6 cfs as compared to Prairie Creek at 204 cfs, or about 1:50. Harrison Creek commonly dries during the low flow late summer season and flows subterranean.

Fresh water for use in the pilot plant process will 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 is currently used to supply potable water to the camp in support of routine care and maintenance activity



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The aquifer was investigated and well pump tests conducted at the time the wells were developed in 1982. The aquifer is described as being confined in a sand and gravel layer 13 feet in thickness. The well is 66 feet deep and 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 m³ at a pumping rate of about 2.0 m³ per minute.

Total water use over the whole of the pilot plant program will be in the range of 2000 – 4000 m³ of which half or 1000 – 2000 m³ will be fresh and half or 1000 – 2000 m³ will be reclaim. The well and aquifer therefore have significant over-capacity relative to the requirements of the pilot plant.

For comparison purposes, when the Prairie Creek mine was originally permitted for operation in 1982 under Water Licence N3L3-0932, it was authorized to draw up to 1,150 m³ per day from the Prairie Creek Valley Aquifer via the existing on-site wells.

Initially, fresh water would be pumped from the well into one of the two 35 ft. diameter thickeners in the mill to a ½ to ¾ full level, equivalent to 125 to 200 m³ of fresh water storage. Fresh water would be fed to the pilot plant from the fresh water storage thickener. Process water and solids ("tailings") from the pilot plant would then be discharged to the second thickener, which would simulate a "tailings pond". Process water from this second thickener would then be recycled to the pilot plant to simulate reclaim from the tailings pond during full-scale operations. All process water will be retained in available tankage within the mill pending testing and treatment, if necessary, to ensure it is of acceptable quality prior to discharging to the existing tailings pond. Treatment would be accomplished through lime addition within the mill to precipitate dissolved metals.

The existing tailings pond, 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 m³. The crest elevation of the impoundment dike is at 876m for a freeboard of about 8m. Pumping of the entire volume of treated process water to the impoundment will add less than 2% to the volume and result in a rise in pond level of only about 4cm. Handling of the process water in this manner will provide for a 50 times dilution of process water with water currently retained within the impoundment and no direct discharge of process water to Prairie Creek.

The pilot plant program will be conducted wholly within the confines of the existing mill building and there will be no discharges to surface or groundwater as a result of surface runoff or airborne contaminants.

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On this basis, negligible impacts on the water quality of Harrison Creek, Prairie Creek, the South Nahanni River or the Nahanni National Park Reserve are predicted to occur. Water quality monitoring of Prairie Creek upstream and downstream of the mine site conducted by DIAND over the years has revealed no significant impacts associated with the presence of the Prairie Creek mine.

Within the South Nahanni watershed, the most significant current development other than the Prairie Creek mine is the CanTung tungsten mine at Tungsten, N.W.T. The CanTung property is located about 190 km in a straight line west-northwest of the Prairie Creek mine. The minesite facilities are located adjacent to and on the floodplain of the Flat River, a major tributary of the South Nahanni River. CanTung operated over 24 years from 1962 to 1986, prior to being put on care and maintenance due to a fall in world tungsten prices. As a result of improved economic conditions, the CanTung Mine is currently preparing to resume production at the site around December 2001.

During the extended care and maintenance period, the Class A Water Licence has been kept current and the associated Surveillance Network Program has been carried out. The data collected since 1986 have continued to demonstrate that high standards of water quality have been maintained in the Flat River.

No specific water quality data were reviewed for streams in the vicinity of the Howards Pass zinc prospect. However, an intensive Environmental Water Quality Monitoring and Assessment Program of the South Nahanni River Basin has been undertaken by Environment Canada in association with Parks Canada since 1988. The results of this program have been 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). Both of these 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 for that matter the Prairie Creek Mine, and concluded that the waters of the South Nahanni River remain pristine.

Based on the foregoing analysis the 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, are expected to remain very low.

Socioeconomic Considerations

In its directions to Canadian Zinc related to the proposed Metallurgical Pilot Plant Program, the Review Board specifically emphasized that socio-economic impacts, as well as environmental impacts, should be included in the cumulative impact assessment. As a result, the following discussion and analysis is provided.

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The proposed Metallurgical Pilot Plant Program is an integral part of the process of quantifying metallurgical performance and other operating parameters associated with operation of the milling facility at the Prairie Creek Mine. The main objective of this program is to confirm, by processing a bulk sample of ore, the estimates of metallurgical recoveries produced from previous bench-scale testwork conducted on smaller quantities of ore, and to provide accurate information on the quality and quantity of waste products expected to be produced by the milling process.

This information, in combination with additional work planned for 2001, such as an underground decline and exploration program, and a further surface exploration program, will form the basis for a bankable feasibility study originally scheduled for completion in the last quarter of 2001. With a bankable feasibility study demonstrating a positive return on investment, Canadian Zinc believes it will be able to attract the necessary financing to support re-development of mine operations leading to production by 2003, subject to receipt of the necessary operating permits and licences.

In the short term, the proposed program will create positive economic impacts for local communities in terms of employment opportunities and contracted support and supply services. Canadian Zinc employed two local residents of Nahanni Butte for the majority of the 2000 summer season. Similar opportunities are anticipated in 2001 in support of this and other planned programs. The proposed development is expected to employ about 7-9 persons, including a metallurgical engineer, metallurgical technician, laboratory technician, certified electrician, certified mechanic/pipefitter and 2-4 labourers. It will also provide an opportunity to initiate pre-operational training and mill processing orientation programs for local residents in preparation for full-scale operations.

Fixed wing aircraft and helicopter support will provide opportunities for charter companies in Fort Simpson and Fort Liard. Consumables will also be sourced from local suppliers and flown into site. Project management will necessitate travel for head office and other personnel, resulting in positive economic impacts for commercial airlines servicing Yellowknife and Fort Simpson, as well as hotels and restaurants in Yellowknife, Fort Simpson and other local communities.

In the long term, the proposed program is necessary to support plans for mine re-development. Positive economic impacts of future mining operations at Prairie Creek to local communities, the Northwest Territories and Canada are substantial and have been estimated as follows.

Once operational, the mine will employ up to 170 persons directly at the mine site plus an additional 60 under various contracts for at least 18 years based on the current mineral resource. Using a standard multiplier of 2:1 this would be predicted to create another 460 jobs elsewhere in the NWT and Canada.



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Annual payroll, including benefits, will be in the order of \$14.3 million. Payments to government, including corporate income tax, employee income tax and royalty payments are estimated at \$15.4 million. Third party contracts for catering, air transport, incoming freight and outgoing concentrate total an estimated \$10.5 million. Mill supplies and general consumable, including fuel, total \$8 million annually. Road construction and annual operating costs, including the Liard ferry crossing, total \$17 million and \$1 million respectively. The capital cost of the ferry and approaches is an additional \$1 million.

The existing mineral resource has been established over only about 2.1 km of mineralized strike length of 16 km, suggesting the potential to define additional mineral resources and extend the mine life, and economic benefits associated therewith, well beyond current projections is excellent. As well, much thicker stratabound mineralization discovered in 1992 to be underlying the known vein mineralization is currently underexplored and holds the potential to significantly increase the mineral resource of the property, thereby extending the projected mine life.

The Prairie Creek Mine is located on land claimed by the Nahanni Butte Dene Band of the Deh Cho First Nations (DCFN) as their traditional territory. The DCFN are engaged in ongoing negotiations with the Government of Canada and the Government of the Northwest Territories in what is referred to as the Deh Cho Process. The negotiations are currently at the Interim Measures and Agreement In Principle stage. The outcome of the negotiations is expected to be a Final Agreement that will provide, amongst other things, for the implementation of a Deh Cho form of government to oversee the delivery of programs and services to residents within the DCFN territory. It is expected that the negotiations will take some five to seven years to complete.

In 1996, the Company and the Nahanni Butte Dene Band successfully negotiated and executed the Prairie Creek Development Cooperation Agreement. The overall intent of the Agreement was to establish and maintain a positive and cooperative working relationship between the Company and Nahanni in respect of the further development and operation of the mine, while at the same time supporting an economically viable and environmentally sound operation and maximizing economic opportunity and benefits to Nahanni and other Deh Cho First Nations.

This Agreement foresaw the many benefits which could accrue to the Nahanni Butte Dene Band and the DCFN in conjunction with development of the road and mine, and made provision for maximizing opportunities to realize these benefits. To this end, the Agreement provides employment and contracting opportunities as well as equity participation for the Nahanni Butte and the DCFN. The negotiation of this Agreement by Nahanni Butte was supported by the DCFN by Tribal Council Resolution and the final Agreement itself was endorsed by Nahanni Butte Band Council Resolution.

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Some specific considerations as set out in the Agreement pertaining to economic opportunities relating thereto are as follows:

- Nahanni shall enjoy preferential access to economic opportunities including open book negotiated contracts.
- CZN shall have a minimum target of 20% employees from DCFN communities.
- CZN shall require non-First Nation contractors to have a target of not less than 20% employees from DCFN communities.
- Nahanni will receive a 5% equity interest of profits before taxation, but after recovery of prior capital and development costs.
- Nahanni will be granted an option to purchase either a 10% or 15% working interest in the Project for \$6 or \$9 million, inflation adjusted on completion of a Feasibility Study, but before construction.
- Following the commencement of commercial production, Nahanni and the Project will fund equally between them:
- The establishment of The Prairie Creek Education Centre in Nahanni Butte at a cost of up to a maximum of \$150,000 and the annual operating costs up to a maximum of \$50,000. This centre will focus on adult literacy programs and special needs education for children; and
- A Scholarship Trust Fund of \$20,000 per annum initially, increasing to \$30,000 per annum following the payback of all capital costs.
- Upon commencement of construction of the Access, the Project will contribute \$25,000 per annum to a Trust Fund to provide compensation to traditional harvesters who are negatively affected by the Project and the Access.

Canadian Zinc is committed to continuing to work closely with the Nahanni Butte Dene Band and the DCFN to fulfill the provisions of the Development Cooperation Agreement and ensure that First Nations communities in the area have ongoing input into the re-development plans for the mine.

The socioeconomic benefits projected to accrue from the progressive re-development of the Prairie Creek mine are expected to act in an additive and/or cumulative manner in relation to other existing or new developments or activities that may occur within DCFN lands.

Most directly related to the Prairie Creek mine, these would include the socioeconomic benefits that are expected to be generated as a result of resumed mining at the CanTung tungsten mine and increasing tourism activities in Nahanni National Park Reserve.

North American Tungsten has initiated and is continuing its dialogue with the communities of Nahanni Butte and Ft. Liard, DCFN, GNWT and the Federal government. An important element of these consultations has related to the use of northern-based service companies and people for employment and other opportunities that the CanTung mine may be able to offer beginning as early as the last quarter of 2001.

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Similarly, tourism visits to Nahanni National Park Reserve, and the socioeconomic benefits derived from such activities are expected to increase over time. In the year 1999-2000, more than 7,281 people visited the Park Reserve, compared with 4,551 visitors in 1995-96 (Parks Canada Records).

Although no quantitative information is available on the precise nature of the socioeconomic benefits and opportunities that will be generated by these other developments, it is reasonable to assume that the local communities and the Deh Cho Territory are equally well positioned to gain substantial benefits from the combination of other mining developments and Park Reserve-related activities that are expected to take place in the Deh Cho, as they have shown themselves to be with the Prairie Creek Mine, as well as with oil and gas activity in the Fort Liard area. Assuming that participation in these other opportunities is equally effectively managed by the stakeholders, the anticipated cumulative socioeconomic benefits are expected to grow with time.

Uncertainties in the Assessment

The main uncertainty associated with this assessment pertains to the likelihood that any or all of the developments discussed will proceed within the temporal scope of the assessment, and hence the cumulative impact issues that have been evaluated will in fact occur. The re-development of the Prairie Creek mine is contingent on a number of factors including:

- The results of the proposed pilot plant program.
- A subsequent bankable feasibility study demonstrating a positive return on investment.
- Availability of future financing to support re-development.
- Continued support from the communities and leadership of the DCFN.
- Acquisition of the necessary regulatory authorization to proceed and operate.

Similar uncertainties need to be addressed and resolved for other prospective developments in the vicinity, such as the CanTung mine and the Howards Pass mineral prospect, each of which are situated further upstream in the South Nahanni River Watershed. The operation and potential expansion of the Nahanni National Park Reserve is of course always subject to federal budget constraints and the availability of tax dollars to support such initiatives.

Mitigation Measures

The mitigation measures to be employed to prevent or minimize impacts to water quality were reviewed in earlier sections of this cumulative impact assessment and the EA Report.

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In the context of socioeconomic issues management, the Development Cooperation Agreement executed by the Nahanni Butte Dene Band and Canadian Zinc, sets out the various measures and commitments made by both parties to optimize benefits and minimize possible negative effects. Canadian Zinc remains committed to continuing to work closely with the Nahanni Butte Dene Band and the DCFN to fulfill the provisions of this Agreement.

Abandonment and Restoration

CZN shall describe and evaluate the abandonment and restoration methods that will be employed for the proposed developments. This should include a discussion of incremental abandonment and restoration costs resulting from the proposed developments.*

The entire pilot plant operation will take place within the existing mill facility. As such, there will no new areas of disturbance requiring reclamation.

The pilot plant itself has a significant intrinsic value, considerably exceeding the cost of relocating the equipment upon completion of the program. The equipment therefore will be an asset as opposed to a liability.

The tailings solids produced from the operation of the pilot plant, which are comprised of ground up rock the consistency of sand, will be stored in the mill thickeners. Upon commencement of operations, these solids will be combined with the mill tailings for disposal underground as paste backfill or in the tailings pond. In the event that operations do not recommence the tailings can remain in the thickeners, or be disposed in an acceptable manner underground, in the tailings pond or landfilled.

Beyond the foregoing considerations, the proposed development entails little in the way of reclamation and closure requirements.

Environmental Management Plan

CZN shall describe their environmental management plan, including monitoring undertaken during the development as well as follow-up monitoring. This submission should include, but not be limited to:

- Objectives;
- Schedule;
- Aspects to be monitored;
- Frequency, duration and geographic extent of monitoring;
- Approaches and methods for analysis; and
- Reporting and response mechanisms for adjusting the project design or implementing mitigation/remedial measures, if necessary, based on monitoring results.



