

facsimile  
TRANSMITTAL

RECEIVED  
SEP 10 2001  
*JK*

to: Louie Azzolini  
MVEIRB, Yellowknife  
fax #: 920-4761  
re: **Technical Report Submission: Canadian Zinc Corporation  
Underground Decline and Metallurgical Pilot Plant Operation, EA01-002, and  
Phase II Surface Exploration EA01-003 Environmental Assessments**  
date: September 7, 2001  
pages: 8.....( including this cover sheet).

*Saved & emailed  
copies*

Louie:

We are enclosing the DIAND's Technical Report for this EA. An electronic copy has also been sent to you.

Ranjit.

From: Ranjit Sonlasy  
ENVIRONMENTAL SCIENTIST  
Environment & Conservation Division  
Indian and Northern Affairs Canada  
PO Box 1500, Yellowknife, NWT  
CANADA, X1A 2N1  
Fax 867-669-2701  
Phone 867-669-2591  
E-mail: sonlasyr@lnac.gc.ca





Indian and Northern  
Affairs Canada  
www.inac.gc.ca

Affaires indiennes  
et du Nord Canada  
www.ainc.gc.ca

P.O. Box 1500  
Yellowknife, NT, X1A 2R3

*Your file - Votre référence*

*Our file - Notre référence*  
73927-A2-10

Mr. Louie Azzolini  
Environmental Assessment Officer  
MVEIRB  
Yellowknife, NT

September 7, 2001

SENT BY FAX: 920-4761

**RE: Technical Report Submission: Canadian Zinc Corporation (CZN)  
Underground Decline and Metallurgical Pilot Plant Operation, EA01-002, and  
Phase II Surface Exploration EA01-003 Environmental Assessments.**

Enclosed, for consideration by the Mackenzie Valley Environmental Impact Review Board, are DIAND's comments on the Canadian Zinc Corporation Underground Decline Development, Metallurgical Pilot Plant Operation and Phase II Surface Exploration Environmental Assessments. Please let us know if you require additional clarification on this report.

Sincerely,

Mary Tapsell  
Regional Manager

Encl.

Canada

*Printed on recycled paper - Imprimé sur papier recyclé*

**ATTACHMENT**

September 7, 2001

**Technical Report Submission:  
Canadian Zinc Corporation (CZN)  
Underground Decline and Metallurgical Pilot Plant Operation, EA01-002, and  
Phase II Surface Exploration EA01-003 Environmental Assessments.**

**Prepared for: The Mackenzie Valley Environmental Impact Review Board (Review Board).**

**Prepared by: The Department of Indian Affairs and Northern Development (DIAND).**

The Department of Indian Affairs and Northern Development (DIAND) has conducted a technical review of the Environmental Assessment (EA) Reports, submitted by the Canadian Zinc Corporation (CZN), entitled *Underground Decline Development and Exploration Drilling* (June 21, 2001), and *Metallurgical Pilot Plant Program* (June 21, 2001), in response to the Mackenzie Valley Environmental Impact Review Board (Review Board) Terms of Reference of May 31, 2001. The purpose of the technical review is to assist the Review Board in conducting its EA for the project.

The comments provided relate specifically to:

- 1) the surface exploration of up to 60 drill holes at the Prairie Creek site (also referred to as Phase II Mineral Exploration Drilling);
- 2) the opening of a portal, at the 905 m elevation, 600 m north of the existing mill facility and excavating a 600m long x 3m wide x 2.3 m high underground decline; and
- 3) the operation of a 1.5 tonnes per hour metallurgical pilot plant, to process a total of 1,000 to 2,000 tonnes of ore, from the surface stock pile or the decline development.

The purpose of the surface exploration and the underground decline development is to upgrade the known mineral resources at the site to mineral reserve status. The purpose of the pilot plant is to evaluate the feasibility of incorporating a gravity pre-concentration step to reject some of the low density non-mineralized rock and expand mill throughput to 1,500 tonnes per day, without mill expansion, and obtain additional metallurgical data on concentrate characteristics.

-2-

The Prairie Creek site has been subject to previous development, including a 1,000 ton per day mill, a 240 person camp and support facilities, constructed since 1981. The development however did not reach the commercial production stage due to unfavourable economic circumstances. Thus, although the EA is for an exploration project, the proposed activities will take place on an already disturbed and developed site, with substantial surface drilling between 1992 and 1995 (in excess of 100 drill holes).

