Fisheries and Oceans
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Your file *Votre référence*
EA0809-002

Our file *Notre référence*
YK-08-00114

October 29th, 2010

Mackenzie Valley Environmental Impact Review Board
#200 Scotia Centre
5102-50th Avenue
Yellowknife, NT
X1A 2N7

Via e-mail to:
chubert@reviewboard.ca
pmercredi@reviewboard.ca

RE: Fisheries and Oceans Canada - Second Round Information Request for Canadian Zinc Corporation's proposed Prairie Creek Mine Project

Fisheries and Oceans Canada (DFO) would like to thank the Mackenzie Valley Environmental Impact Review Board (MVEIRB) for granting a second round of Information Requests (IR) for the Prairie Creek Mine Project.

DFO's IR submission can be found in the attached document. We have also attempted to cross-reference our current IRs with those previously submitted during the first round as well as those submitted by other parties.

As raised in our previous letter, DFO still requires additional information to make a determination of whether the project will require an authorization under the *Fisheries Act* and to properly assess the potential impacts of the project on fish and fish habitat. With respect to the timing of the proponent's response, it is understood that timelines are an integral part of an efficient review process. Respectfully, however, it is DFO's view that the proponent should take the necessary time to gather the required information and thoroughly respond to all the IR requests, as the quality of the responses could directly affect the efficiency and quality of the next stage of the environmental assessment.

If you have any questions, please do not hesitate to contact Sarah Olivier at (867) 669-4919, by fax (867) 669-4940, or email at Sarah.Olivier@dfo-mpo.gc.ca.

Sincerely,

Sarah Olivier

On behalf of

Beverley Ross
Regional Manager, Environmental Assessment for Major Projects
Central and Arctic Region
Fisheries and Oceans Canada

cc Mike Hecimovich, Fisheries and Oceans Canada
Kelly Austin, Fisheries and Oceans Canada
Lorraine Sawdon, Fisheries and Oceans Canada

Canada

Canadian Zinc Corporation
Prairie Creek Mine

Fisheries and Oceans Canada - Information Request
Round Two

IR Number: **DFO_2-1**
Related IRs: **DFO_01; EC-2-1; PCA 2-2**
Source: **Fisheries and Oceans Canada**
To: **Canadian Zinc Corporation**
Subject: **Nutrient Loading**
References:

- **Section 4.7.4 of the DAR;**
- **IR Response to DFO_01 - Appendix J.**
- **Technical Session - Undertakings #2, 3, 4, 7, 8 and 10**

Preamble:
In our first round of IRs (DFO_01) and based on information in the DAR, DFO requested that Canadian Zinc Corporation (CZN) provide a map of the locations where increases in nutrient levels have been previously observed downstream from the mine site and to assess the potential impacts on aquatic organisms, including fish and fish habitat, due to increases in nutrient loading into the downstream system. CZN was also asked to provide mitigation measures, where appropriate, for all predicted impacts.
In CZN's written response to DFO_01, information was provided about water quality objectives and a map of sampling sites; however this information did not address our initial request. DFO still has outstanding concerns related to possible increases in productivity that may have effects on the fish and the habitat within Prairie Creek, which includes potential effects to all life stages of fish, changes in fish behaviour, and changes of habitat use by all resident fish species. Prairie Creek is a naturally oligotrophic stream (having low productivity) and could be sensitive to any additional loading of nutrient into the system. DFO has concerns that the potential impacts have not been adequately assessed.

This IR relates to Environment Canada's Information request: EC-2-1

Request:

1) As requested in DFO_01, please provide
    a) A map of the locations where increases in nutrient levels have been observed downstream from the mine site within Prairie Creek.
    b) An assessment of the potential impacts on aquatic organisms, including fish and fish habitat, due to potential increases in nutrient loading into the system and provide mitigation measures, where appropriate.

IR Number: **DFO_2-2**
Related IRs: **DFO_02; DFO_2-5; PCA 2-1**
Source: **Fisheries and Oceans Canada**
To: **Canadian Zinc Corporation**
Subject: **Source of Aggregate for road construction and maintenance**
References:

- **Section 6.13 DAR (p. 200);**
- **Section 5 DAR Addendum (p.5-6);**
- **IR Response to DFO_02;**
- **Technical Session**

Preamble:
In CZN's written response to DFO_02, it was stated that "sources of aggregate will not be situated in river beds or within the high water mark of alluvial fans" for the construction and maintenance of the road. CZN also clearly re-iterated this point during the technical sessions. DFO appreciates CZN's commitment to not using watercourse materials as an aggregate source, however, it is still unclear what sources of materials will be used for the construction and maintenance of the road. In Appendix D of the CZN's written IR response submission, borrow sites were identified on a map (Figure II-4) including locations that were either within or near watercourses.