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Introduction:

The proposed pilot plant is typical of technology used throughout the world to confirm mineral recoveries using metallurgical science. The technique represents standard industry practice and has minimal environmental impacts associated with it when conducted employing standard mitigative measures. Typically these measures form the basis for standard terms and conditions incorporated into waste management permits.

Where access to ground transportation is readily available, bulk samples for treatment in such a pilot plant are commonly shipped to major population centers where the testwork is carried out in a laboratory-type setting. In the case of the Prairie Creek Mine where ground transportation is currently not readily available, but where a fully equipped mill facility is in place, an on-site test program is deemed to be much more practical. As a consequence, the pilot plant can be fully contained and operated within the existing mill facility with no discharge to the environment. Process water can be sampled, tested and treated, as necessary, prior to release from the mill for containment in the existing tailings pond.

In previous sections of this EA Report, CZN has described the potential for impacts on the environment as a result of the proposed development and concluded in each case that such impacts would be negligible based on the implementation of standard mitigation measures.

Accordingly, the emphasis of environmental management in relation to operation of the pilot plant at Prairie Creek will be on operational monitoring to ensure the implementation and effectiveness of these mitigation measures, rather than monitoring of environmental effects, which have been demonstrated to be minimal where effective mitigation is practiced. For this reason, environmental effects monitoring is not judged to be warranted in support of the pilot plant program, except in the instance of an identified failure of a mitigation measure, such as in the case of a spill, in which case incident specific monitoring would be initiated as appropriate.

Objectives:

The objectives of the Environmental Management Plan are therefore to guide the operational procedures and management practices during and after activity to ensure the effective implementation environmental mitigation measures.

Environmental performance will be measured based on the degree of adherence to applicable permit conditions and regulations, as well as on use and performance of mitigation measures and general operating practice, including the functioning of equipment and drainage collection systems such as mill floor sumps, etc.



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Operating procedures will be planned and scheduled in advance to minimize environmental impacts as well as to comply with all government regulations and permits.

Process water will be sampled, tested and treated, as necessary, prior to release from the mill for containment in the existing tailings pond.

Schedule:

Environmental management considerations will be built in to the operational planning for the pilot plant program and carried through to the completion of the program.

Based on the current schedule it is planned to commence in September, completing a portion of the pilot plant program prior to shutting down and winterizing the camp by the end of October. The program would re-commence and be finished off the following summer.

The environmental management plan will be implemented in conjunction with and carried on throughout all stages of the pilot plant operation.

Samples of process water will be sample and tested prior to release from containment structures in the mill. If necessary, process water will be treated to achieve acceptable water quality objectives prior to release to the tailings pond.

Aspects to be monitored:

All aspects of the operation which have the capacity to result in a significant adverse impact on the environment and for which mitigation measures have been proposed, will be monitored, including, but not necessarily limited to:

- Pilot plant operation and performance
- Reagent storage, handling, mixing and addition
- Mill process water storage
- Process water quality prior to discharge
- Process water discharge lines
- Tailings Pond water quality

Frequency, duration and geographic extent of monitoring:

Operational planning sessions will be held at the beginning of each day to review operating practices and procedures.

Operational monitoring will be conducted throughout the duration of the pilot plant operation. Operating crews will monitor performance of equipment and containment structures on a continual basis during operations. As well, the pilot plant will be inspected daily by the project manager.



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Process water will be sampled and tested prior to discharge to the tailings pond.

Process water requiring treatment prior to discharge to the tailings pond will be tested after treatment and prior to discharge.

The tailings pond will be sampled and tested for applicable physical and chemical water quality parameters prior to the initial discharge of process water and monthly during operation of the pilot plant.

Approaches and Methods for analysis:

The proposed development will be conducted under the direct supervision of Mr. Alan Taylor, VP, Exploration or, in his absence, his appointed designate. The results of daily inspections and ongoing operational monitoring will be reviewed at daily planning sessions. The condition of mitigation measures will be reviewed daily to determine effectiveness of performance.

Grab samples of process and tailings pond water will be collected on a monthly basis. Samples will be shipped to a qualified laboratory and analyzed by standard acceptable methodology for applicable physical and chemical water quality parameters.

Reporting and response mechanisms for adjusting the project design or implementing mitigation/remedial measures, if necessary, based on monitoring results:

Daily reports will be completed detailing the results of each day's activities. Such reports will note deficiencies in performance of equipment and mitigation measures.

These reports, as well as the results of the daily inspections by the Project Manager, will be reviewed at the daily operational meetings. Decisions on the need for changes to operational plans, repairs to existing mitigation measures or implementation of new mitigation measures will be made at these meetings.

An Emergency Response Plan and Spill Contingency Plan have been prepared to address emergency situations. The types of potential emergencies and the response to them are defined in the Emergency Response and Spill Contingency Plans.

Staff will be trained to handle emergency situations with appropriate procedures as set out in the Emergency Response Plan. Responsibilities are clearly defined under procedures outlined above.



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Follow-up Monitoring

In the course of project planning, the application stage and the EA process, CZN has made commitments as to the ways and means by which the development will be undertaken in order to achieve its objectives, while at the same time ensuring that the development will not result in significant adverse impacts to the environment.

The MVEIRB, in its Report of Environmental Assessment, will accept CZN's plans and commitments and/or make further recommendations for mitigation measures to ensure that the development will not result in significant adverse impacts to the environment.

The MVLWB, in issuing the required Water Licence, will incorporate terms and conditions for undertaking the development in accordance with the commitments and recommendations made by CZN and the MVEIRB, respectively.

In order to ensure that the terms and conditions of the Licence are met, site inspections will be conducted by regulatory agency personnel during the course of the development.

Site Inspection Reports will be available to demonstrate the effectiveness of these follow-up programs in an open and transparent manner.

Following completion of the pilot plant program, project reports will be completed summarizing the results of the testwork, including the environmental aspects including process water quality, tailings solids quality, tailings pond water quality, etc. This information will be incorporated into future environmental assessment reports in support of permitting for mine operations.

Once the pilot plant program is complete, further follow-up monitoring is deemed to be unnecessary as no potential for residual impacts have been identified

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ENVIRONMENTAL ASSESSMENT REPORT

**UNDERGROUND DECLINE DEVELOPMENT AND
EXPLORATION DRILLING**

PRAIRIE CREEK MINE

Land Use Permit Application MV2001C0023
MVEIRB FILE 01-002

SUBMITTED TO:

Mackenzie Valley Environmental Impact Review Board
200 Scotia Centre
P.O. Box 938
Yellowknife, NT
X1A 2N7

SUBMITTED BY:

Canadian Zinc Corporation
Suite 1202 – 700 West Pender Street
Vancouver, BC, V6C 1G8

June 21, 2001



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Canadian Zinc has prepared this EA Report in response to the Terms of Reference established for the Decline Development and Underground Exploration Drilling Program dated May 31, 2001. For ease of reference, headings used in the Terms of Reference have been adopted in this EA Report in **bold** print, while details of the information requested are shown in *italics*. CZN's response to each of the specific information requests follows in plain type.

Executive Summary

CZN shall provide an Executive Summary that encompasses the contents of the existing documentation and the information submitted in response to these Terms of Reference.

Canadian Zinc submitted an Application to the MVLWB on March 5, 2001 for a Land Use Permit to support the development of an underground decline and an underground exploration drilling program at the Prairie Creek mine site.

The proposed development is part of the ongoing process of establishing, confirming and enhancing the known mineral resource at the Prairie Creek property, the main objective of which is to further delineate the area of known stratabound and vein mineralization at Prairie Creek in order to upgrade these mineral resources to mineral reserve status. The development will also provide direct access to mineralized zones for the purpose of collecting a bulk sample of the vein ore.

This information, in combination with additional work planned for 2001/2002, including an additional surface mineral exploration drilling program, and the operation of an on-site pilot plant to confirm metallurgical performance, will provide the additional information necessary to complete a bankable feasibility study. The feasibility study will form the basis for making a production decision and attracting the financing necessary to re-activate mining operations at Prairie Creek, which could occur as early as 2003, subject to receipt of the necessary operating permits and licences.

In order to meet this schedule, the proposed development was scheduled to be carried out from May through October, 2001.

The proposed decline development and underground mineral exploration core drilling program is typical of the technology used at prospective underground mineral exploration properties throughout the world. The technique represents standard industry practice and has minimal environmental impacts associated with it.



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However, prior to completion of preliminary screening by the MVLWB, the application (MV2001C0022) was unilaterally referred to the Mackenzie Valley Environmental Impact Review Board (the Review Board) by the Nahanni National Park Reserve on April 11, 2001 for further assessment citing "the potential to impact the ecological integrity of the park reserve". The 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.

As a result of the referral, the Review Board undertook to develop a Draft Work Plan and Terms of Reference for the program. 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 sets out milestone dates for completion of various stages of the EA process, with a decision by the Review Board scheduled by August 15, 2001.

Assuming a favourable decision and given the additional time required for Ministerial comment and issuance of the Land Use Permit by the MVLWB, this would suggest receipt of approval for commencement of the operation by the end of August at the earliest. As a result of the delay, the Decline Development and Underground Exploration Program will likely have to be extended into the summer of 2002, or alternatively, completed in its entirety during the 2002 summer season.

In setting the Terms of Reference, the Review Board recognized the substantive nature of existing documentation supplied in support of the previous Phase I Drilling Program. In accepting this information, the Review Board identified outstanding information requirements in respect of this EA.

Canadian Zinc has responded to these information requests, identifying potential impacts and predicted residual impacts after mitigation as requested for each of the following components of the natural, socio-economic and cultural environment:

- 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



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An underground decline of the type proposed in this application is a tunnel driven into the rock in the side of a mountain at a slight downward angle. The proposed decline will be accessed by an entranceway, or "portal", to be developed at the 905 m elevation approximately 600 m north of the existing mill facility. The entire development is proposed to take place within 1000m of the existing minesite facilities and within the area of traditional mining activity at Prairie Creek and the boundaries of Mining Lease 2932 and Surface Lease 95F10/10-5-3.

The proposed portal location is accessible by existing roads. This will be the fourth portal established on the property to access the underground workings, the others being in the same general area at the 870m, 930m and 970m elevations.

Initial scoping of the development identified the disposal of waste rock and the handling of mine water as the two principal sources of potential impacts on the natural environment. As a result, the development was designed incorporate measures to mitigate against such impacts.

The decline development will produce approximately 5200 m³ of broken rock, which will be trucked and stockpiled within the existing plantsite area, either adjacent to the existing ore stockpile or in the storage yard along the toe of the tailings impoundment dam. While the mineral resources at Prairie Creek are sulphidic in nature, the mineralized zones themselves are hosted in carbonate rocks.

The development has been designed such that the decline will be driven entirely within the sedimentary dolostone formation which hosts the mineralized zones. The Upper Spar and Chert/Dolostone rock units from which the rock will originate have been tested and determined to have low sulphide values and high excess neutralization potential, and will therefore pose no hazard to the environment through sulphide oxidation processes.

The underground workings will likely require dewatering during decline development and exploration drilling, the volume of which will depend upon the extent and nature of underground watercourses intersected.

Based on experience to date the sedimentary dolostone formation in which the decline will be driven entirely within is relatively water-tight. Little water is expected to be encountered until the vein is intersected at the far end of the decline near the 825m elevation, 80m below the portal elevation.

Water volumes underground can be quite variable and quantities are almost impossible to predict with high degree of accuracy in advance. Of the three existing adits, both the 930m and 970m levels are relatively dry. Only the 870m level produces minewater in any appreciable quantities. While there is no flow from the approximate 800 linear metres of workings on the 870m level in the winter, estimates of flow in the summer have ranged from 0.1 m³/min in September to 0.5 m³/min in June.



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These flows are indicative of quantities of water which might be expected to be encountered in conjunction with the decline development.

No artesian conditions have been encountered in any of the mineral exploration holes drilled on the property to date. Given the nature of the dolostone formation and since the development is a decline with 80-90 m of head, the mine water is expected to settle out below the level of the portal at the 905m elevation, which would result in no discharge of water from the portal. The quality of water remaining in the underground workings is expected to be typical of the local groundwater regime which connects naturally with the Prairie Creek aquifer

Dewatering of the workings during development will be accomplished through the use of sumps and pumps located underground. A final sump will be developed near the mouth of the portal to act as a finishing settling pond for mine water prior to release to Harrison Creek. Quality of the water to be pumped from the underground workings is expected to be typical of the local groundwater regime which is hydraulically connected with the Prairie Creek Aquifer.

Following completion of the exploration program, all equipment will be removed, dewatering will be discontinued and the workings will be allowed to flood to the natural groundwater level. The portal entrance will be sealed as required. Flooding will submerge the mineralized vein zones encountered near the end of the decline preventing future oxidation. The quality of water remaining in the underground workings is also expected to be typical of the local groundwater regime which connects naturally with the Prairie Creek Aquifer.

Given the nature of the proposed development, being that activity is largely confined to underground development, waste rock will be carbonate based with high excess neutralization potential, and mine water is expected to be of a quality similar to that of the existing groundwater regime, Canadian Zinc has concluded that the potential for any significant adverse impact on the environment, even within the immediate area of the minesite, is negligible.



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Introduction

The Prairie Creek Mine is 100% owned and operated by Canadian Zinc Corporation of Vancouver, BC. The mine is located in the southern Mackenzie Mountains in southwestern Northwest Territories in the area claimed by the Nahanni Butte Dene Band of the Deh Cho First Nations as their traditional territory.

The Prairie Creek Mine has been the focus of exploration since mineralization was first discovered on the property in 1928. As a result of this activity the property is now known to contain a significant polymetallic Zinc-Lead-Silver-Copper mineral resource. In addition to this mineral resource, the site also contains approximately \$150 million of minesite infrastructure, in today's dollars, including a 1,000-ton per day mill, a 240 person camp, an administration and service complex and support facilities, all constructed in 1981. Although fully permitted for operation in 1982, the mine did not achieve commercial production due to a sudden collapse in world silver prices. The operating permits and licences then in force have since been allowed to lapse.

Prior to construction of the mine in 1981, a total of over 10,000 meters of exploration drilling (the majority from surface) and 3,800 meters of underground development had been completed. Approximately 120 diamond drill holes had been completed at the Prairie Creek Mine up to this point. At the time Canadian Zinc became involved in the property in 1991, the ore reserve estimate stood at 1.81 million tonnes grading 10.8% lead, 11.75% zinc, 0.4% copper and 182 g/tonne silver.