The following comments are based on all the documentation received from the Review Board, including responses to several "information requests" (IR's) and are supplemented by personal observations, made during a field trip to the site on August 28, 2001.

### **Tailings Containment Area**

#### 1. The integrity of the tailings pond is still a concern that needs be further addressed.

CZN's response to DIAND's IR #1 stated that (4<sup>th</sup> paragraph) *"It is important to recognize that the pond has been in place and containing roughly the equivalent amount of water for the past 20 years without any indication of failure or deterioration of stability, and without incurring significant erosion of the rip-rap armour by Prairie Creek"*. This statement is at variance with the Bruce Geotechnical Consultants (BGC) letter of August 16, 2001 and their report of December 18, 2000, based on geotechnical engineering studies on the tailings facility in 1994 and 1995, which reported: slumping of the backslope above the tailings pond; sloughing of the gravel cover on the pond side of the downstream embankment; and occurrence of erosion on the river side of the embankment, where the riprap was not placed. The water levels were also reported as having a natural fluctuation of approximately 1 metre.

#### 2. The exact water level in the tailings pond is still in doubt and verification is required.

With regard to the proposed use of the tailings pond for up to 70,000 m<sup>3</sup> of water, which would raise the water level by about 70 cm, the BGC letter includes several cautions and disclaimers. The letter starts by stating *"Assuming that the level in the facility is still at the approximate 1994 level..."* This level is not given, but is estimated at **869.5 metres** on the drawings (dated 30 Nov 2000) appended to the December report.

The response to IR#1 states that the water level in the tailings impoundment is **868 metres**, a difference of 1.5 metres below the 1994 level. Verification of these water levels is required, and if correct, an explanation is also required for the short fall of 150,000 m<sup>3</sup> (1.5 metres) of water. The evaporation/precipitation ratio is not high enough to account for this much water loss.

In the response to DIAND IR#3, it is stated that the tailings *"pond was originally filled with water pumped from Prairie Creek"*. This statement does not support the current water level in the tailings pond. These discrepancies amount to significant volumes of water which must be accounted for to determine the integrity of the tailings pond. It is believed that seepage from the pond may well be occurring.

-3-

The BGC letter also states that *"the tailings pond containment structure is adequate for the proposed use provided levels do not rise more than about 1m above the 1994 level..."* and cautions against pumping down the water level to make room for the planned discharges without additional geotechnical assessment, because of *"potentially adverse uplift pressures on the basal clay liner."* The water level is already 1.5 metres below the 1994 level and BGC has recommended against pumping it down even 70 cm from the 1994 level. This variation in water levels is enough to warrant a thorough geotechnical assessment to determine the adequacy of the containment structure for the currently proposed use.

During the 28 August 2001 site visit, the sloughing on the pond side of the embankment was still evident but appeared to have stabilized. This must be verified by a qualified geotechnical engineer as must the stability of the backslope. In the BGC report, erosion of the embankment on the river side is identified and shown to be several metres downstream of the actual tailings impoundment. This area was apparently not rip-rapped during construction activities in 1982. Active erosion is evident with the presence of loose gravel and the lack of vegetation.

Significant erosion of the riprap armour on the embankment upstream of the erosion area identified by BGC, on the river side of the tailings impoundment, was also observed. The riprap shows significant evidence of erosion at the inside bend of the embankment, where the flow of Prairie Creek crosses over from the right side of the channel and the entire flow of the river is deflected by the riprap. At high flows, the maximum force of the river is directed at this point on the embankment and there is evidence of large boulders being shifted by the flows.

From the 1994 and 1995 field observations, the BGC report recommends a good deal of rehabilitation work at the tailings containment structure with an estimated cost ranging from \$750,000 to \$1,230,000. This indicates that the engineered structure had already suffered serious deterioration. Another six years of weathering at the site has occurred since the site visit by BGC staff. Although CZN believes that the slumping has stabilized, a geotechnical survey seems prudent, considering that the location of the site is immediately upstream of Nahanni National Park Reserve.

3. Groundwater monitoring at several locations downgradient of the tailings pond should be required as a condition of project approval.

