



Northwest
Territories Environment and Natural Resources

August 8, 2008

Tyree Mullaney
Regulatory Officer
Mackenzie Valley Land and Water Board
7th FL. 4910-50TH AVE.
P.O. BOX 2130
YELLOWKNIFE, NT X1A 2P6

Dear Ms. Mullaney:

**CANADIAN ZINC CORP., MV2008T0012, MV2008T0013, MV2008D0014 and
MV2008L2-0002**
**Land Use Permit and Water License Applications – Prairie Creek Mine and
Liard and Tetcela Transfer Facilities.**

The Department of Environment and Natural Resources (ENR) has reviewed the above applications based on its mandated responsibilities under the *Wildlife Act*, the *Forest Management Act (FMA)* and the *Environmental Protection Act (EPA)* and provides the following comments for your consideration.

ENR understands that the Proponent currently holds a Land Use Permit (MV2001C0023) and Water License (MV2001L2-0003) for the development of an underground decline and a pilot plant program, as well as a Land Use Permit (MV2004C0030) for Phase II Drilling.

The Proponent further holds a Land Use Permit (MV2003F0028) for a mine access road. As a result of the requirement for road rehabilitation, a Water License (MV2007L8-0026) and Quarry Permit were issued; however, authorization from the Department of Fisheries and Oceans is still pending.

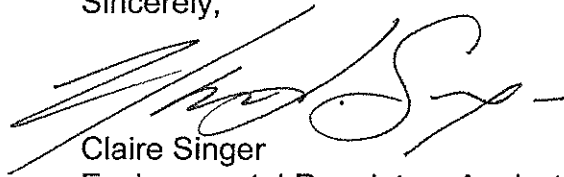
If and when a Mine Production License and Permit are issued, does the Board anticipate that they will encompass full site activities? If so, ENR requests that the Board confirm whether this would result in the cancellation of the previously issued permits and licenses (excluding those associated with the road).

To optimize management and operational efficiency, it is ENR view that the administration of one Water License and one Land Use Permit will improve the effectiveness of the regulation of water use and waste disposal at the Prairie

Creek Mine site. ENR anticipates that current terms and conditions will be integrated into the new license and permit. For example, ENR anticipates that conditions 29-32 in MV2001C0023, which outline the requirement for a Wildlife Management Plan, will be included in the new Water License and Land Use Permit for mine production.

Should you have any questions regarding the above, please contact Claire Singer, Environmental Regulatory Analyst at 920-6591 or Gavin More, Manager at (867) 920-6595.

Sincerely,

A handwritten signature in black ink, appearing to read 'Claire Singer', with a horizontal line extending to the right.

Claire Singer
Environmental Regulatory Analyst
Environmental Assessment and Monitoring
Environment and Natural Resources

Attachments:

- **ENR Comments re: Prairie Creek Mine**
- **ENR Comments re: Liard and Tetcela Transfer Facilities**

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ENR Comments – Prairie Creek Mine

MV2008D0014 and MV2008L2-0002

Wildlife - General

Project Specific Concerns and Context:

1. Wolverines have the potential to occur in the project area. These animals are high-level carnivores, which have been known to habituate to human presence. In some cases, especially in the winter months, wolverines may live under buildings, potentially posing a threat to human inhabitants who may inadvertently come in close proximity to the animal. Habituated animals may be removed from the development area, but if they persist (return) they may have to be destroyed as nuisance animals. The best method of avoiding the habituation of animals is to properly store and dispose of garbage and waste; however, in some cases wolverines may still be attracted to development areas. In order to decrease the probability of having to destroy a habituated wolverine, and to protect the safety of employees, a response plan should be developed.
2. The *Species at Risk Act* (SARA) states that adverse effects on listed species must be identified and assessed, and regardless of significance, mitigated and monitored (s.79). It is ENR's view that species assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and the GNWT General Status Rankings should be treated in a fashion consistent to those species listed under SARA. Mitigation measures and plans to monitor the effectiveness of the mitigative measures are required under SARA.

The GNWT is signatory to the *Accord for the Protection of Species at Risk* and is therefore committed to ensuring that the environmental assessment of projects within its jurisdiction takes Species at Risk into consideration. Further, any impact to habitat that is important to Species at Risk, including the 'critical habitat' and 'residence' specified under SARA, must be considered during EIA. If the habitat is known to be used by a species of wildlife at risk, any its important is unclear, a precautionary approach requires treating that habitat as important unless the balance of evidence suggests otherwise.

The following COSEWIC-listed species may occur in the project area:

- Grizzly bear (Special Concern),
- Wolverine (Special Concern),
- Rusty blackbird (Special Concern), and
- Short-eared owl (Special Concern).