Since that time CZN has completed an additional 129 diamond drill holes, for a total of an additional 40,000 meters of surface diamond drilling, core from which is presently stored in racks at the minesite. To support these programs the Company purchased 2 Longyear Diamond Drill Rigs in 1992, which were transported to the minesite by air and assembled in the on site shop facilities.

As a result of these efforts the mineral resource now stands at 11.8 million tonnes grading 10.1% lead, 12.5% zinc, 0.4% copper and 161 g/tonne silver

The Company's drilling focus to date has been primarily in the immediate area of the mine site and underground workings (Zone 3), where 80% of the total exploratory work has been carried out.

In 1992, a stratabound form of mineralization was discovered underlying the vein-type deposits of Zone 3 while drilling to extend these vein resources at depth. Up to six mineralized stratabound lenses have been intersected varying in thickness from between less than one metre to several metres in thickness. Total thickness of the stratabound zone reaches up to 28 m. The stratabound deposits are located at around the 600 – 650m elevation, 200 – 350 m below the existing underground workings and 400 m below the surface of the ground.



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The stratabound deposits are very underexplored, thus having the potential to significantly increase the known mineral resource and, due to their thickness, hold the key to supporting the desired increased mill throughput of 1500 tonnes per day.

As part of the ongoing process of establishing, confirming and enhancing the known mineral resource at the Prairie Creek property, Canadian Zinc has proposed to develop an exploration decline to permit access for underground exploration drilling of the stratabound deposit underlying the Zone 3 quartz vein mineralization.

The main objective of the proposed decline development* and underground drilling exploration program is to further delineate the area of known stratabound and vein mineralization at Prairie Creek in order to upgrade these mineral resources to mineral reserve status. The development will also provide direct access to mineralized zones for the purpose of collecting a bulk sample of the vein ore.

The proposed decline will allow drilling to be conducted from underground about 200 m above the stratabound, as compared to drilling from surface which would require approximately 450 m long holes, resulting in a substantial improvement in accuracy and saving in drilling costs. The decline development is proposed to take place within 1000m of the existing minesite facilities and within the area of traditional mining activity at Prairie Creek and the boundaries of Mining Lease 2932 and Surface Lease 95F10/10-5-3.

The proposed decline development and underground mineral exploration core drilling program is typical of the technology used at prospective underground mineral exploration properties throughout the world. The technique represents standard industry practice and has minimal environmental impacts associated with it.

This information, in combination with additional work planned for 2001/2002, including an additional surface mineral exploration drilling program, and the operation of an on-site pilot plant to confirm metallurgical performance, will provide the additional information necessary to complete a bankable feasibility study. The feasibility study will form the basis for making a production decision and attracting the financing necessary to re-activate mining operations at Prairie Creek, which could occur as early as 2003, subject to receipt of the necessary operating permits and licences.

Canadian Zinc submitted an application to the Mackenzie Valley Land and Water Board for a Land Use Permit on March 5, 2001 in support of this activity at its Prairie Creek minesite proposed for the summer of 2001.

Prior to completion of preliminary screening by the MVLWB, the application (MV2001C0023) was unilaterally referred by the Nahanni National Park Reserve to the Mackenzie Valley Environmental Impact Review Board (the Review Board) on April 16, 2001 for further assessment citing "the potential to impact the ecological integrity of the park reserve".



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As a result of the referral, the Review Board undertook to develop a Draft Work Plan and Terms of Reference for the program. 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 milestone dates for completion of various stages of the EA process, with a decision by the Review Board scheduled by August 15, 2001.

Assuming a favourable decision and given the additional time required for Ministerial comment and issuance of the Land Use Permit by the MVLWB, this would suggest receipt of approval for commencement of the operation by the end of August at the earliest, 6 months after submission of the application and 4 months after the proposed start-up date. This would effectively extend the planned 5-6 month program into 2002. As a result, the decline program may have to be run over two seasons, commencing immediately upon receipt of the permit and running until closing and winterizing of the camp in October, and then recommencing in May, 2002 and running until completion, likely in August, 2002. Alternatively, the entire program may have to be delayed until the summer of 2002.

Description of the development

An underground decline of the type proposed in this application is a tunnel driven into the rock in the side of a mountain at a slight downward angle. The tunnel is driven by drilling and blasting the rock, and then removing the broken rock with mechanical equipment, such as a scooptram. The tunnel provides access for men and equipment for the purposes of more detailed exploring of areas of known mineralization deep under the surface of the earth. The advantage of a decline is that it allows exploration work to be undertaken in much closer proximity to the mineralized areas, thus significantly decreasing the length of the holes that have to be drilled and providing direct access to mineralized zones for the purpose of collecting a bulk sample of the ore.

The proposed decline will be accessed by an entranceway, or "portal", to be developed at the 905 m elevation approximately 600 m north of the existing mill facility. The proposed portal location is accessible by existing roads. This will be the fourth portal established on the property to access the underground workings, the others being in the same general area at the 870m, 930m and 970m elevations. The existing underground workings differ from the proposed decline in that all three are horizontal adits designed to intersect the shallower vein mineralization. The decline, which will be approximately 3m in width, 2.3m high and 600 m long at a 15% downward grade, will intersect deeper vein mineralization for taking of a bulk sample and provide closer access to the still deeper stratabound mineralization for drilling.



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The majority of the equipment utilized in support of this program currently exists on-site. The main drive would be drilled by a two-boom air jumbo drill, which would be airlifted into the site. Rock from the underground development would be removed by existing 2-yard scoop trams and transported to stockpile locations by existing loader and truck. This equipment is currently on-site, along with necessary compressors and fuel.

A minimum of 9 drill cutouts will be prepared along the decline to support the planned underground exploration drilling program. This work will be carried out using Boyles electric or hydraulic diamond core drills. It is estimated that further delineation of the deposits will require drilling of 50 to 250 m long holes totaling approximately 5000m.

The mineral resources at Prairie Creek are hosted in carbonate rocks. The decline will be driven entirely within the sedimentary dolostone formation and will produce approximately 5200 m³ of broken rock, which will be trucked and stockpiled within the existing plantsite area, either adjacent to the existing ore stockpile or in the storage yard along the toe of the tailings impoundment dam.

The Upper Spar and Chert/Dolostone rock units from which the rock will originate have been tested and determined to have low sulphide values and high excess neutralization potential, and will therefore pose no hazard to the environment through sulphide oxidation processes. The results of this testwork have been provided with this EA Report.

The proposed portal will be developed at the 905m elevation on the northwest side of the Harrison Creek valley approximately 860m upstream of its confluence with Prairie Creek. Harrison Creek is a small tributary of Prairie Creek with a catchment area of about 7.5 km² as compared to the catchment area of Prairie Creek above the minesite at 495 km². The average annual flow of Harrison Creek has been estimated at 3.6 cfs as compared to Prairie Creek at 204 cfs, a ratio of about 1:50. Harrison Creek commonly dries during the low flow late summer season and flows subterranean.

The underground workings will likely require dewatering during decline development and exploration drilling, the volume of which will depend upon the extent and nature of underground watercourses intersected.

Based on experience to date the sedimentary dolostone formation in which the decline will be driven entirely within is relatively water-tight. Little water is expected to be encountered until the vein is intersected at the far end of the decline near the 825m elevation, 80m below the portal elevation.



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Water volumes underground can be quite variable and quantities are almost impossible to predict with high degree of accuracy in advance. Of the three existing adits, both the 930m and 970m levels are relatively dry. Only the 870m level produces minewater in any appreciable quantities. While there is no flow from the approximate 800 linear metres of workings on the 870m level in the winter, estimates of flow in the summer have ranged from 0.1 m³/min in September to 0.5 m³/min in June. These flows are indicative of quantities of water which might be expected to be encountered in the decline development.

No artesian conditions have been encountered in any of the mineral exploration holes drilled on the property to date. Given the nature of the dolostone formation and since the development is a decline with 80-90 m of head, the mine water is expected to settle out below the level of the portal at the 905m elevation, which would result in no discharge of water from the portal. The quality of water remaining in the underground workings is expected to be typical of the local groundwater regime which connects naturally with the Prairie Creek aquifer.

Dewatering of the workings during development will be accomplished through the use of sumps and pumps located underground. A final sump will be developed near the mouth of the portal to act as a finishing settling pond for mine water prior to release to Harrison Creek. Quality of the water to be pumped from the underground workings is expected to be typical of the local groundwater regime which is hydraulically connected with the Prairie Creek Aquifer.

Following completion of the exploration program, all equipment will be removed, dewatering will be discontinued and the workings will be allowed to flood to the natural groundwater level. The portal entrance will be sealed as required. The quality of water remaining in the underground workings is also expected to be typical of the local groundwater regime which connects naturally with the Prairie Creek Aquifer.

The portal will be developed adjacent to and upslope of Harrison Creek, making this the most practical point for discharge of minewater. Fisheries studies by Beak consultants in 1980-81 and Rescan in 1994 have identified limited fisheries habitat potential in Harrison Creek, with steep gradients restricting fish movement upstream of the mouth. As well, Harrison Creek commonly dries during the low flow late summer season and flows subterranean, and 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. Fish utilization of Prairie Creek appears to be confined largely to the headwaters and the mouth. The headwaters appear to be utilized by Dolly Varden (or Bull Trout) and Rocky Mountain Whitefish. Artic Grayling do not appear to move upstream in Prairie Creek beyond the lowest reaches near the mouth.



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As mine water quality is predicted to be good, no impacts on fisheries or other aquatic resources are anticipated as a result of the release of mine water during the operation. This would be confirmed by periodic testing of the mine water. In the event that any constituents were determined to be elevated to unacceptable levels, provision is available for minewater to be pumped to the tailings impoundment.

A total of 15 persons are estimated to be employed in carrying out the land use operation. The employees will stay in camp at the Prairie Creek Mine site where full accommodations are available. Existing minesite facilities, as have been used to support similar levels of on-site activity over the last number of years, include:

- Fully serviced bunkhouse, kitchen, office and washroom facilities
- Electricity supplied from an on-site diesel powered generator
- Potable water supplied from a well & pumphouse, located approximately 35m N of the main office and service building; the well draws water from a depth of about 50 feet in the Prairie Creek floodplain; potable well water is untreated
- Sewage disposal is by discharge to and exfiltration from an excavated and covered septic sump constructed in floodplain sands and gravels adjacent to and SW of the main office and service building; sewage disposal is hydraulically down gradient from the water well at a distance of approximately 45m
- Camp refuse is burned in an oil fired incinerator

A qualified person carrying a valid required First Aid Certificate will be based in camp at all times. Communications are via satellite phone/fax and access is presently by air onto a privately owned 1000 metre airstrip from either Ft. Nelson or Ft. Simpson. It is anticipated that the entire program of decline development and underground exploration drilling will take in the order of 5- 6 months to complete.

Description of the existing environment potentially impacted by the proposed development (e.g. natural and human setting)

The 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 48 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 property is within the area claimed by the Nahanni Butte Dene Band of the Deh Cho First Nations as their traditional territory.

The nearest settled communities within the Deh Cho 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
- Wrigley, NT - 200 km to the north-east
- Jean Marie River, NT - 220 km to the east
- Trout Lake, NT - 230 km to the south-east
- Fort Providence, NT - 380 km to the east
- Kakisa, NT - 400 km to the east
- Enterprise, NT - 480 km to the east
- Hay River, NT - 490 km to the east

The nearest major center is Yellowknife, the capital of the NWT, 550 km to the east. Year round access to the property is by charter aircraft, generally from Fort Simpson, NWT or Fort Nelson, B.C. The mine is serviced by a 1,000 m gravel airstrip that is located adjacent to Prairie Creek approximately 1 km to the north of the mine site.

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 40 cm, most of which falls as rain. The minesite, including the area of the proposed drilling program, is located within the Alpine Forest-Tundra section of the Boreal Forest characterized by stunted fir with limited undergrowth and open areas dominated by lichen.

The exploration decline and underground drilling program currently proposed is to be carried out within 1000m of the existing minesite facilities, wholly within the boundaries of the existing surface and mineral leases and within the area of traditional mining activity at Prairie Creek. The portal location is accessible by the existing network of exploration roads. As a result no new road development is required in support of the development.

Detailed baseline studies describing the existing environment in the vicinity of the Prairie Creek mine and along the access road corridor were undertaken in 1980-81 as a component of previous environmental assessments conducted in support of operating permits and licences issued at that time. Additional studies were undertaken in 1994 in support of further permitting efforts at that time. The results of these studies, which included field assessments and descriptions of fisheries and aquatic resources, as well as wildlife populations and wildlife habitat, have been used as the basis for the discussions on impacts of the proposed development in the following sections.



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Environmental Assessment

This EA report has been prepared in response to the Terms of Reference established by the MVEIRB for the Decline Development and Underground Exploration Drilling Program Land Use Permit Application for the purposes of assisting in this further assessment. For ease of reference, headings used in the Terms of Reference have been adopted in this EA Report in **bold** print, while details of the information requested are shown in *italics*. CZN's response to each of the specific information requests follows in plain type.

Environmental Assessment Methodology

CZN shall provide a description of the methodology they used during the preparation of their EA Report. This should include, but not be limited to:

- *A description of and the reasoning behind the setting of the spatial and temporal boundaries used; and*
- *A description of how significance was determined.*

Environmental assessment of the development actually commenced at the project concept stage where, as discussed further in the next section, environmental considerations and mitigation measures were built into the development design. These then formed the basis of the original application and appended Project Description Report submitted to the MVLWB on March 5, 2001.

The environmental assessment process includes a risk based approach to evaluating potential impacts on components of the natural environment which considers the magnitude, probability and consequences of any such occurrence. Mitigation measures are incorporated into the development design in order to reduce the respective risk factor(s) to a level whereby the resulting potential for impact is judged to be minimal.

In completing this EA Report, CZN used its expert knowledge of mining technology, and of the Prairie Creek mine site generally, as well as professional judgment to further evaluate potential sources for impacts associated with the development beyond those for which mitigation measure have already been built into the design.

In so doing, the Company considered the scope and scale of the proposed development in terms of its size, location and duration of the operation in relation to those components of the environment as identified by the MVEIRB in their scoping of the assessment as set out in Sections 6 and 7 of the Terms of Reference. The information contained in the comprehensive database of existing baseline studies were reviewed in identifying those components of the existing environment in the vicinity of the Prairie Creek mine with the potential to be impacted by the development.