CZN has not substantiated its claim that no seepage is occurring, by showing that inputs - evaporation = change in storage. As seepage must be occurring through either the embankments or the base, as the water level is not rising, it is appropriate that groundwater be monitored at several locations downgradient of the tailings facility.

4. An update on the probable maximum flood (PMF) level and flow should be required.

The IR#1 response indicates the probable maximum flood calculation was done with data from 1975 to 1980 at the Prairie Creek flow gauge. An additional 10 years of data, to 1990, are available and should be included in an updated calculation of PMF and, perhaps, for a flood frequency analysis.

-4-

There is also a weather station at the Virginia Falls hydrometric gauge that can provide additional data on which to assess possible flood events. It was reported while on site that the water levels were "halfway or more" up the riprap in the spring. The size of the logs stranded on the gravel bars across from the tailings impoundment also indicate that Prairie Creek has experienced some very large flows. Enhancement of the riprap armour on the tailing pond embankment should be investigated.

### **Water Quality In the Tailings Impoundment**

#### 5. Data on the water quality in the tailings impoundment is lacking and should be provided.

In response to DIAND IR #3, a statement was made that the water quality in the tailings impoundment is assumed to "closely reflect that of Prairie Creek and the local hydrologic regime from which the water originated". As the source of the water may also include groundwater seepage from the impoundment backslope and surface runoff from disturbed land areas, the quality of the water in the tailings pond needs to be verified.

Prior to the deposition of any effluent into the tailings area, water sampling from the tailings area should be conducted to confirm CZN's assumption about the water quality being similar to that of Prairie Creek. This would provide valuable information about the tailings area either for closure purposes or should the project proceed to the production stage.

#### 6. A more accurate estimate of the ground water quantity discharge from the 870 m portal should be provided to assess current water discharges to Prairie Creek.

During the site visit, an estimate of the water flowing from the 870 m portal was quoted as 60 L/min (Malcolm Swallow). In the response to DIAND IR #8, the discharge was however given as 2 to 10 L/sec (i.e. 120 to 600 L/min). This water drains across the project site to the catchment pond adjacent to Harrison Creek. The control structure on the catchment pond outlet culvert was open during the site visit and water was flowing into Harrison Creek and Prairie Creek. A more accurate estimate of the discharge volume from the 870 m portal should also be provided.

#### 7. Data on the water quality from the 870 m portal should be provided to assess current water discharges to Prairie Creek.

In the response to DIAND IR#5, it is stated the water from the 870 m portal has not been sampled and analysed for metals, even though the water source is the mineralized vein structure and "has been closely associated with highly mineralized vein ore". Analysis of the mine water from the 870 m portal and from the site catchment pond should be required to assess the current water discharges to Prairie Creek.

-5-

8. No mine water should be discharged to Prairie Creek until the chemistry of the decline water is determined and proven acceptable for disposal.

The EA Report indicated that the water quality from the 870 m portal discharge will not be representative of discharges from the proposed decline. This raises the issue of the potential high variability in water quality from the decline and the need for close and periodic monitoring.

9. The periodic monitoring of the mine water quality during decline development should be required to determine the mine water quality and should be a condition of project approval.

Any mine water produced from the proposed decline development should be subject to periodic monitoring. As a minimum, weekly sampling and analysis should be conducted on the mine water produced from the proposed decline. Until the chemistry of the decline water is determined and proven acceptable for disposal, no mine water should be discharged to Prairie Creek.

The EA Report explains that mine water will go to a settling pond and then be released to Harrison Creek and that monthly grab samples will be taken from mine water and analysed for common physical / chemical parameters. As indicated earlier, a greater sampling frequency is more appropriate to provide more complete information. It is also recommended that samples of mine water be also tested for ammonia, as well as those parameters listed by the company's response to RWED/GNWT's IR#2.

A contingency plan will be required at the regulatory stage, should the settling pond not provide sufficient treatment.

In response to DIAND IR#8, CZN states that minewater encountered at the 870m level is "not considered to be representative of the chemistry of the minewater expected to be encountered in the decline". CZN's basis is that the 870m level intersects highly mineralized vein ore at several locations which is a known conduit for water flow (see DIAND IR#5). The proposed decline is to be driven through dolostone/limestone formations and will only intersect the vein near the end, as the other formations are water tight. As a result, CZN has indicated that less water will be produced, which is a reasonable assumption. However, mine water quality should not differ substantially since it is originating from the same source (vein ore). Regular monitoring during decline development should be required to determine the mine water quality and should therefore be a condition of approval.