Recommended Condition:

With the expectation that conditions 29-32 from MV2001C0023 will be included in MV2008D0014 and MV2008L2-0002 should these authorizations be issued, ENR recommends the following amendments to the above-noted conditions:

29. The Permittee shall submit a Wildlife Management Plan to be implemented upon approval by the Board before land use operations commence, including:
 - (a) a bear and wolverine response protocol that allows personnel to respond adequately to problem bears and wolverines;
 - (b) measures for the protection of the existing mineral lick near the minesite that provide for its continued use by wildlife with minimal disturbance;
 - (c) a wildlife movement and interactions monitoring program;
 - (d) a wildlife education protocol for all employees working on site; and
 - (e) identification of adverse effects on species at risk (including those listed as Endangered, Threatened or Special Concern by COSEWIC) and development of monitoring and management plans for these species and their critical habitat.
30. The Permittee shall maintain a wildlife-sighting log, which shall be submitted to the regional Environment and Natural Resources office on an annual basis.
31. The Permittee shall not harass wildlife during this land use operation.
32. The Permittee shall use food handling and garbage disposal procedures that do not attract carnivores (including bears and wolverines) and scavengers (including foxes).

Wildlife – Roads and Transportation

Project Specific Concerns and Context:

The Proponent indicates that there will be approximately 4800 hauls annually with 21 vehicles. This equates to approximately 3 trips/day/truck. Given these figures, 24/hour/day haulage is likely.

ENR is concerned that the above figures will result in continuous traffic and noise along the road for a period of approximately two and a half months. This increase in volumes of traffic will likely significantly increase the corresponding rates of wildlife-vehicle collisions.

ENR also notes that though the road does not bisect any known mountain caribou migration routes, it could nonetheless create a semi-permanent barrier to

other wildlife (i.e. moose, wood bison, wolves, etc.) when continuous traffic is taken into account.

Recommended Condition:

To ensure the safety of both wildlife and personnel, the Permittee shall:

- (a) Report all wildlife-related collisions immediately to the regional Environment and Natural Resources office;
- (b) Have each vehicle driver maintain a wildlife sighting log, to be submitted to the Regional Environment and Natural Resources office on an annual basis;
- (c) Establish protocols for the communication of wildlife sightings between vehicles; and
- (d) Remove all animal carcasses from the road right-of-way, so as to decrease the possibility that the carcasses will attract other animals to the road.

Monitoring

ENR notes that the Project Description for the mine site does not include a concise description of any monitoring programs (i.e. hydrological, geochemical, etc.) intended for the duration of construction and operation. ENR requests that that information be provided for review if available.

Existing Development (4.1.1)

The Proponent states that, "Approximately 40,000 tonnes of Vein material were mined from the 880 and 930 meter level in 1981/2 and this is presently stockpiled beside the Mill".

It is unclear how this material is being managed currently, and how ARD/ML potential is being mitigated.

Sewage Treatment and Garbage Incineration (4.4.5 and 4.4.6)

Project Specific Concerns and Context:

1. The mine site Project Description indicates that the existing Sewage Treatment Plant will be refurbished to treat sewage based on 120 people. Effluent is to be pumped to the Water Storage Pond, settled solids will be returned to the aeration tank is needed and any excess will be dried and taken for incineration.

The incineration of sewage waste requires the use of specific treatment procedures and incineration technology; otherwise, significant environmental impacts, including the production of toxic compounds, and

the potential emission and/or release of infectious substances will likely result.

2. The Proponent states that they “Will incinerate food waste, other acceptable combustible wastes, and sewage treatment plant sludge. The new incinerator will be a forced-air-diesel-fired, state-of-the-art double chamber model.”

It is important to note that the installation of ‘technologically-advance’ incinerators alone is not sufficient to ensure compliance with the Canada-wide Standard (CWS) and minimization of emissions. It is critical that the technology be combined with a comprehensive waste management strategy (especially waste segregation) as well as diligent operation and maintenance.

The Proponent should demonstrate that appropriate training will be, or has been provided to personnel operating the incinerator and ensure that appropriate record keeping procedures are in place (i.e. completion of burn cycle and operation maintenance logs).

The Proponent's objective should be to ensure that the amount of waste burned is reduced as much as possible through implementation of pollution prevention strategies, such as purchasing policies that focus on reduced packaging. They should also ensure that only food waste and food-contaminated waste is burned (though the use of paper, cardboard and clean wood as supplementary fuel is acceptable) through implementation of onsite diversion and segregation programs (i.e. the separation of non-food waste items suitable for storage and subsequent transport and disposal or recycling).