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Given the small scale of the proposed development and the nature in which it is to be carried out, initial scoping suggested that the potential for impacts was very low and where impacts might occur their magnitude would be very slight. As a result, the spatial boundaries for the assessment of impacts were initially set within the localized area immediately surrounding the minesite, including Prairie Creek in the vicinity of the mine. The assumption being that if impacts were negligible on a localized scale they would be even less so within larger spatial boundaries. Similarly, temporal boundaries were initially set for the duration of the operation, again because initial scoping suggested minimal potential for longer-term or residual impacts, with the assumption again being that if short term effects were minimal, longer term effects would be even less so.

The results of the assessment confirmed this approach, suggesting that the potential for adverse impacts associated with the development were negligible. Expanding temporal or spatial boundaries beyond those considered in the initial environmental assessment was therefore considered unnecessary.

In its Report of Environmental Assessment on CZN's Phase I Mineral Exploration Drilling Program (May 5, 2001), the Review Board gave direction on the matter of significance determination. The Board stated that it would prefer to have an EA Report emphasize the reporting of residual impacts using acceptable reporting attributes such as magnitude, geographic extent, timing, duration, frequency, irreversibility of impacts and probability of occurrence and confidence level and "refrain from drawing significance conclusions".

In its environmental assessment, CZN considered such attributes in evaluating the potential for a quantifiable impact to occur. Where the potential for such impacts was identified, the task of quantifying the impacts within appropriate temporal and spatial boundaries would be undertaken.

In practice, the assessment identified no residual impacts and determined the potential for such impacts associated with the development to be negligible, eliminating the need to attempt further quantification of the impacts.

Environmental Considerations in the Development Design

CZN shall describe how environmental considerations were incorporated into the design of the developments.

Environmental considerations form an integral part of project planning for any development at a mining property. The decline development is no exception and the final design of the proposed development incorporates a number of such considerations. These are discussed in detail in the description of the development and may be summarized as follows:

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- The decline is designed to be developed entirely within the carbonate host rock. This will ensure a high excess neutralization capacity and eliminate the potential for sulphide oxidation in waste rock
- All waste rock will be stored within the existing plantsite area avoiding further surface disturbance
- Developing the decline in carbonate host rocks will minimize the potential for mine water contamination associated with oxidation of mineralized sulphide zones
- Designing the underground development as a decline will allow the workings to flood activity back to the natural level of the watertable upon completion of exploration, preventing future oxidation of mineralized zones
- Drilling from underground will reduce disturbance associated with surface drilling

Accidents and Malfunctions

CZN shall report on the probability, potential magnitude, potential environmental impacts and contingencies to deal with possible development accidents and malfunctions. The submission shall include the Spill Contingency Plan and/or Emergency Response Plan that CZN would use in the event of a problem.

The probability, risk and potential magnitude of an accident or malfunction associated with the proposed development are deemed to be very low. Principal possible failure mechanisms with associated risk assessment factors are as follows:

Failure Mode	Initiating Event	Probability	Magnitude	Consequence
Diesel Spill	Compressor Day Tank Failure	Low	Small Max. 300 gals	Low – Medium Relatively small volume; Spill likely contained at portal site; Worst case loss of portion to Harrison Creek
Diesel Spill	Spill during Transfer	Low	Small Max 130 gals.	Low – Medium As above
Diesel spill Air emissions	Fire	Low	Small	Low Relatively small combustible volumes
Mine water Discharge	Sump Failure	Low	Small Max. 50 gals.	Low Small volumes; water & suspended solids unlikely to migrate much beyond drill pad

Canadian Zinc has a Spill Contingency Plan developed for the Prairie Creek mine which has been filed with Indian and Northern Affairs Canada. The Company maintains a supply of spill clean-up materials at the site including a variety of absorbent materials and ready access to large inventory of heavy equipment, tools and supplies at the site. Canadian Zinc's Emergency Procedures Manual has been provided in conjunction with this EA Report.



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Alternatives

CZN shall provide an explanation and evaluation of the alternatives to the principal and accessory parts of the developments. This evaluation should include the "do nothing" scenario. This evaluation should also include a thorough discussion of the comparative impacts of the alternatives along with the rationale for selecting the proposed developments.

The process of diamond drilling represents standard industry practice in the exploration of base metal and other mineral deposits. It has been, and continues to be used commonly throughout the Northwest Territories, throughout Canada and throughout the world for this purpose. At Prairie Creek, the first diamond drill holes were drilled in 1966. Since that time a total of some 249 holes have been drilled throughout the property.

Similarly, the development of underground workings, such as a decline, are standard industry practice for accessing mineralization at depth for the purposes exploration drilling. The alternative to this is far more extensive drilling from surface of much deeper, and therefore more costly and less accurate holes. This in turn results in greater surface disturbance associated with creating drill pads and access roads.

Underground development is also standard practice for accessing larger quantities of mineralization for the purposes of acquiring a bulk sample. At Prairie Creek, underground development also commenced in the 1960's. To date underground workings have been developed on three levels over a total of about 5000 m.

There are no viable alternatives to the practice of exploration diamond drilling of the type proposed for the purpose of establishing, confirming and enhancing the known mineral resource at the Prairie Creek property, nor for underground development for the purposes of collecting a bulk sample.

While various other geophysical, geochemical and biogeochemical techniques exist for locating mineralized zones on a broader scale and for further enhancing our understanding of geologic processes, none are considered practical alternatives to in-situ diamond drilling and the subsequent assay of recovered drill core. Similarly, while bench-scale metallurgical tests on small quantities of ore may be acceptable for a scoping study level of detail, typically processing of a bulk sample is required to define a feasibility level of confidence in metallurgical processing performance.

Security Exchange Commission rules and regulations, which apply to all public mining companies, set rigorous standards for release of information pertaining to mineral resource and reserve estimates. These typically require strict adherence to quality assurance standards in the drilling, recovery and assaying of drill core and the subsequent interpretation of data by a qualified individual.



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Air Quality and Climate

CZN shall report the impacts on air quality. This will include a discussion of measures considered to minimize the release of air contaminants (such dust, exhaust fumes, pilot plant emissions and other air contaminants).

The majority of the work related to this development will take place underground in the decline. The development and exploration drills, as well as the ventilation fans will be driven by compressed air. Compressed air will be supplied by a diesel powered compressor located at the portal entrance. The compressor diesel engine will 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 produces little in the way of particulate emissions. Water used as a lubricant in the drilling process assists in this regard.

Other potential sources of air contaminants are restricted to hydrocarbon combustion products from gasoline and diesel engines in support vehicles, including the scooptrams, loaders and rock trucks. Again, routine preventive maintenance will be employed to minimize contaminants resulting from inefficient operation of such equipment to minimize fuel consumption and emissions. Road dust from vehicle traffic is expected to be negligible due to low traffic volumes, reduced speeds and roads bedded largely in coarse crushed rock.

The impacts of the proposed development will be additional to similar impacts associated with routine care and maintenance and ongoing exploration activity planned for the property. These will entail operation of the site power generator, vehicle operation and aircraft support. No residual impacts are expected to result from the operation.

In view of the foregoing, the potential for impacts of the proposed development on air quality are expected to be negligible.

Terrain

CZN shall report the impacts on the environment when surficial geology, bedrock or soils are disturbed, or used for construction purposes.

The proposed decline development and underground exploration drilling program will entail minimal disturbance or use of surficial materials, as the majority of the activity will take place underground.



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The proposed portal location is accessible by existing exploration tote roads which will minimize disturbance relating to the establishment of roads. Waste rock generated from decline development will be stored within the existing plantsite area. All activity will take place within the area of traditional mining activity and within 1000 m of the existing mill and associated facilities. New surface disturbance will be restricted to the immediate area of the portal, an area of about 500 m².

Surficial materials will be stripped and stockpiled adjacent to the portal area. As the decline is expected to be re-used in future drilling programs, the portal area will not be fully reclaimed until it is determined it is no longer required. When final reclamation is completed, cut banks will be re-contoured and stabilized, and stockpile surficial materials will be back bladed over the disturbed area.

The minor surficial terrain impacts associated with the proposed undertaking will be additional to those which have already occurred in conjunction with previous exploration, construction and development at the site. Residual impacts are expected to be minor as the associated disturbed area is relatively small and will be re-contoured and stabilized following completion of use.

In view of the foregoing, the potential for impacts of the proposed development on the environment resulting from disturbance or use of surficial geology, bedrock or soils is expected to be negligible.

Vegetation and Plant Communities

CZN shall report the impacts on local plant communities, highlighting rare or highly valued species, and long-term, direct and indirect, habitat loss or alteration.

As stated above, minimal clearing will be required in order to carry out the proposed decline development and underground exploration drilling program. The area of the proposed program is 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 will take place within the area of traditional mining activity and within 1000 m of the existing mill and associated facilities.

No rare or highly valued species have been identified from past studies of vegetation and plant communities in the area. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) does not list any plant species as endangered, threatened or of special concern in the area of the Prairie Creek Mine.

In view of the foregoing, the potential for impacts of the proposed development on local plant communities resulting in habitat loss or alteration is expected to be negligible.



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Water Quality and Quantity

CZN shall report the impacts on the quality and quantity of surface and ground waters. This analysis shall include predictions of the chemical, physical and toxic characteristics of any discharges that may effect the immediate or downstream environment as well as predictions on water usage and discharge quantities.

The proposed portal will be developed at the 905m elevation on the northwest side of the Harrison Creek valley approximately 860m upstream of its confluence with Prairie Creek. Harrison Creek is a small tributary of Prairie Creek with a catchment area of about 7.5 km² as compared to the catchment area of Prairie Creek above the minesite at 495 km². The average annual flow of Harrison Creek has been estimated at 3.6 cfs as compared to Prairie Creek at 204 cfs, a ratio of about 1:50. Harrison Creek commonly dries during the low flow late summer season and flows subterranean.

The underground workings will likely require dewatering during decline development and exploration drilling depending upon the extent and nature of watercourses intersected. Based on experience to date the sedimentary dolostone formation in which the decline will be driven entirely within is relatively water-tight. Little water is expected to be encountered until the vein is intersected at the far end of the decline near the 825m elevation, 80m below the portal elevation.

Dewatering of the workings will be accomplished through the use of sumps and pumps located underground. A final sump will be developed near the mouth of the portal to act as a finishing settling pond for mine water prior to release to Harrison Creek. Quality of the water to be pumped from the underground workings is expected to be typical of the local groundwater regime which is hydraulically connected with the Prairie Creek Aquifer.

Following completion of the exploration program, all equipment will be removed, dewatering will be discontinued and the workings will be allowed to flood to the natural groundwater level. The portal entrance will be secured as required.

Of the three existing adits, both the 930m and 970m levels are relatively dry. Only the 870m level produces minewater in any appreciable quantities. While there is no flow from the approximate 800 linear metres of workings on the 870m level in the winter, estimates of flow in the summer have ranged from 0.1 m³/min in September to 0.5 m³/min in June. These flows are indicative of quantities of water which might be expected to be encountered in the decline development.



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No artesian conditions have been encountered in any of the mineral exploration holes drilled on the property to date. Given the nature of the dolostone formation and since the development is a decline with 80-90 m of head, the mine water is expected settle out below the level of the portal at the 905m elevation, which would result in no discharge of water from the portal. The quality of water remaining in the underground workings is expected to be typical of the local groundwater regime which connects naturally with the Prairie Creek aquifer

The decline development and underground exploration program will result in only very minor emissions or discharges to air, land or water which will then have the capability of being transported to surface waters. Discharges which will occur will be of a short term nature and relatively small in terms of quantity.

The mineral resources at Prairie Creek are hosted in carbonate rocks. The decline will be driven entirely within the sedimentary dolostone formation and will produce approximately 5200 m³ of rock, which will be trucked and stockpiled within the existing plantsite area, either adjacent to the existing ore stockpile or in the storage yard along the toe of the tailings impoundment dam. All runoff from the plantsite area is collected in the existing catchment pond prior to release to Harrison Creek.

The Upper Spar and Chert/Dolostone rock units from which the rock will originate have been tested and determined to have low sulphide values and high excess neutralization potential, and will therefore pose no hazard to the environment through runoff associated with sulphide oxidation processes.

In view of the foregoing, the potential for impacts of the proposed development on surface and groundwater quality and quantity is expected to be negligible.

Aquatic Resources and Habitat

CZN shall report the impacts on aquatic organisms and their habitat, taking into account predicted water quality and quantity impacts.

Fisheries studies by Beak consultants in 1980-81 and Rescan in 1994 identified limited fisheries habitat potential in Harrison Creek, with steep gradients restricting fish movement upstream of the mouth. As well, Harrison Creek commonly dries during the low flow late summer season and flows subterranean, and 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.



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Fish utilization of Prairie Creek appears to be confined largely to the headwaters and the mouth. The headwaters appear to be utilized by Dolly Varden (or Bull Trout) and Rocky Mountain Whitefish. Arctic Grayling do not appear to move upstream in Prairie Creek beyond the lowest reaches near the mouth. Use of Prairie Creek in the vicinity of 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.

In view of the foregoing, and since, as stated in the two preceding sections, impacts to water quality and quantity are expected to be negligible, so the potential for impacts of the proposed development on fisheries or other aquatic resources are also expected to be negligible.

Wildlife and Wildlife Habitat

CZN shall report on the impacts (both direct and indirect) on wildlife and wildlife habitats, including migratory birds. Special consideration shall be given to species listed as vulnerable or endangered on the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) list. This analysis shall include a discussion of habitat fragmentation resulting from the developments and associated impacts.

The development will take place within 1000m of the existing mill and campsite facilities and within the area of traditional mining activity at Prairie Creek. Previous activity has been undertaken over much of the surrounding area and the proposed development will occupy only a small area adjacent to an existing exploration tote road. The majority of the development work will occur underground. The only new disturbance on surface will be restricted to the immediate area of the portal, an area of approximately 500 m². The waste rock storage will be located on previously developed ground in the plantsite area adjacent to the existing coarse ore stockpile or near the toe of the impoundment dam. Waste rock storage will likely cover an area approximately 50m by 20m.