### **Metallurgical Pilot Plant Operation**

10. Further details about the final disposal and abandonment/reclamation plans for the byproducts of the Pilot Plant Operation will be required at the regulatory stage.

CZN has indicated that there is sufficient storage space within the mill building for the containment of the liquid wastes produced during the operation of the pilot plant.

-6-

As ultimate treatment and disposal of this effluent will be required, it is recommended that CZN be required to provide the following information:

- i. Detailed metal scans of the liquid effluents;
- ii. A plan for the ultimate treatment and disposal of the liquid effluents; and
- iii. A plan for the disposal of the tailing wastes.

### **Waste Rock Management and Disposal**

11. It is recommended that the level of potential heavy metal contaminants leaching out of the old ore stockpile be determined.

In the response to DIAND IR #5, the proponent has stated that they may process some of the material from the existing 20-year old ore stockpile *"thereby reducing the quantity of material as a source of potential contamination"*. The level of metal contaminants in the runoff from this old ore stockpile has not been provided.

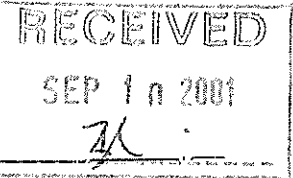
The response to DIAND IR#6 (waste rock and ore drainage management)-states that CZN has no concerns about the quality of runoff from the predicted 5200 m<sup>3</sup> of waste rock and the site in general, due to the expected low volume of runoff and the results of past ABA tests conducted on the Upper Spar and Chert/Dolostone rock units.

Although it is stated in CZN's response to DIAND IR#6 that there is no plan to install a control structure between the catchment pond and Harrison Creek, water licencing will establish water quality limits which apply to any release of site wastewater to the environment. Consequently, monitoring of this catchment basin should be conducted to confirm predictions of site runoff quality and determine if a control structure might be needed.

12. A contingency plan to pump and treat deleterious wastewater is recommended for the proper management of the waste rock and ore drainage system.

Again in response to DIAND's IR#6, it is recommended that CZN be required to develop a contingency plan to pump and treat any deleterious water from potential runoff and seepage from the waste rock and ore piles.



**facsimile  
TRANSMITTAL**

to: Louie Azzolini  
MVEIRB, Yellowknife

fax #: 920-4761

re: **Technical Report Submission: Canadian Zinc Corporation  
Underground Decline and Metallurgical Pilot Plant Operation, EA01-002, and  
Phase II Surface Exploration EA01-003 Environmental Assessments**

date: September 7, 2001

pages: 8.....(including this cover sheet).

---

Louie:

We are enclosing the DIAND's Technical Report for this EA. An electronic copy has also been sent to you.

Ranjit.

From: Ranjit Sonlassy  
ENVIRONMENTAL SCIENTIST  
Environment & Conservation Division  
Indian and Northern Affairs Canada  
PO Box 1500, Yellowknife, NWT  
CANADA, X1A 2N1  
Fax 867-669-2701  
Phone 867-669-2591  
E-mail: sonlassy@lnac.gc.ca





Indian and Northern  
Affairs Canada  
www.inac.gc.ca

Affaires indiennes  
et du Nord Canada  
www.ainc.gc.ca

P.O. Box 1500  
Yellowknife, NT, X1A 2R3

*Your file - Votre référence*

*Our file - Notre référence*  
73927-A2-10

Mr. Louie Azzolini  
Environmental Assessment Officer  
MVEIRB  
Yellowknife, NT

September 7, 2001

SENT BY FAX: 920-4761

**RE: Technical Report Submission: Canadian Zinc Corporation (CZN)  
Underground Decline and Metallurgical Pilot Plant Operation, EA01-002, and  
Phase II Surface Exploration EA01-003 Environmental Assessments.**

Enclosed, for consideration by the Mackenzie Valley Environmental Impact Review Board, are DIAND's comments on the Canadian Zinc Corporation Underground Decline Development, Metallurgical Pilot Plant Operation and Phase II Surface Exploration Environmental Assessments. Please let us know if you require additional clarification on this report.

Sincerely,

Mary Tapsell  
Regional Manager

Encl.