3. ENR only supports the Proponents proposed method of incinerator ash disposal if it can be demonstrated that the ash is encapsulated in a non-leachable form, such as the aggregate in set concrete. If incinerator bottom and/or fly ash are targeted for disposal in the NWT (rather than the proposed mine backfill mix), it must be tested prior to disposal to ensure that it meets the criteria specified in the *NWT Environmental Guideline for Industrial Waste Discharges*.

Recommended Condition:

The Permittee shall complete a Waste Management Plan, including *Incineration Management Strategies* that ensure that any incinerators meet the emission limits established under the Canada-wide Standards (CWS) for Dioxins and Furans (CCME 2001)¹ and the CWS for Mercury Emissions (CCME 2000)². The *Incineration Management Strategies* should address:

¹ http://www.ccme.ca/assets/pdf/d_and_f_standard_e.pdf

- Selected incineration technology and rationale for selection (the minimum requirement to accommodate camp waste streams should be a dual-chamber, controlled-air incinerator);
- Specific incineration procedures and technology for the treatment of sewage waste;
- Recycling and waste segregation for waste streams entering the incinerator;
- Operator training and qualifications, as well as the identification of trained and designated operators;
- Procedures for operation and maintenance, including record-keeping (i.e. completion of burn cycle and maintenance logs and recording of the weight of each waste load charged to the incinerator);
- A reporting requirement to summarize the tracking and record-keeping component;
- Weigh scales to record the weight of each load charged to the incinerator; and
- Incineration residual disposal procedures.

Hazardous Waste (4.7.3)

The GNWT *Guideline for General Management of Hazardous Waste*³ states that the responsibility for proper waste management rests with the generator of the waste. The Proponent is registered with ENR as a generator of hazardous waste for PCBs and sodium cyanide, and as such, must:

- Ensure that a waste manifest is properly completed and accompanies the shipment;
- Ensure that the waste is transported by a registered hazardous waste carrier to a registered receiver; and
- Ensure receiving facilities outside the Northwest Territories (NWT) are registered in the receiving province or territory, and are approved to manage the associated wastes.

Further to the above, ENR requests that the Proponent provide an update addressing expected volumes and types of waste associated with the proposed mine production activities.

The Proponent states, "CZN will adopt industry-standard practices for the managements of hazardous waste, whether this is by on-site destruction, or transfer off-site for disposal". ENR requests that the Proponent clarify the meaning of 'on-site destruction'.

² http://www.ccme.ca/assets/mercury_emis_std_e1.pdf

³ http://www.enr.gov.nt.ca/eps/pdf/06HW_GEN%20REV.pdf

Hazardous Waste – Waste Oil (4.7.3)

The Proponent states, “A sizeable inventory of waste oil from vehicle and generator maintenance was left by Cadillac. CZN has consolidated this inventory in the Tank Farm enclosure, and has steadily been depleting it by using the oil to ignite camp refuse in the high temperature on-site incinerator”.

Although potentially classified as an *Industrial Hazardous Waste*, ENR recognizes that, in some circumstances, used oil can have a secondary value as a resource if it is burned as a fuel (i.e. for space heating). However, used oil can contain metals and other contaminants, and improper burning can lead to the otherwise preventable formation and spread of contaminants in the workplace and in the environment.

The project description states “CZN has consolidated this inventory in the Tank Farm enclosure, and has steadily been depleting it by **using the oil to ignite camp refuse** in the high temperature on-site incinerator”. It appears from the Proponent’s project description that waste oil is being incinerated in an inappropriate device. Waste oil is a hazardous waste and must be disposed of appropriately. If waste oil is incinerated, it should:

- (a) Be burned in an approved waste oil burner and tested for contaminants as required in the NWT under the *Used Oil and Waste Fuel Management Regulations*.
- (b) If it cannot be demonstrated that the waste oil meets the above-noted *Used Oil and Waste Fuel Management Regulations*, it must be burned in an incineration device that is capable of meeting the emission limits established by the CCME under the CWS for Dioxins and Furans and the CWS for Mercury Emissions.
- (c) If the standards included in part (a) and (b) cannot be met, the waste oil should be safely stored and transported in sealed containers (odour-free to prevent animal attraction) to a facility that is a registered recycling or disposal facility for these wastes.

Hazardous Waste – On-Site Bioremediation Cell (4.7.3)

Project Specific Concerns and Context:

The Proponent states, “CZN is investigating the development of an on-site bioremediation cell in order to manage any contaminated soil from minor spills. Development plans will be presented to the appropriate agencies for review and authorization before embarking on construction of such a cell”.