The principal wildlife species in the vicinity of the minesite are Dall Sheep. Varying numbers, including rams, ewes and lambs frequent the airstrip, mill and campsite areas. Dall Sheep are generally observed daily in these areas by site personnel in the course of carrying out their duties. These groups have been routinely observed to be unperturbed by ongoing site activity, showing little avoidance behavior in response to aircraft landing or taking off, vehicle traffic or other human activity typically being conducted on a day to day basis around the minesite.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) lists only two species in the area of the Prairie Creek Mine. These are the Grizzly Bear (*Ursus arctos*) and the Wolverine (*Gulo gulo*), both of which are listed in the Special Concern category.



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In areas removed from the minesite COSEWIC lists the Anatum Peregrin Falcon (*Falco peregrinus anatum*), the Woodland Caribou Boreal population (*Rangifer tarandus caribou*) and the Wood Bison (*Bison bison athabasca*) all of which are considered Threatened.

Field studies of wildlife populations and wildlife habitat in the area of the Prairie Creek Mine and the access road were conducted by Beak Consultants in 1980-81 and again by Rescan in 1994. The studies identified no critical habitats in the area of the minesite.

Grizzly bears have been infrequently encountered in the surrounding area of the mine. No denning areas have been identified in the immediate area of the minesite, including the area of the proposed development. Care is taken in the handling and disposal of refuse, with all kitchen and food wastes incinerated prior to disposal, in order to avoid attracting bears or other animals to the campsite. No incidents relating to problem bears in the camp have occurred in recent years as a result of these precautions.

Wolverine have been observed in the area surrounding the Prairie Creek mine on only a very few rare occasions over the past 20 years. As a result, the proposed development is expected to have negligible impact on wolverine populations.

Previous wildlife studies have identified potential caribou habitat and caribou populations in areas well removed from the minesite to the north and east in the Mackenzie mountains. As the minesite area itself is not classified as prime caribou habitat and caribou are only rarely observed in and around the minesite, no impact is expected on caribou populations.

Previous wildlife field studies have specifically targeted potential Peregrine falcon nesting habitat. However, none have been identified in the area of the minesite. As a result, no impacts are expected on Peregrine falcon populations. Similarly, no impacts are expected on migratory bird populations as limited usage of the minesite area by such populations has been identified.

Wood bison populations are located 90 km or so to the south and east of the minesite in the vicinity of Nahanni Butte, and will not be impacted by the proposed development.

In view of the foregoing and given the short term and localized nature of the proposed development, as well as the fact that the decline development and underground exploration program will be conducted mostly underground, the potential for impacts on wildlife and wildlife habitat are expected to be negligible.



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Cultural and Heritage Resources

CZN shall report the impacts on cultural and heritage resources.

An archaeological database search was conducted on August 18, 2000 through the Canadian Museum of Civilization in support of Land Use Permit Application MV2000C0030 submitted by Canadian Zinc.

The database search area encompassed the entire minesite area, as well as the entire access road corridor from the Prairie Creek mine to the Liard River. To accomplish this, the search parameters were defined by geographical coordinates to cover a block extending from 61° 00' to 61° 45' N. latitude and from 122° 45' to 125° 00' W. longitude.

No archaeological sites were identified within the minesite area proposed for use under this Land Use application. The closest identified sites are south of the South Nahanni River near the mouth of the Meilleur River, 35-40 km south of the minesite.

All areas proposed for use in this application are within 1000 metres of the existing facilities and within the area of traditional mining activity.

In view of the foregoing, and given that the decline development and underground exploration program will be conducted largely underground and otherwise principally in previously developed areas, the potential for impacts of the proposed development on cultural and heritage resources are expected to be negligible.

Socio-economics

CZN shall report the impacts on the economy, having regard to direct, indirect and induced impacts on income and employment.

The proposed development is part of the process of establishing, confirming and enhancing the known mineral resource at the Prairie Creek property, which has been ongoing since mineralization was first discovered in 1928.

The main objective of the current program is to further delineate the area of known mineralization in order to upgrade these mineral resources to mineral reserve status. This information, in combination with additional work planned for 2001/2002, such as a further surface mineral exploration program, and operation of an on-site pilot plant, will form the basis for a bankable feasibility study originally scheduled for completion in the last quarter of 2001. With a bankable feasibility study demonstrating a positive return on investment, CZN believes it will be able to attract the necessary financing to support re-development of mine operations leading to production by 2003, subject to receipt of the necessary operating permits and licences.



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In the short term, the proposed development will create positive economic impacts for local communities in terms of employment opportunities and contracted support and supply services. CZN employed two local residents of Nahanni Butte for the majority of the 2000 summer season. Similar opportunities are anticipated in 2001/2002 in support of this and other planned programs. The proposed development is expected to employ about 15 persons, including 1 Project Superintendent, 1 Shift Boss, 1 Surveyor, 1 Lead Mechanic, 3 Shift Mechanics, 1 Electrician, 1 Surface Operator/Labourer and 6 Miners. It will also provide an opportunity to initiate pre-operational training and mining orientation programs for local residents in preparation for full-scale operations.

Fixed wing aircraft and helicopter support will provide opportunities for charter companies in Fort Simpson and Fort Liard. Consumables will also be sourced from local suppliers and flown into site. Project management will necessitate travel for head office and other personnel, resulting in positive economic impacts for commercial airlines servicing Yellowknife and Fort Simpson, as well as hotels and restaurants in Yellowknife, Fort Simpson and other local communities.

In the long term, the proposed development is necessary to support plans for mine re-development. Positive economic impacts of future mining operations to local communities, the Northwest Territories and Canada are substantial and have been estimated as follows.

The mine will employ up to 170 persons directly at the minesite plus an additional 60 under various contracts for at least 18 years based on the current mineral resource. Using a standard multiplier of 2:1 this would be predicted to create another 460 jobs elsewhere in the NWT and Canada.

Annual payroll, including benefits, will be in the order of \$14.3 million. Payments to government, including corporate income tax, employee income tax and royalty payments are estimated at \$15.4 million. Third party contracts for catering, air transport, incoming freight and outgoing concentrate total an estimated \$10.5 million. Mill supplies and general consumables, including fuel, total \$8 million annually. Road construction and annual operating costs, including the Liard ferry crossing, total \$17 million and \$1 million respectively. The capital cost of the ferry and approaches is an additional \$1 million.

The existing resource has been established over only about 2.1 km of a mineralized strike length of 16 km, suggesting the potential to define additional mineral resources and extend the mine life, and economic benefits associated therewith, well beyond current projections is excellent. As well, much thicker stratabound mineralization discovered in 1992 to be underlying the known vein mineralization is currently underexplored and holds the potential to significantly increase the mineral resource of the property, thereby extending the projected mine life.



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The Prairie Creek Mine is located on land claimed by the Nahanni Butte Dene Band of the Deh Cho First Nations (DCFN) as their traditional territory. The DCFN are engaged in ongoing negotiations with the Government of Canada and the Government of the Northwest Territories in what is referred to as the Deh Cho Process. The negotiations are currently at the Interim Measures and Agreement In Principle stage. The outcome of the negotiations is expected to be a Final Agreement that will provide, amongst other things, for the implementation of a Deh Cho form of government to oversee the delivery of programs and services to residents within the DCFN territory. It is expected that the negotiations will take some five to seven years to complete.

In 1996, the Company and the Nahanni Butte Dene Band successfully negotiated and executed the Prairie Creek Development Cooperation Agreement. The overall intent of the Agreement was to establish and maintain a positive and cooperative working relationship between the Company and Nahanni in respect of the further development and operation of the mine, while at the same time supporting an economically viable and environmentally sound operation and maximizing economic opportunity and benefits to Nahanni and other Deh Cho First Nations. This Agreement foresaw the many benefits which could accrue to the Nahanni Butte Dene Band and the DCFN in conjunction with development of the road and mine, and made provision for maximizing opportunities to realize these benefits. To this end, the Agreement provides employment and contracting opportunities as well as equity participation for the Nahanni Butte and the DCFN. The negotiation of this Agreement by Nahanni Butte was supported by the DCFN by Tribal Council Resolution and the final agreement itself was endorsed by Nahanni Butte Band Council Resolution.

In the Agreement, Nahanni proclaimed its support for the mine and the establishment of the access road in recognition of the significant benefits to Nahanni and the DCFN communities as a whole, and undertook to assist the Company in procuring permits, approvals and licences necessary to bring the mine into production, as well as grants, guarantees or other financial assistance from Government towards the establishment of the access road.

Some specific considerations as set out in the Agreement pertaining to economic opportunities relating thereto are as follows:

- Nahanni shall enjoy preferential access to economic opportunities including open book negotiated contracts
- CZN shall have a minimum target of 20% employees from DCFN communities
- CZN shall require non-First Nation contractors to have a target of not less than 20% employees from DCFN communities
- Nahanni will receive a 5% equity interest of profits before taxation, but after recovery of prior capital and development costs



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- Nahanni will be granted an option to purchase either a 10% or 15% working interest in the Project for \$6 or \$9 million, inflation adjusted on completion of a Feasibility Study, but before construction
- Following the commencement of commercial production, Nahanni and the Project will fund equally between them:
 - The establishment of The Prairie Creek Education Centre in Nahanni Butte at a cost of up to a maximum of \$150,000 and the annual operating costs up to a maximum of \$50,000. This centre will focus on adult literacy programs and special needs education for children; and
 - A Scholarship Trust Fund of \$20,000 per annum initially, increasing to \$30,000 per annum following the payback of all capital costs.
- Upon commencement of construction of the Access, the Project will contribute \$25,000 per annum to a Trust Fund to provide compensation to traditional harvesters who are negatively affected by the Project and the Access.

CZN is committed to continuing to work closely with the Nahanni Butte Dene Band and the DCFN to fulfill the provisions of the Development Cooperation Agreement and ensure that First Nations communities in the area have ongoing input into the re-development plans for the mine.

Land and Resource Use

CZN shall report the impacts on the use of land, water and renewable resources, including:

- *Traditional land use and occupation;*
- *Existing land use and occupation;*
- *Hunting, trapping, and outfitting;*
- *Recreational, commercial and sport fishing;*
- *Availability, abundance and quality of wildlife, fishing, gathering, recreational;*
- *Commercial land and water-based areas; and*
- *Protected areas.*

All areas proposed for use in this application are within 1000 metres of the existing facilities and within the area of traditional mining activity at Prairie Creek. The decline development and underground exploration program will be conducted largely underground and otherwise principally in previously developed areas. No uses, other than mining, have been made of the land or resources in this area in recent history.

The Prairie Creek mine is located 90 km from the nearest settled community of Nahanni Butte. There is no road access into the property other than the old winter road alignment which dates back to 1982. Access is by air only, to a private airstrip controlled by the Company. There are no other existing land occupations nor commercial land or water based activities in the vicinity of the mine. Similarly, no observed traditional use or trapping activity has been observed in the minesite area in recent history.



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South Nahanni Outfitters hold the outfitting licence for the area. Hunting activity generally takes place in the fall in areas well removed from the mine and should not be impacted by the proposed development.

The Prairie Creek mine is located adjacent to Prairie Creek, 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 prior to reaching its confluence with Prairie Creek, of which 235 km are within the Park Reserve.

The watershed of the South Nahanni River is 37,000 km², of which 4,766 km² are contained within the Nahanni National Park Reserve. By comparison, the watershed of Prairie Creek above the minesite is 495 km². In accordance with the relative sizes of their respective watersheds, water flow in the South Nahanni averages 75 times that of Prairie Creek and ranges from 50 to 180 times as much.

The Nahanni National Park Reserve was created in 1972, following a canoe trip down the river by Pierre Elliot Trudeau, specifically for the purpose of setting aside the South Nahanni River for wilderness recreational purposes. Exploration activity at Prairie Creek had been ongoing for many years and underground development was well advanced at this point in time.

The South Nahanni River, regularly used for canoeing trips during the summer months, represents the nearest water use downstream of the Prairie Creek mine. Wilderness river tours are supported by a number of outfitting companies from as far away as Ontario. Parks Canada reports that there were 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. As the proposed development is not expected to affect water quantity or quality at the minesite, it is similarly not expected to impact on water quality or quantity within the Park Reserve or on these downstream users.



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In 1996, the Company 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 on behalf of its membership "does fully ratify and endorse the Prairie Creek Development Cooperation Agreement" in which the Nahanni Butte Dene Band proclaimed its support for the Prairie Creek mine and the establishment of an all weather access road to the mine in recognition of the significant benefits to Nahanni Butte and the DCFN communities as a whole.

More recently, the Deh Cho First Nations have put forward a proposal at the Treaty 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 would remain in effect until superceded by the provisions of the Deh Cho Final Agreement.

The Nahanni Butte Dene Band issued a Band Council Resolution on May 18, 2000 in support of protecting the South Nahanni watershed, stating that "the Nahanni National Park Reserve was created without the consent or participation of the Deh Cho First Nations" and that the "Final Agreement should provide for the recognition of Deh Cho First Nations jurisdiction over the entire Nahanni watershed, including the Park or Park Reserve." On January 1, 2001 the Nahanni Butte Dene Band issued another Band Council Resolution rescinding its support of the Protected Areas Strategy for the Nahanni National Park Reserve Watershed.

As the Prairie Creek Development Cooperation Agreement provides for a positive and cooperative working relationship between the Company, Nahanni and the Deh Cho First Nations in respect of developing and operating an environmentally sound operation at Prairie Creek, which will not have significant adverse environmental effects on the ecological integrity of the South Nahanni River or the Nahanni National Park Reserve, the separate goals of the local communities in achieving economic self-sufficiency and protecting the environment seem justifiably quite compatible.

In view of the foregoing, the potential for impacts of the proposed development on the use of land, water and renewable resources is expected to be negligible.

Noise

CZN shall report the impacts on the environment resulting from changes to ambient noise levels, including both continuous and acute exposure.

The principal sources of noise associated with carrying out the decline development and underground mineral exploration drilling program relate to the operation of the drills, blasting, scooptrams and diesel compressors which supply compressed air to power the drill rigs, ventilation fans etc.

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Most of these activities will take place largely underground, except for initial development of the portal. Surface related activities will be restricted to operation of the scooptrams, surface equipment and compressors. Routine maintenance will be employed to ensure the engines are running efficiently.

Noise from the development will generally be localized and in most cases restricted to underground. No residual impacts are expected relating to ambient or acute noise levels associated with the proposed development.

In view of the foregoing, the potential for impacts of the proposed development associated with ambient noise levels is expected to be negligible.

Visual and Aesthetic Resources

CZN shall report the impacts on visual and aesthetic resources.