Canada

*Printed on recycled paper - Imprimé sur papier recyclé*

**ATTACHMENT**

September 7, 2001

**Technical Report Submission:  
Canadian Zinc Corporation (CZN)  
Underground Decline and Metallurgical Pilot Plant Operation, EA01-002, and  
Phase II Surface Exploration EA01-003 Environmental Assessments.**

**Prepared for: The Mackenzie Valley Environmental Impact Review Board (Review Board).**

**Prepared by: The Department of Indian Affairs and Northern Development (DIAND).**

The Department of Indian Affairs and Northern Development (DIAND) has conducted a technical review of the Environmental Assessment (EA) Reports, submitted by the Canadian Zinc Corporation (CZN), entitled *Underground Decline Development and Exploration Drilling* (June 21, 2001), and *Metallurgical Pilot Plant Program* (June 21, 2001), in response to the Mackenzie Valley Environmental Impact Review Board (Review Board) Terms of Reference of May 31, 2001. The purpose of the technical review is to assist the Review Board in conducting its EA for the project.

The comments provided relate specifically to:

- 1) the surface exploration of up to 60 drill holes at the Prairie Creek site (also referred to as Phase II Mineral Exploration Drilling);
- 2) the opening of a portal, at the 905 m elevation, 600 m north of the existing mill facility and excavating a 600m long x 3m wide x 2.3 m high underground decline; and
- 3) the operation of a 1.5 tonnes per hour metallurgical pilot plant, to process a total of 1,000 to 2,000 tonnes of ore, from the surface stock pile or the decline development.

The purpose of the surface exploration and the underground decline development is to upgrade the known mineral resources at the site to mineral reserve status. The purpose of the pilot plant is to evaluate the feasibility of incorporating a gravity pre-concentration step to reject some of the low density non-mineralized rock and expand mill throughput to 1,500 tonnes per day, without mill expansion, and obtain additional metallurgical data on concentrate characteristics.

-2-

The Prairie Creek site has been subject to previous development, including a 1,000 ton per day mill, a 240 person camp and support facilities, constructed since 1981. The development however did not reach the commercial production stage due to unfavourable economic circumstances. Thus, although the EA is for an exploration project, the proposed activities will take place on an already disturbed and developed site, with substantial surface drilling between 1992 and 1995 (in excess of 100 drill holes) .

The following comments are based on all the documentation received from the Review Board, including responses to several "information requests" (IR's) and are supplemented by personal observations, made during a field trip to the site on August 28, 2001.

### **Tailings Containment Area**

#### 1. The integrity of the tailings pond is still a concern that needs be further addressed.

CZN's response to DIAND's IR #1 stated that (4<sup>th</sup> paragraph) "*It is important to recognize that the pond has been in place and containing roughly the equivalent amount of water for the past 20 years without any indication of failure or deterioration of stability, and without incurring significant erosion of the rip-rap armour by Prairie Creek*". This statement is at variance with the Bruce Geotechnical Consultants (BGC) letter of August 16, 2001 and their report of December 18, 2000, based on geotechnical engineering studies on the tailings facility in 1994 and 1995, which reported: slumping of the backslope above the tailings pond; sloughing of the gravel cover on the pond side of the downstream embankment; and occurrence of erosion on the river side of the embankment, where the riprap was not placed. The water levels were also reported as having a natural fluctuation of approximately 1 metre.

#### 2. The exact water level in the tailings pond is still in doubt and verification is required.

With regard to the proposed use of the tailings pond for up to 70,000 m<sup>3</sup> of water, which would raise the water level by about 70 cm, the BGC letter includes several cautions and disclaimers. The letter starts by stating "*Assuming that the level in the facility is still at the approximate 1994 level...*" This level is not given, but is estimated at **869.5 metres** on the drawings (dated 30 Nov 2000) appended to the December report .

The response to IR#1 states that the water level in the tailings impoundment is **868 metres**, a difference of 1.5 metres below the 1994 level. Verification of these water levels is required, and if correct, an explanation is also required for the short fall of 150,000 m<sup>3</sup> (1.5 metres) of water. The evaporation/precipitation ratio is not high enough to account for this much water loss.

In the response to DIAND IR#3, it is stated that the tailings "*pond was originally filled with water pumped from Prairie Creek*". This statement does not support the current water level in the tailings pond. These discrepancies amount to significant volumes of water which must be accounted for to determine the integrity of the tailings pond. It is believed that seepage from the pond may well be occurring.