ENR refers the Proponent to the GNWT *Guidelines for Contaminated Site Remediation* (2003) for the assessment and remediation of contaminated sites. These guidelines have been developed based on CCME CWS for Petroleum

Hydrocarbon (PHC) in Soil (2001) and the *Canadian Environmental Quality Guidelines* (1999).

ENR also refers the Proponent to Environment Canada's *Federal Guidelines for Landfarming Petroleum Hydrocarbon Contaminated Soils* (December 2005). This document provides details on design considerations, siting, monitoring and decommissioning.

Recommended Condition:

The Permittee shall prepare for approval by the Board, a Remedial Action Plan (RAP) detailing the methodology for remediation, including:

- Contact information of key personnel, consultants and contractors,
- Summarization of all data on contaminants identified during site investigation,
- Identification of contaminants of concern and the media affected,
- Identification of proposed cleanup criteria,
- Identification, quantification and characterization of the materials to be treated/removed,
- Detail and schedule and implementation plan, and
- Identification of remedial verification and long-term monitoring plans.

Hazardous Waste – Asbestos (4.7.3)

Project Specific Concerns and Context:

The Proponent states, “The age of the existing buildings at the Mine is such that the presence of asbestos-containing materials (ACM) cannot be ruled out. ACM may occur in insulation, roof and floor tiles and cladding. Some of the buildings are beyond repair and will be demolished. Before this occurs CZN will engage a contractor to conduct a full inspection of all buildings on-site, define where ACMs occur and develop an appropriate management plan”.

ENR refers the Proponent and the Board to the GNWT's *Environmental Guideline for Waste Asbestos*.⁴

Recommended Condition:

The Permittee shall bury asbestos-containing materials (ACMs) in the onsite landfill in the following manner:

- (a) stored in sealed, airtight containers (that are sound, undamaged and not leaking) or double-wrapped 6mm poly bags labeled “asbestos”;
- (b) immediately buried and covered with one half meter of cover material (cover material can be locally available soils, refuse or other materials provided the asbestos containment is not ruptured);

⁴ <http://www.enr.gov.nt.ca/eps/pdf/ASBESTOS.pdf>

- (c) located and buried where they won't be disturbed;
- (d) referenced on a map or diagram of the property, which will be supplied to Indian and Northern Affairs Canada and Environment and Natural Resources; and
- (e) designated onsite as an area of hazardous material disposal.

Waste Rock (4.7.1)

The Proponent indicates that waste rock will be produced from both the mine and the mill and that some of this rock may be left underground to avoid haulage to surface for disposal. The Proponent plans to place the waste rock from mine development near the 930 level portal in a compact, engineered facility.

A conceptual design report for the Waste Rock Pile (done by Golder and Associates) was conducted. ENR is pleased to learn that the design includes upslope runoff diversion and pile drainage collection during operations. The drainage will be routed via pipeline into the mine water management system. ENR supports the following recommendations as provided in the *Conceptual Design and Preliminary Geotechnical Assessment, Waste Rock Pile Harrison Creek (Golder)*:

- Geotechnical inspection of the site;
- Confirmation of the topography provided and slope stability information;
- Testing of the waste rock and underlying soil and rock; and
- Additional information of the overall site for the development of water management features.

Tailings (4.7.2)

The Proponent is planning two temporary storage sites for tailings. "One site will be a building adjacent to the concentrate shed which will have a concrete floor and heating from the glycol heat recovery system associated with power generation. This site will have capacity for 10,000 tonnes. A second temporary storage site will be built on the north side of the Water Storage Pond."

Golder and Associates completed the *Temporary Tailings Storage Area DMS Coarse Reject Rock Storage Area and Water Storage Pond Design* report for the temporary storage site. ENR supports the following recommendations from the above-noted report:

- Detailed ground survey of the facility area, specifically the north slope of the pond to determine slope stability;
- Additional field investigation work and instrumentation installations on north slope;
- Field investigation and laboratory testing program to confirm assumed strength parameters for underlying clay, later to confirm stability of dyke;
- Information on water levels in Prairie Creek, along with piezometric pressure head levels in underlying clay; and

- Review of the design storm storage requirements.

Mine/Mill Water Management (4.8.2)

Parks Canada's January 25, 2007 letter to the MVLWB requested that the Proponent revise their *Mine Water Contingency Plan*. No response was provided, and Parks Canada submitted a second letter on October 22, 2007. ENR supports Parks Canada's request for a revision of the *Mine Water Contingency Plan*. This Plan should be revised to incorporate activities associated with the proposed mine operations.