The proposed development will be very localized and take place within the area of traditional mining activity and within 1000 metres of the existing minesite facilities and will therefore not stand out in contrast to undisturbed terrain. Most of the activity will take place underground and residual impacts will be restricted to minor alterations in topography in the immediate vicinity of the portal and to waste rock storage in the plantsite area. The Prairie Creek minesite is very remote and not generally visible except by low flying aircraft operating in and around the Prairie Creek valley.

In view of the foregoing, the potential for impacts of the proposed development on visual and aesthetic resources is expected to be negligible.

Cumulative Impacts

CZN shall provide a cumulative impacts assessment. This should include, but not be limited to:

- *An identification of cumulative impacts as well as a determination of significance;*
- *Methods used for the cumulative impacts assessment;*
- *Time and spatial boundaries and supporting rationale;*
- *Location and timing of all projects included in the assessment;*

- *Discussing and attempting to quantify the potential cumulative impacts, including a determination of significance;*
- *Discussing uncertainties in the assessment; and*
- *Identifying mitigation measures that will be applied.*

CZN is reminded that socio-economic impacts as well as environmental impacts are to be included in the cumulative impacts assessment.

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The following cumulative impacts assessment (environmental and socioeconomic) has been adapted by CZN for the Decline Development and Underground Exploration Program from the previous assessment completed by EBA Engineering Consultants Ltd. for the Phase II mineral exploration program at the Prairie Creek Mine property submitted to the MVEIRB June 7, 2001.

Methodology

The assessment of potential cumulative impacts was conducted in general conformance with the Interim Guide for Addressing Cumulative Environmental Effects in Environmental Assessments Under the Mackenzie Valley Resource Management Act (September, 2000). The assessment includes:

- definition of cumulative impacts;
- scoping of the assessment;
- analysis of the impacts;
- identification and incorporation of mitigation;
- significance determination; and
- follow-up.

Definition of cumulative impacts

Part 5, Section 117 (2) of the Mackenzie Valley Resource Management Act (MVRMA) specifies that:

Every environmental assessment and environmental impact review of a proposal for a development shall include a consideration of:

- a) the impact of the development on the environment, including the impact of malfunctions of 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; and*
- b) the significance of any such impacts.*

Canadian Zinc's approach to assessing possible cumulative impacts employed the following basic premises:

- There must be an environmental, biophysical, social or cultural impact related to the proposed Decline Development and Underground Exploration Program.
- The impact must be demonstrated to operate cumulatively, additively or synergistically, either within the context of Canadian Zinc's development activity at the Prairie Creek mine, or with impacts from other projects or activities.



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- The other projects or activities considered exist or are likely to be carried out and are not hypothetical.

Scoping the assessment

Selection of Components for Assessment

The foregoing sections of the EA Report for the Underground Decline Program have provided information on the existing environment and assessed the potential for impacts of the proposed program on the environmental, socioeconomic and cultural resources of the development area. The components considered included:

- Air Quality, Noise and Climate;
- Terrain;
- Vegetation and Plant Communities;
- Water Quality and Quantity;
- Aquatic Habitat;
- Wildlife and Wildlife Habitat;
- Land and Resources Use;
- Visual and Aesthetic Resources;
- Cultural and Heritage Resources; and
- Economy.

As reported, the proposed program is to be carried out within 1000 m of the existing minesite facilities, within the area of traditional mining activity at Prairie Creek and within the boundaries of Mining Lease 2932 and Surface Lease 95F10/10-5-3.

The impact assessment predicts that the anticipated residual impacts of the program on all of the biophysical resources, cultural and heritage resources, visual and aesthetic resources and land and resources use were expected to be negligible.

These results are consistent with the short-term, highly localized nature of the proposed program and the fact that all of the activities would occur within the footprint of existing mining activity at the Prairie Creek Mine.

Based on these predictions alone, there is theoretically little basis for proceeding further with a conventional cumulative impact assessment. Nevertheless, recognizing the direction given by the Review Board, and concerns raised by certain stakeholders related to potential cumulative effects on regional water quality, vegetation/wildlife habitat loss and socioeconomic matters, these issues will be examined further in the following assessment.

*Time and Spatial Boundaries**Time*

Exploration activities in the Prairie Creek area date back to 1928 when mineralization was first discovered. Exploration continued at various times throughout the years to present, and in 1981 a complete mine was constructed and permitted. However, the mine did not achieve commercial production, was closed, and has remained in a "moth-balled" state. At this time, it is anticipated that the proposed Decline Development and Underground Exploration Program will be completed over the next two summer seasons. Residual impacts extending beyond this timeframe will be limited to those associated with physical alterations of terrain as a result of the development of the portal and storage of waste rock within the disturbance footprint of previous mining activity.

In the longer term, assuming that the mine is restarted, the projected mine life will be at least 18 years, based on the current mineral resources. Progressive reclamation will be practiced throughout this timeframe, and it is assumed that surface disturbance will have been reclaimed within this timeframe. Thus, the cumulative effects assessment covers all activities that have taken place at Prairie Creek from the late 1920s to the year 2020.

Space

The spatial boundaries for the assessment will differ for each of the two biophysical components being examined. The spatial boundaries for the water quality assessment will begin with consideration of Harrison Creek, with a catchment area of about 7.5 km². The assessment will subsequently examine possible water quality implications for downstream Prairie Creek, with a catchment area above the minesite of 495 km² and the much larger South Nahanni River watershed which encompasses 37,000 km².

The spatial boundaries for the vegetation/wildlife habitat component of the assessment includes the local mine and exploration footprint area and, for more regional purposes, the 30,819 ha (308 km²) of the Spruce/Lichen vegetation zone in the Prairie Creek watershed within which the footprint of mining activities at Prairie Creek is found.

For socioeconomic assessment purposes the local region is represented by the boundaries of the Deh Cho First Nation Territory. Economic impacts will be projected as appropriate to include the Northwest Territories and Canada.

Other Projects Considered

For the purposes of this cumulative effects assessment, other projects considered in the analysis include recognized mining activities that have or may take place within the southern Nahanni Watershed, and the Nahanni National Park Reserve. The mining activities considered are the CanTung tungsten mine and the Howard's Pass zinc project. Brief Descriptions of these activities follow.



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CanTung Tungsten Mine

The CanTung mine, operated by North American Tungsten Corporation, is situated in the Mackenzie Mountains about 190 km in a straight line west-northwest of the Prairie Creek Mine. The CanTung property drains into the Flat River, a major tributary of the South Nahanni River. It flows into the South Nahanni within the limits of Nahanni National Park Reserve, approximately 100 km upstream of where Prairie Creek enters the river.

Exploration activities and mining at CanTung have taken place since the early 1960's. Mining began in 1962 but the mine was closed down in 1986 due to poor economic conditions, and the property has been on care and maintenance since then. Currently, as a result of dramatically improved economics, North American Tungsten is planning to restart the mine and initiate production by the end of 2001. The mine has a projected mine-life of 3 years and will operate under an existing water licence regulated by the Mackenzie Valley Land and Water Board.

Howards Pass Project

The Howards Pass zinc prospect is located in the Yukon portion of the Mackenzie Mountains near the upper end of the South Nahanni River Watershed, about 250 kilometres northeast of the Prairie Creek property.

Howards Pass is currently owned by Copper Ridge Explorations Inc., was first discovered in 1972 and was actively explored through to 1981. More recently in 2000, an eight hole core drilling program was completed by Copper Ridge. The Howards Pass project is estimated to have a calculated resource of 110 million tonnes grading 7.7% combined zinc plus lead, much of which is believed to be amenable to open pit mining. However, considerably more drilling will be required outside of the high grade core of the main deposit to upgrade the resource to a mineable reserve and to permit development plans to proceed.

Nahanni National Park Reserve

Nahanni National Park Reserve comprises 4,766 km² and encompasses 300 km of the South Nahanni River Valley. The Prairie Creek mine is located outside the Park Reserve boundary adjacent to Prairie Creek, a tributary of the South Nahanni River, around which the Nahanni National Park Reserve was created. The mine is located 32 km upstream of the point where Prairie Creek crosses into the Park Reserve and 48 km from the confluence of Prairie Creek and the South Nahanni River. At its closest point, the mine is 14 km from the nearest Park Reserve boundary, but separated from the Park Reserve by a range of mountains rising up to peaks of 1,750 m in height. The lowest pass through these mountains is about 1,340 m, about 365 m above the South Nahanni River at "the Gate".



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Nahanni National Park Reserve was set aside as a Park Reserve by Order in Council in 1972 and gazetted as a Park Reserve in 1978. Parks Canada subsequently nominated Nahanni National Park Reserve for inclusion on the World Heritage List under the UNESCO World Heritage Convention and that portion of the South Nahanni within the Park Reserve for designation as a Canadian Heritage River under the Canadian Heritage Rivers System. The former was achieved in 1978 and the latter in 1987. Parks Canada is proposing expansion of the Park Reserve into 3 new areas totaling an additional 4,175 km², which would bring the total area of the Park Reserve to 8,925 km².

The Park Reserve has proven itself to be a popular destination as a wilderness river canoeing and kayaking experience. In 1999-2000, 7,281 person-visits were recorded in the Park Reserve. Wilderness adventure trips generally range from 7 – 21 days and cost in the order of \$3,000-5,000. Several wilderness tour companies based in Ontario, Yellowknife and Whitehorse operate in the area.

ANALYSIS OF POTENTIAL CUMULATIVE IMPACTS

The scoping portion of the cumulative impact assessment identified two biophysical components (water quality, vegetation/wildlife habitat) and one socioeconomic component (economy) that warranted more thorough analysis. The following presents the cumulative impact assessment for each of these three issues.

Water Quality

The proposed program will be carried out on the northwest side of the Harrison Creek valley approximately 860m upstream of its confluence with Prairie Creek. Harrison Creek is a small tributary of Prairie Creek with a catchment area of about 7.5 km² as compared to the catchment area of Prairie Creek above the minesite at 495 km². The average annual flow of Harrison Creek has been estimated at 3.6 cfs as compared to Prairie Creek at 204 cfs, a ratio of about 1:50. Harrison Creek commonly dries during the low flow late summer season and flows subterranean.

The underground workings will likely require dewatering during decline development and exploration drilling depending upon the extent and nature of watercourses intersected. Based on experience to date the sedimentary dolostone formation in which the decline will be driven entirely within is relatively water-tight. Little water is expected to be encountered until the vein is intersected at the far end of the decline near the 825m elevation, 80m below the portal elevation.



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Dewatering of the workings will be accomplished through the use of sumps and pumps located underground. A final sump will be developed near the mouth of the portal to act as a finishing settling pond for mine water prior to release to Harrison Creek. Quality of the water to be pumped from the underground workings is expected to be typical of the local groundwater regime which is hydraulically connected with the Prairie Creek Aquifer. Provision is available to pump mine water to the existing tailings pond in the event of any water quality concerns.

Following completion of the exploration program, all equipment will be removed, dewatering will be discontinued and the workings will be allowed to flood to the natural groundwater level. The portal entrance will be secured as required.

Of the three existing adits, both the 930m and 970m levels are relatively dry. Only the 870m level produces minewater in any appreciable quantities. While there is no flow from the approximate 800 linear metres of workings on the 870m level in the winter, estimates of flow in the summer have ranged from 0.1 m³/min in September to 0.5 m³/min in June. These flows are indicative of quantities of water which might be expected to be encountered in the decline development.

No artesian conditions have been encountered in any of the mineral exploration holes drilled on the property to date. Given the nature of the dolostone formation and since the development is a decline with 80-90 m of head, the mine water is expected to settle out below the level of the portal at the 905m elevation, which would result in no discharge of water from the portal. The quality of water remaining in the underground workings is expected to be typical of the local groundwater regime which connects naturally with the Prairie Creek aquifer.

The mineral resources at Prairie Creek are hosted in carbonate rocks. The decline will be driven entirely within the sedimentary dolostone formation and will produce approximately 5200 m³ of rock, which will be trucked and stockpiled within the existing plantsite area, either adjacent to the existing ore stockpile or in the storage yard along the toe of the tailings impoundment dam.

The Upper Spar and Chert/Dolostone rock units from which the rock will originate have been tested and determined to have low sulphide values and high excess neutralization potential, and will therefore pose no hazard to the environment through runoff associated with sulphide oxidation processes.

On the basis of the foregoing, and given the relatively short duration and magnitude of the potential discharges, minimal impact on the water quality or quality of either surface water or groundwater is expected to result from carrying out the decline development and underground exploration drilling program.



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In the future, when the mine is reactivated, all water discharges to Prairie Creek will be regulated through a Class A Water Licence administered by the Mackenzie Valley Land and Water Board. The Licence is expected to include discharge and monitoring conditions intended to ensure that downstream water quality remains unimpaired to protect the aquatic resources of Prairie Creek and the South Nahanni River. On this basis, negligible impacts on the water quality of Prairie Creek, the South Nahanni River or the Nahanni National Park Reserve are predicted to occur.

Within the South Nahanni watershed, the most significant current development other than the Prairie Creek mine is the CanTung tungsten mine at Tungsten, N.W.T. The CanTung property is located about 190 km in a straight line west-northwest of the Prairie Creek mine. The minesite facilities are located adjacent to and on the floodplain of the Flat River, a major tributary of the South Nahanni River. CanTung operated over 24 years from 1962 to 1986, prior to being put on care and maintenance due to a fall in world tungsten prices. As a result of improved economic conditions, the CanTung Mine is currently preparing to resume production at the site around December 2001.

During the extended care and maintenance period, the Class A Water Licence has been kept current and the associated Surveillance Network Program has been carried out. The data collected since 1986 have continued to demonstrate that high standards of water quality have been maintained in the Flat River.

No specific water quality data were reviewed for streams in the vicinity of the Howards Pass zinc prospect. However, an intensive Environmental Water Quality Monitoring and Assessment Program of the South Nahanni River Basin has been undertaken by Environment Canada in association with Parks Canada since 1988. The results of this program have been 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). Both of these 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 for that matter the Prairie Creek Mine, and concluded that the waters of the South Nahanni River remain pristine.

Based on the foregoing analysis the 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, are expected to remain very low.



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Vegetation and Wildlife Habitat

The proposed program will entail minimal disturbance or use of terrain or surficial materials and thus associated vegetation and wildlife habitat.

The proposed portal location is in close proximity to existing exploration tote roads which will minimize disturbance relating to the establishment of new road access. The portal area itself will only result in the disturbance of about 500 m².