-3-

The BGC letter also states that *"the tailings pond containment structure is adequate for the proposed use provided levels do not rise more than about 1m above the 1994 level..."* and cautions against pumping down the water level to make room for the planned discharges without additional geotechnical assessment, because of *"potentially adverse uplift pressures on the basal clay liner."* The water level is already 1.5 metres below the 1994 level and BGC has recommended against pumping it down even 70 cm from the 1994 level. This variation in water levels is enough to warrant a thorough geotechnical assessment to determine the adequacy of the containment structure for the currently proposed use.

During the 28 August 2001 site visit, the sloughing on the pond side of the embankment was still evident but appeared to have stabilized. This must be verified by a qualified geotechnical engineer as must the stability of the backslope. In the BGC report, erosion of the embankment on the river side is identified and shown to be several metres downstream of the actual tailings impoundment. This area was apparently not rip-rapped during construction activities in 1982. Active erosion is evident with the presence of loose gravel and the lack of vegetation.

Significant erosion of the riprap armour on the embankment upstream of the erosion area identified by BGC, on the river side of the tailings impoundment, was also observed. The riprap shows significant evidence of erosion at the inside bend of the embankment, where the flow of Prairie Creek crosses over from the right side of the channel and the entire flow of the river is deflected by the riprap. At high flows, the maximum force of the river is directed at this point on the embankment and there is evidence of large boulders being shifted by the flows.

From the 1994 and 1995 field observations, the BGC report recommends a good deal of rehabilitation work at the tailings containment structure with an estimated cost ranging from \$750,000 to \$1,230,000. This indicates that the engineered structure had already suffered serious deterioration. Another six years of weathering at the site has occurred since the site visit by BGC staff. Although CZN believes that the slumping has stabilized, a geotechnical survey seems prudent, considering that the location of the site is immediately upstream of Nahanni National Park Reserve.

3. Groundwater monitoring at several locations downgradient of the tailings pond should be required as a condition of project approval.

CZN has not substantiated its claim that no seepage is occurring, by showing that  $\text{inputs} - \text{evaporation} = \text{change in storage}$ . As seepage must be occurring through either the embankments or the base, as the water level is not rising, it is appropriate that groundwater be monitored at several locations downgradient of the tailings facility.

4. An update on the probable maximum flood (PMF) level and flow should be required.

The IR#1 response indicates the probable maximum flood calculation was done with data from 1975 to 1980 at the Prairie Creek flow gauge. An additional 10 years of data, to 1990, are available and should be included in an updated calculation of PMF and, perhaps, for a flood frequency analysis.

-4-

There is also a weather station at the Virginia Falls hydrometric gauge that can provide additional data on which to assess possible flood events. It was reported while on site that the water levels were "halfway or more" up the riprap in the spring. The size of the logs stranded on the gravel bars across from the tailings impoundment also indicate that Prairie Creek has experienced some very large flows. Enhancement of the riprap armour on the tailing pond embankment should be investigated.

### Water Quality In the Tailings Impoundment

#### 5. Data on the water quality in the tailings impoundment is lacking and should be provided.

In response to DIAND IR #3, a statement was made that the water quality in the tailings impoundment is assumed to "closely reflect that of Prairie Creek and the local hydrologic regime from which the water originated". As the source of the water may also include groundwater seepage from the impoundment backslope and surface runoff from disturbed land areas, the quality of the water in the tailings pond needs to be verified.

Prior to the deposition of any effluent into the tailings area, water sampling from the tailings area should be conducted to confirm CZN's assumption about the water quality being similar to that of Prairie Creek. This would provide valuable information about the tailings area either for closure purposes or should the project proceed to the production stage.

#### 6. A more accurate estimate of the ground water quantity discharge from the 870 m portal should be provided to assess current water discharges to Prairie Creek.

During the site visit, an estimate of the water flowing from the 870 m portal was quoted as 60 L/min (Malcolm Swallow). In the response to DIAND IR #8, the discharge was however given as 2 to 10 L/sec (i.e. 120 to 600 L/min). This water drains across the project site to the catchment pond adjacent to Harrison Creek. The control structure on the catchment pond outlet culvert was open during the site visit and water was flowing into Harrison Creek and Prairie Creek. A more accurate estimate of the discharge volume from the 870 m portal should also be provided.