The existing water storage pond is intended for use. During the environmental assessment process there were concerns related to the use of the pond, specifically whether there was an intact and impermeable liner and whether the underlying and surrounding soils were stable. The Proponent has ensured that these concerns will be addressed through further engineering investigations, buttressing of the pond backslope and the placement of an additional liner. Golder's recommendations, as noted in Section 4.7.2 include recommendations for the water storage pond.

Preliminary Final Mine Closure Plan (4.10.1)

The Proponent's Abandonment and Restoration Plan for the Decline and Pilot Plant was approved July 2005. At that time there were issues surrounding the interpretation of the Land Use Permit and Water License with respect to abandonment and reclamation requirements for components and structures still intended for future use. ENR requests that the Abandonment and Restoration Plan be revised to include all mine components associated with the Prairie Creek Mine Site.

As outlined in INAC's *Mine Site Reclamation Guidelines for the NWT* (January 2007), a key concept for an effective Closure Plan is following an 'objectives-based' approach, which starts with clear statements of objectives and the subsequent development of closure criteria. These objectives take into consideration the physical stability, chemical stability and future use and aesthetics of the site after closure. Closure criteria should be specific enough for a third party to verify compliance or success.

ENR Comments – Liard and Tetcela Transfer Facilities

MV2008T0012 and MV2008T0013

Forest Management

1. A more detailed vegetative description of the Liard Transfer Facility (LTF) is required with regards to dominant tree heights, species, diameter, volume per hectare and understorey vegetation present on the site.
2. ENR is unclear as to the degree of disturbance that will occur at the Transfer Facilities. Will overburden be removed and piled to one side or will a geotextile mat be put down to cover ground vegetation and secured with gravel?
3. ENR is unclear as to the Proponent's plans for restoration. If clearing of a forested area occurs, restoration becomes necessary following site abandonment.

Past use of seed mixes for reclamation purposes in the Northwest Territories has led to the introduction of non-native plant species, many of which are considered invasive. Therefore, ENR recommends that:

- Seeding be avoided whenever possible and that minimally disturbed ground be replanted with tree seedlings, native plant cuttings or propagules, or left to naturally regenerate depending on site-specific objectives.
- Any seed mix that is used for stabilizing areas of greater disturbance be free of invasive alien species, sub-species or varieties and should be approved by regional ENR staff.
- Exotic species only be used when there are no other alternatives to achieve revegetation objectives and if the species (plants and seeds) used has a proven record of persisting in NWT habitats for less than two years (nonpersistence).
- All exotic species used be monitored for persistence. Monitoring is an essential component of a revegetation plan due to changes in climate and growing season characteristics.

Silver Concentrates

ENR notes that there is no mention of silver in the concentrates described in the Project Descriptions. With the value of silver concentrates at over \$17 an ounce, the value of this product is higher than that of kimberlite per ton. Silver concentrates should be included in the Project Description to assess potential soil contamination.

Quarrying

The Project Descriptions does not mention the specific location of the gravel source with respect to the construction of pads. The construction of such a quarry will likely require another Land Use Permit. Does the Proponent hold such a Land Use Permit?

Disposal of Wastewater

The site sketch includes a 'wheel wash facility' but there is no discussion in the Project Description with respect to the operation of this facility or the products that will be used there. This information is required to properly assess impacts for the disposal of this wastewater.

Waste Management

ENR assumes that garbage and sewage will be transported to the mine site for disposal. If this is the case, our comments and recommendations pertaining to waste management at the mine site are applicable.

Should the Proponent decide to haul waste from the Transfer Facilities to an NWT community for disposal, it is important for the Proponent to demonstrate that the receiving community or facility has an appropriate Land Use Permit and/or Water License in place, that those authorizations and local by-laws each allow for the disposal of this outsourced waste, and that the community has been consulted and has consented to the use of its infrastructure for the disposal of the waste types and quantities in question.

Water Source

The covering letter of the LTF states that potable water will be sourced locally. This requires the use of a public well along the Upper Blackstone River (beside the highway). ENR is concerned that this pump will not be able to support the withdrawal of water at the volumes required by the Proponent. ENR requests that the Board confirm that this is indeed the source of potable water for the mine and to ensure that the Proponent, by using this source, will not be stressing the facilities already used by locals.

Fuel Storage

The Project Descriptions don't indicate whether the 400,000-liter tank will be built to any regulation or standard. At minimum, the Proponent should adhere to the National Fire Code. Secondary containment and spill contingency planning (i.e. berms or dykes) would also be basic requirements for a tank of this volume.