Where clearing is required in conjunction with portal development, surface vegetation will be cleared and surficial materials will be stripped and stockpiled adjacent to the area. When use of the decline is complete, cut banks will be re-contoured and stabilized, and stockpile surficial materials will be back bladed over the disturbed area. As the decline is expected to be re-used in the future, it will not be fully reclaimed until it is determined to be no longer required.

Detailed vegetation analysis and wildlife habitat assessments were conducted by Beak Consultants in 1981 in conjunction with a comprehensive program of baseline studies in support of operational permitting activity at that time. The mine development and construction of the minesite facilities were approved, and the mine fully permitted for operations in 1982, following a comprehensive environmental assessment and public review before the Northwest Territories Water Board.

The study area for the vegetation and wildlife studies covered 209,000 ha including the minesite and surrounding area, and the majority of the Prairie Creek watershed, as well as a 160 km long by 10 km wide corridor covering the access road alignment from the minesite to the Liard River. The results of this work were reported by Beak in their report entitled *Prairie Creek Project: Vegetation and Wildlife Studies January to July, 1981*.

The Prairie Creek minesite, including the area of the proposed decline development and underground exploration program was determined to be located within the Spruce/Lichen vegetation map unit of the Mackenzie Mountains. The Spruce/Lichen zone was estimated by Beak to cover approximately 30,819 ha (308 km²) of the study area, largely within the boundaries of the Prairie Creek watershed.

A breakdown of historical disturbance around the Prairie Creek property, within the Prairie Creek watershed and largely within the Spruce/Lichen zone, as a result of exploration and development over the last 40 years is estimated as follows:



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• Plantsite	10 ha
• Tailings impoundment	10 ha
• Airstrip	7 ha
• Exploration roads and drill pads	6 ha
• Access road (0 – 17 km)	8.5 ha
• Miscellaneous	2.5 ha
• Total	44 ha

Total disturbance to date therefore represents a physical disturbance of approximately 0.14% of the area of the Spruce/Lichen zone within the Prairie Creek watershed, resulting in available habitat reduction from 30,819 ha to 30,775 ha.

The portal development would result in the disturbance of approximately 500 m², representing approximately 0.00015% of the area of the Spruce/Lichen vegetation zone. The also planned Phase I and Phase II surface exploration programs would result in an additional increase in the disturbed area of 20,100 m² (2.0 ha). The combined programs would result in a total additional disturbance of 0.0068% of the Spruce/Lichen zone, reducing remaining available habitat from 30,775 ha to 30,773 ha. Compared with the original 30,819 ha that existed before mining activity took place in the Prairie Creek area, this would represent a total cumulative disturbance from all historical and currently proposed exploration drilling of 46.1 ha. This represents 0.15% of the original predisturbance area of the Spruce/Lichen zone within the Prairie Creek watershed.

As an underground mine with site infrastructure is currently in place, further disturbance of the Spruce/Lichen zone in the Prairie Creek watershed associated with mine re-development and operations would be expected to be slight relative to disturbance to date. Furthermore, progressive reclamation to be implemented in the future would be expected to reduce the size of the limited disturbance zone which is currently predicted.

The Spruce/Lichen zone in the area of the Prairie Creek mine is classified as fair Dall's sheep range, good caribou winter range and along the bottom of the Prairie Creek valley, fair moose range. Above the valley bottom, the habitat is classified as insignificant moose habitat.

Wildlife observations in the immediate area of the mine site, including the area of the proposed drill program, have identified Dall's sheep as the predominant species utilizing the area. During summer months they typically frequent the mine site area, using the adjacent talus slopes as escape terrain. Caribou and moose have only rarely been observed anywhere in the vicinity of the mine or, for that matter, in the Prairie Creek valley generally.



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Given the very small area of disturbance relative to the available habitat and the observed limited use of the mine site and surrounding area by wildlife species, impacts, including cumulative impacts, associated with the proposed development are predicted to be negligible.

Socioeconomic Considerations

In its directions to Canadian Zinc related to the proposed Decline Development and Underground Exploration Program, the Review Board specifically emphasized that socio-economic impacts, as well as environmental impacts, should be included in the cumulative impact assessment. As a result, the following discussion and analysis is provided.

The proposed Decline Development and Underground Exploration Program is an integral part of the process of establishing, confirming and enhancing the known mineral resource at the Prairie Creek property, which has been ongoing since mineralization was first discovered in 1928.

The main objective of this program is to further delineate the area of known mineralization in order to upgrade these mineral resources to mineral reserve status. This information, in combination with additional work planned for 2001, such as a surface exploration program, and operation of an on-site pilot plant, will form the basis for a bankable feasibility study scheduled for completion in the last quarter of 2001. With a bankable feasibility study demonstrating a positive return on investment, Canadian Zinc believes it will be able to attract the necessary financing to support re-development of mine operations leading to production by 2003, subject to receipt of the necessary operating permits and licences.

In the short term, the proposed program will create positive economic impacts for local communities in terms of employment opportunities and contracted support and supply services. Canadian Zinc employed two local residents of Nahanni Butte for the majority of the 2000 summer season. Similar opportunities are anticipated in 2001 in support of this and other planned programs. The proposed development is expected to employ about 15 persons, including 1 Project Superintendent, 1 Shift Boss, 1 Surveyor, 1 Lead Mechanic, 3 Shift Mechanics, 1 Electrician, 1 Surface Operator/Labourer and 6 Miners. It will also provide an opportunity to initiate pre-operational training and mining orientation programs for local residents in preparation for full-scale operations.

Fixed wing aircraft and helicopter support will provide opportunities for charter companies in Fort Simpson and Fort Liard. Consumables will also be sourced from local suppliers and flown into site. Project management will necessitate travel for head office and other personnel, resulting in positive economic impacts for commercial airlines servicing Yellowknife and Fort Simpson, as well as hotels and restaurants in Yellowknife, Fort Simpson and other local communities.



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In the long term, the proposed program is necessary to support plans for mine re-development. Positive economic impacts of future mining operations to local communities, the Northwest Territories and Canada are substantial and have been estimated as follows.

Once operational, the mine will employ up to 170 persons directly at the mine site plus an additional 60 under various contracts for at least 18 years based on the current mineral resource. Using a standard multiplier of 2:1 this would be predicted to create another 460 jobs elsewhere in the NWT and Canada.

Annual payroll, including benefits, will be in the order of \$14.3 million. Payments to government, including corporate income tax, employee income tax and royalty payments are estimated at \$15.4 million. Third party contracts for catering, air transport, incoming freight and outgoing concentrate total an estimated \$10.5 million. Mill supplies and general consumable, including fuel, total \$8 million annually. Road construction and annual operating costs, including the Liard ferry crossing, total \$17 million and \$1 million respectively. The capital cost of the ferry and approaches is an additional \$1 million.

The existing mineral resource has been established over only about 2.1 km of mineralized strike length of 16 km, suggesting the potential to define additional mineral resources and extend the mine life, and economic benefits associated therewith, well beyond current projections is excellent. As well, much thicker stratabound mineralization discovered in 1992 to be underlying the known vein mineralization is currently underexplored and holds the potential to significantly increase the mineral resource of the property, thereby extending the projected mine life.

The Prairie Creek Mine is located on land claimed by the Nahanni Butte Dene Band of the Deh Cho First Nations (DCFN) as their traditional territory. The DCFN are engaged in ongoing negotiations with the Government of Canada and the Government of the Northwest Territories in what is referred to as the Deh Cho Process. The negotiations are currently at the Interim Measures and Agreement In Principle stage. The outcome of the negotiations is expected to be a Final Agreement that will provide, amongst other things, for the implementation of a Deh Cho form of government to oversee the delivery of programs and services to residents within the DCFN territory. It is expected that the negotiations will take some five to seven years to complete.

In 1996, the Company and the Nahanni Butte Dene Band successfully negotiated and executed the Prairie Creek Development Cooperation Agreement. The overall intent of the Agreement was to establish and maintain a positive and cooperative working relationship between the Company and Nahanni in respect of the further development and operation of the mine, while at the same time supporting an economically viable and environmentally sound operation and maximizing economic opportunity and benefits to Nahanni and other Deh Cho First Nations.



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This Agreement foresaw the many benefits which could accrue to the Nahanni Butte Dene Band and the DCFN in conjunction with development of the road and mine, and made provision for maximizing opportunities to realize these benefits. To this end, the Agreement provides employment and contracting opportunities as well as equity participation for the Nahanni Butte and the DCFN. The negotiation of this Agreement by Nahanni Butte was supported by the DCFN by Tribal Council Resolution and the final Agreement itself was endorsed by Nahanni Butte Band Council Resolution.

Some specific considerations as set out in the Agreement pertaining to economic opportunities relating thereto are as follows:

- Nahanni shall enjoy preferential access to economic opportunities including open book negotiated contracts.
- CZN shall have a minimum target of 20% employees from DCFN communities.
- CZN shall require non-First Nation contractors to have a target of not less than 20% employees from DCFN communities.
- Nahanni will receive a 5% equity interest of profits before taxation, but after recovery of prior capital and development costs.
- Nahanni will be granted an option to purchase either a 10% or 15% working interest in the Project for \$6 or \$9 million, inflation adjusted on completion of a Feasibility Study, but before construction.
- Following the commencement of commercial production, Nahanni and the Project will fund equally between them:
- The establishment of The Prairie Creek Education Centre in Nahanni Butte at a cost of up to a maximum of \$150,000 and the annual operating costs up to a maximum of \$50,000. This centre will focus on adult literacy programs and special needs education for children; and
- A Scholarship Trust Fund of \$20,000 per annum initially, increasing to \$30,000 per annum following the payback of all capital costs.
- Upon commencement of construction of the Access, the Project will contribute \$25,000 per annum to a Trust Fund to provide compensation to traditional harvesters who are negatively affected by the Project and the Access.

Canadian Zinc is committed to continuing to work closely with the Nahanni Butte Dene Band and the DCFN to fulfill the provisions of the Development Cooperation Agreement and ensure that First Nations communities in the area have ongoing input into the re-development plans for the mine.

The socioeconomic benefits projected to accrue from the progressive re-development of the Prairie Creek mine are expected to act in an additive and/or cumulative manner in relation to other existing or new developments or activities that may occur within DCFN lands.



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Most directly related to the Prairie Creek mine, these would include the socioeconomic benefits that are expected to be generated as a result of resumed mining at the CanTung tungsten mine and increasing tourism activities in Nahanni National Park Reserve.

North American Tungsten has initiated and is continuing its dialogue with the communities of Nahanni Butte and Ft. Liard, DCFN, GNWT and the Federal government. An important element of these consultations has related to the use of northern-based service companies and people for employment and other opportunities that the CanTung mine may be able to offer beginning as early as the last quarter of 2001.

Similarly, tourism visits to Nahanni National Park Reserve, and the socioeconomic benefits derived from such activities are expected to increase over time. In the year 1999-2000, more than 7,281 people visited the Park Reserve, compared with 4,551 visitors in 1995-96 (Parks Canada Records).

Although no quantitative information is available on the precise nature of the socioeconomic benefits and opportunities that will be generated by these other developments, it is reasonable to assume that the local communities and the Deh Cho Territory are equally well positioned to gain substantial benefits from the combination of other mining developments and Park Reserve-related activities that are expected to take place in the Deh Cho, as they have shown themselves to be with the Prairie Creek Mine, as well as with oil and gas activity in the Fort Liard area. Assuming that participation in these other opportunities is equally effectively managed by the stakeholders, the anticipated cumulative socioeconomic benefits are expected to grow with time.

Uncertainties in the Assessment

The main uncertainty associated with this assessment pertains to the likelihood that any or all of the developments discussed will proceed within the temporal scope of the assessment, and hence the cumulative impact issues that have been evaluated will in fact occur. The re-development of the Prairie Creek mine is contingent on a number of factors including:

- The results of the proposed underground exploration drilling program.
- The results of the related metallurgical pilot plant and surface exploration programs.
- A subsequent bankable feasibility study demonstrating a positive return on investment.
- Availability of future financing to support re-development.
- Continued support from the communities and leadership of the DCFN.
- Acquisition of the necessary regulatory authorization to proceed and operate.



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Similar uncertainties need to be addressed and resolved for other prospective developments in the vicinity, such as the CanTung mine and the Howards Pass mineral prospect, each of which are situated further upstream in the South Nahanni River Watershed. The operation and potential expansion of the Nahanni National Park Reserve is of course always subject to federal budget constraints and the availability of tax dollars to support such initiatives.

Mitigation Measures

The mitigation measures to be employed to prevent or minimize impacts to water quality and vegetation/wildlife habitat were reviewed in earlier sections of this cumulative impact assessment and the EA Report.

In the context of socioeconomic issues management, the Development Cooperation Agreement executed by the Nahanni Butte Dene Band and Canadian Zinc, sets out the various measures and commitments made by both parties to optimize benefits and minimize possible negative effects. Canadian Zinc remains committed to continuing to work closely with the Nahanni Butte Dene Band and the DCFN to fulfill the provisions of this Agreement.

Abandonment and Restoration

CZN shall describe and evaluate the abandonment and restoration methods that will be employed for the proposed developments. This should include a discussion of incremental abandonment and restoration costs resulting from the proposed developments.

The area of the proposed development is within the area of traditional mining activity and adjacent to the existing facilities, including the existing underground workings. As a result, these areas, including the decline itself, are expected to be subject to ongoing activity associated with further exploration and mine development. Accordingly, final reclamation and abandonment of these sites is not proposed at this time.

The proposed program will entail minimal disturbance of surficial materials. The proposed portal location is adjacent to an existing exploration tote road. As a result, no additional disturbance will occur as a result of further road establishment.

Surficial materials will be stripped and stockpiled adjacent to the portal area. Any trees which require clearing will be bucked into 1.5 metre lengths. When the portal is permanently abandoned cut banks will be re-contoured to conform to the local topography and stabilized, and stockpile surficial materials will be back bladed over the disturbed area.

The waste rock storage area will form part of the operational plantsite area and with time will likely be leveled and utilized as a storage laydown area.



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Environmental Management Plan

CZN shall describe their environmental management plan, including monitoring undertaken during the development as well as follow-up monitoring. This submission should include, but not be limited to:

- Objectives;
- Schedule;
- Aspects to be monitored;
- Frequency, duration and geographic extent of monitoring;
- Approaches and methods for analysis; and
- Reporting and response mechanisms for adjusting the project design or implementing mitigation/remedial measures, if necessary, based on monitoring results.