#### 7. Data on the water quality from the 870 m portal should be provided to assess current water discharges to Prairie Creek.

In the response to DIAND IR#5, it is stated the water from the 870 m portal has not been sampled and analysed for metals, even though the water source is the mineralized vein structure and "has been closely associated with highly mineralized vein ore". Analysis of the mine water from the 870 m portal and from the site catchment pond should be required to assess the current water discharges to Prairie Creek.

-5-

8. No mine water should be discharged to Prairie Creek until the chemistry of the decline water is determined and proven acceptable for disposal.

The EA Report indicated that the water quality from the 870 m portal discharge will not be representative of discharges from the proposed decline. This raises the issue of the potential high variability in water quality from the decline and the need for close and periodic monitoring.

9. The periodic monitoring of the mine water quality during decline development should be required to determine the mine water quality and should be a condition of project approval.

Any mine water produced from the proposed decline development should be subject to periodic monitoring. As a minimum, weekly sampling and analysis should be conducted on the mine water produced from the proposed decline. Until the chemistry of the decline water is determined and proven acceptable for disposal, no mine water should be discharged to Prairie Creek.

The EA Report explains that mine water will go to a settling pond and then be released to Harrison Creek and that monthly grab samples will be taken from mine water and analysed for common physical / chemical parameters. As indicated earlier, a greater sampling frequency is more appropriate to provide more complete information. It is also recommended that samples of mine water be also tested for ammonia, as well as those parameters listed by the company's response to RWED/GNWT's IR#2.

A contingency plan will be required at the regulatory stage, should the settling pond not provide sufficient treatment.

In response to DIAND IR#8, CZN states that minewater encountered at the 870m level is "not considered to be representative of the chemistry of the minewater expected to be encountered in the decline". CZN's basis is that the 870m level intersects highly mineralized vein ore at several locations which is a known conduit for water flow (see DIAND IR#5). The proposed decline is to be driven through dolostone/limestone formations and will only intersect the vein near the end, as the other formations are water tight. As a result, CZN has indicated that less water will be produced, which is a reasonable assumption. However, mine water quality should not differ substantially since it is originating from the same source (vein ore). Regular monitoring during decline development should be required to determine the mine water quality and should therefore be a condition of approval.

### **Metallurgical Pilot Plant Operation**

10. Further details about the final disposal and abandonment/reclamation plans for the byproducts of the Pilot Plant Operation will be required at the regulatory stage.

CZN has indicated that there is sufficient storage space within the mill building for the containment of the liquid wastes produced during the operation of the pilot plant.

-6-

As ultimate treatment and disposal of this effluent will be required, it is recommended that CZN be required to provide the following information:

- i. Detailed metal scans of the liquid effluents;
- ii. A plan for the ultimate treatment and disposal of the liquid effluents; and
- iii. A plan for the disposal of the tailing wastes.

### **Waste Rock Management and Disposal**

11. It is recommended that the level of potential heavy metal contaminants leaching out of the old ore stockpile be determined.

In the response to DIAND IR #5, the proponent has stated that they may process some of the material from the existing 20-year old ore stockpile *"thereby reducing the quantity of material as a source of potential contamination"*. The level of metal contaminants in the runoff from this old ore stockpile has not been provided.

The response to DIAND IR#6 (waste rock and ore drainage management)-states that CZN has no concerns about the quality of runoff from the predicted 5200 m<sup>3</sup> of waste rock and the site in general, due to the expected low volume of runoff and the results of past ABA tests conducted on the Upper Spar and Chert/Dolostone rock units.

Although it is stated in CZN's response to DIAND IR#6 that there is no plan to install a control structure between the catchment pond and Harrison Creek, water licencing will establish water quality limits which apply to any release of site wastewater to the environment. Consequently, monitoring of this catchment basin should be conducted to confirm predictions of site runoff quality and determine if a control structure might be needed.

12. A contingency plan to pump and treat deleterious wastewater is recommended for the proper management of the waste rock and ore drainage system.

Again in response to DIAND's IR#6, it is recommended that CZN be required to develop a contingency plan to pump and treat any deleterious water from potential runoff and seepage from the waste rock and ore piles.