Introduction:

The proposed method of mineral exploration by decline development and underground drilling is typical of the technology used at mineral exploration properties throughout the world. The technique represents standard industry practice and has minimal environmental impacts associated with it when conducted employing standard mitigative measures. Typically in the NWT and elsewhere, these measures form the basis for standard terms and conditions incorporated into mineral exploration permits.

In the previous sections of this EA Report, CZN has described the potential for impacts on the environment as a result of the proposed development and concluded in each case that such impacts would be negligible based on the implementation of standard mitigation measures.

Accordingly, the emphasis of environmental management in relation to decline development and underground exploration drilling at Prairie Creek will be on operational monitoring to ensure the implementation and effectiveness of these mitigation measures, rather than monitoring of environmental effects associated with the development, which have been demonstrated to be minimal where effective mitigation is practiced. For this reason, environmental effects monitoring is not judged to be warranted in support of an underground drilling program, except in the instance of an identified failure of a mitigation measure, such as in the case of a spill, in which case incident specific monitoring would be initiated as appropriate.

Objectives:

The objectives of the Environmental Management Plan are therefore to guide the operational procedures and management practices during and after decline development and drilling activity to ensure the effective implementation environmental mitigation measures



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Environmental performance will be measured based on the degree of adherence to applicable permit conditions and regulations, as well as on use and performance of mitigation measures and general operating practice, including the functioning of equipment and drainage control structures such as sumps.

Performance of mitigation measures will be confirmed through sampling and analysis of waste rock and minewater.

Operating procedures will be planned and scheduled in advance, and reviewed on an ongoing basis, to minimize environmental impacts as well as to comply with all government regulations and permits.

Schedule:

Environmental management considerations will be built in to the operational planning for the drill program and carried through to the completion of the program.

Based on the current schedule it is planned to commence the decline development upon receipt of the permit in August, completing as much of the program as possible prior to shutting down and winterizing the camp by the end of October. The drilling program would re-commence and be finished off the following summer. Alternatively, commencement of the development may be delayed until May, 2002.

The environmental management plan will be implemented in conjunction with and carried on throughout all stages of active decline development and underground drilling.

Aspects to be monitored:

All aspects of the drilling operation which have the capacity to result in a significant adverse impact on the environment and for which mitigation measures have been proposed, will be monitored, including, but not necessarily limited to:

- Underground equipment operation
- Explosives handling
- Fuel transfer operations
- Maintenance practices
- Water pumps and distribution systems
- Underground Sumps
- Mine water quality
- Waste rock characteristics

Frequency, duration and geographic extent of monitoring:

Operational planning sessions will be held at the beginning of each day to review operating practices and procedures.



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Operational monitoring will be conducted in active areas throughout the duration of the development. Operating crews will monitor performance of equipment and control structures on a continual basis during operations. As well, operations will be inspected on a daily basis daily by the project manager.

Grab samples of mine water will be collected monthly during operations.

Samples of waste rock will be collected on a weekly basis and combined to form monthly composites.

Approaches and Methods for analysis:

The proposed development will be conducted under the direct supervision of Mr. Alan Taylor, VP, Exploration or, in his absence, his appointed designate. The results of daily inspections and ongoing operational monitoring will be reviewed at daily planning sessions. The condition of mitigation measures will be reviewed daily to determine effectiveness of performance.

Minewater grab samples will be shipped to a qualified laboratory and analyzed for standard physical and chemical water quality parameters

Waste rock composite samples will be shipped to a qualified laboratory and analyzed for standard Acid Base Accounting characteristics and ICP metals scan.

Reporting and response mechanisms for adjusting the project design or implementing mitigation/remedial measures, if necessary, based on monitoring results:

Daily operations reports will be completed detailing the results of each day's activities. Such reports will note deficiencies in performance of equipment and mitigation measures.

These reports, as well as the results of the daily inspections by the Project Manager, will be reviewed at the daily operational meetings. Decisions on the need for changes to operational plans, repairs to existing mitigation measures or implementation of new mitigation measures will be made at these meetings.

An Emergency Response Plan and Spill Contingency Plan have been prepared to address emergency situations. The types of potential emergencies and the response to them are defined in the Emergency Response and Spill Contingency Plans.

Staff will be trained to handle emergency situations with appropriate procedures as set out in the Emergency Response Plan. Responsibilities are clearly defined under procedures outlined above.



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In the event mine water quality monitoring indicated concerns with respect to discharge of mine water to the receiving environment, provision would be available to pump minewater to the tailings pond and/or treat minewater as appropriate. In the event water monitoring indicated changes in quality as a result of operating practices, such as visible hydrocarbons or elevated levels of nitrogen from blasting residue, such practices would be reviewed at operational meetings to minimize inputs.

In the event that waste rock monitoring identified portions of waste rock without the anticipated high excess neutralization capacity, provision would be available for blending of such material with the highly neutralizing dolostone host rock which will make up the vast majority of the waste rock.

Follow-up Monitoring

Upon completion of the development, the portal will be secured and working areas will be cleaned-up. All working areas will be inspected to confirm adequacy of rehabilitation measures. Follow-up inspections will occur in conjunction with routine care and maintenance activity at the site.

In the course of project planning, the application stage and the EA process, CZN has made commitments as to the ways and means by which the development will be undertaken in order to achieve its objectives, while at the same time ensuring that the development will not result in significant adverse impacts to the environment.

The MVEIRB, in its Report of Environmental Assessment, will either accept CZN's plans and commitments and/or make further recommendations for mitigation measures to ensure that the development will not result in significant adverse impacts to the environment.

The MVLWB, in issuing the required Land Use Permit, will incorporate terms and conditions for undertaking the development in accordance with the commitments and recommendations made by CZN and the MVEIRB, respectively.

In order to ensure that the terms and conditions of the Permit are met, regular site inspections will be conducted by regulatory agency personnel during the course of the development. Site Inspection Reports will be available to demonstrate the effectiveness of these follow-up programs in an open and transparent manner.

UNDERGROUND DECLINE DEVELOPMENT - 2001
WASTE ROCK CHARACTERIZATION

Sample ID	Rock Type	Description	Paste pH	Total S %	SO ₄ - S %	Sx - S %	Total AP kgCaCO ₃ /t	Sx-S AP kgCaCO ₃ /t	NP kgCaCO ₃ /t	CO ₂ %	CaNP kgCaCO ₃ /t	NNP kgCaCO ₃ /t	NP/TAP
Unit 6-1	Upper spar	PC94-63;324.5m	9.1	0.51	0.005	0.53	16	17	999	43.2	982	+983	62:1
Unit 6-2	Upper spar	PC94-61A;314.6m	8.8	0.17	0.005	0.26	5	8	1030	45.1	1026	+1025	200:1
Unit 7-1	Chert/Dolostone	PC94-63;260.9m	9.2	0.05	0.005	0.06	2	2	446	19.2	437	+444	285:1
Unit 7-2	Chert/Dolostone	PC94-61A;283.2m	9.1	0.06	0.005	0.1	2	3	342	14.7	334	+340	179:1

Sample ID	Rock Type	Description	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	Hg ppb
Unit 6-1	Upper spar	PC94-63;324.5m	3	0.12	10	10	0.25	17.8	13.5	0.5	9	40	0.47	4.8
Unit 6-2	Upper spar	PC94-61A;314.6m	0.5	0.08	10	20	0.25	10.7	7.5	0.5	6	23	0.27	5.2
Unit 7-1	Chert/Dolostone	PC94-63;260.9m	0.25	0.75	10	5	0.25	3.99	0.5	0.5	120	5	0.15	0.24
Unit 7-2	Chert/Dolostone	PC94-61A;283.2m	0.5	0.52	10	10	0.25	4.82	0.5	0.5	144	5	0.27	0.16

Sample ID	Rock Type	Description	K %	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sr ppm	Ti %	V ppm	Zn ppm
Unit 6-1	Upper spar	PC94-63;324.5m	0.21	15.6	290	1	0.62	2		3200	130	0.005	15	2270
Unit 6-2	Upper spar	PC94-61A;314.6m	0.09	13.2	250	1	0.42	1		380	92	0.005	13	1450
Unit 7-1	Chert/Dolostone	PC94-63;260.9m	0.5	4.4	95	0.5	0.07	6	270	54	19	0.005	52	158
Unit 7-2	Chert/Dolostone	PC94-61A;283.2m	0.22	5.1	95	3	0.2	7	80	41	29	0.005	92	72



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Mr. Louie Azzolini
Environmental Assessment Officer
Mackenzie Valley Environmental Impact Review Board
PO Box 938, 200 Scotia Centre, 5102 – 50th Ave.
Yellowknife, NT
X1A 2N7

Dear Mr. Azzolini:

**Re: Environmental Assessment Report
Underground Decline & Exploration Drilling Program - Prairie Creek Mine
(Land Use Application MV 2001C0023; MVEIRB File EA01-002)**

Please find enclosed our Environmental Assessment Report for the Underground Decline & Exploration Drilling Program prepared by Canadian Zinc in response to the Terms of Reference issued by the Mackenzie Valley Environmental Impact Review Board dated May 31, 2001.

All information is presented in .pdf format accessible by Adobe Acrobat Reader. The submission consists of the following documents: Cover letter, EA report, Waste rock characterization, Safety & Procedures Manual and Land Overlaps Map.

For ease of reference we have also included the following drawings, also in .pdf format, which were included in the original application package submitted to the MVLWB on March 5, 2001: Property Location Map, Proposed Exploration Map, Property Claims Map and Main Zone Long Section Drawing .

Headings used in the Terms of Reference have been adopted in this EA Report in **bold** print, while details of the information requested are shown in *italics*. Canadian Zinc's response to each of the specific information requests follows in plain type.

I trust that you will find that all of the information requests have been responded to adequately. Should you have any questions or require any additional information please feel free to contact me at your convenience.

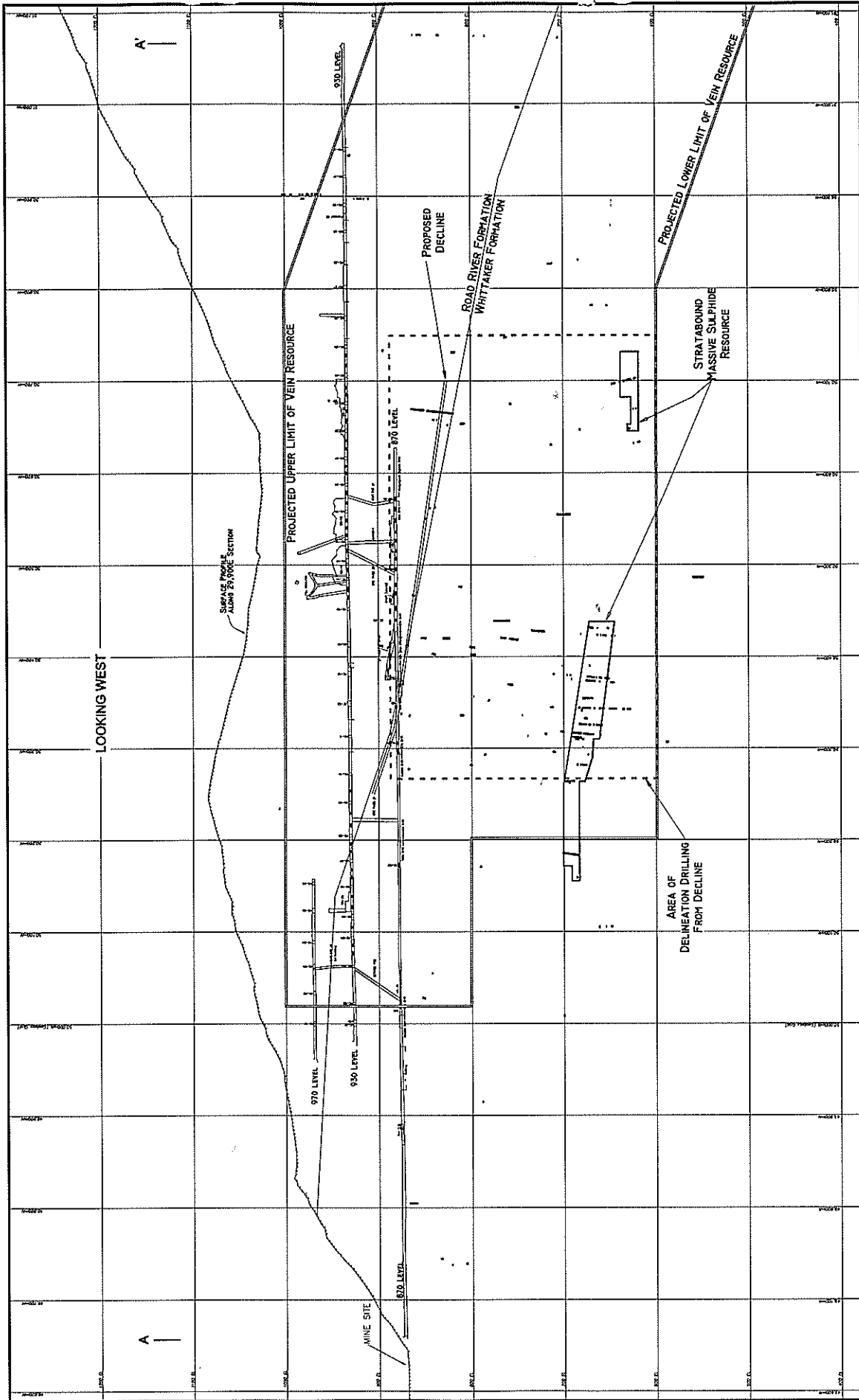
Yours very truly,

CANADIAN ZINC CORPORATION

Original Signed By

J. Peter Campbell
VP Project Affairs

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E-mail: peter@canadianzinc.com, Website: www.canadianzinc.com



PRAIRIE CREEK MINE MAIN ZONE LONGITUDINAL SECTION	
CANADIAN ZINC CORPORATION	
Date: December, 2000 Scale: 1:4,000 File Name: 11X17 Long_Sec.dwg Revised: Figure:	■ Drillhole intercept of stratabound massive sulphides ■ Drillhole intercept of quartz/sulphide vein
SCALE 1:4,000 0 25 50 100 150 200 metres	