As mentioned during the technical sessions, DFO also noticed that some of the borrow sites identified on the map in Appendix D were located off the main road right of way and that additional spur roads and/or crossings may be required to access these materials.

Request:

1) As stated in DFO_02 and the technical sessions, DFO would still require CZN to identify the locations of all aggregate sources in order to determine if additional access roads and/or crossings may be required.
2) CZN should also update Figure II-4 in Appendix D by removing any borrow sites that are located within the high water mark of any watercourses as well as include any additional access roads and/or crossings that may be required to access the borrow sites. Appropriate sediment and erosion control considerations must be provided, along with the necessary fish and fish habitat assessments for any new spur roads. This is also addressed under DFO_2-5.

IR Number: **DFO_2-3**
Related IRs: **DFO_03; EC-2-1; INAC 02-01**
Source: **Fisheries and Oceans Canada**
To: **Canadian Zinc Corporation**
Subject: **Outfall Design**
References:

- **Section 6.16 (p. 208, p. 216-217); Section 8 (p.257); Section 10.2.5 (p.307) DAR;**
- **IR Response to DFO_03**
- **Technical Session – Undertaking #3, 4**
- **Prairie Creek Mine, Outfall Designs – Preliminary Construction Details, Draft, Northwest Hydraulic Consultants, October 5, 2010.**
- **Prairie Creek Mine, Outfall Performance – Downstream Mixing Analysis, Draft, Northwest Hydraulic Consultants, October 6, 2010.**

Preamble:
CNZ proposed in the DAR to use a diffuser to discharge wastewater into Prairie Creek indicating that this option was chosen in order to "avoid icing and minimize other possible impacts" (p. 257) and to "ensure complete mixing with receiving water" (p.307). CNZ also described the use of a diffuser as a best management practice, in Section 10.2.5 of the DAR, to "promote complete mixing with receiving water and avoid impacts associated with non-mixed, 'neat' solutions". During the technical sessions, CZN announced that the diffuser option would be replaced by an effluent culvert into Prairie Creek and provided a two page preliminary outfall design report.

Canadian Zinc should be aware that DFO will not consider authorizing an outfall design option until the downstream impacts have been adequately addressed. CZN should refer to IRs by other parties, notably INAC02-01 and EC-2-1.

Request:

1) Provide rational for why the diffuser outfall option was replaced by a culvert, refer to INAC02-01, including consideration for how the new option will reduce or eliminate downstream impacts.

Once downstream impacts have been considered and the most appropriate outfall option has been selected, DFO will require:

2) Conceptual designs as well as details on the construction and installation methods for the outfall including consideration for:
    a. maintaining stability of the berm;
    b. anchoring and footprint of the outfall;
    c. area and depth of the trench for installation;
    d. disturbance of the banks and riparian area;
    e. area isolated (for the installation of the effluent dispersal mechanism).

   f. maintenance and subsequent decommissioning of the effluent dispersal mechanism;
   g. mitigation measures incorporated to reduce disturbances to substrate and mobilization of sediment; and
   h. fish screens (if required)

3) Specifics on fish use and type of habitat within the area of influence (including the mixing zone) from the construction and operation of the outfall option are required.

IR Number: **DFO_2-4**
Related IRs: **DFO_04; PCA 2-1**
Source: **Fisheries and Oceans Canada**
To: **Canadian Zinc Corporation**
Subject: **Construction of Winter Road - Water withdrawal**
References:

- **Section 6.22 (p. 230) DAR;**
- **IR Response to DFO_04;**
- **Technical Session - Undertakings # 16**

Preamble:
In Canadian Zinc's initial response to our information request (DFO_04), one waterbody (Mosquito Lake) and several watercourses were identified as potential water sources for the construction and maintenance of the winter road and crossings. Most of the water sources being considered by CZN are or potentially may be fish-bearing.

CZN also mentioned the use of the "*DFO Protocol for Winter Water Withdrawal from Ice-covered Waterbodies in the Northwest Territories and Nunavut",* but was advised in previous meetings as well as during the technical sessions that the protocol does not apply to watercourses. This protocol was developed by DFO in conjunction with industry and other regulators to provide standardized guidance to water users on protective water withdrawal volumes for lakes (DFO, 2010). This protocol clearly identifies criteria and information that must be collected in order for the protocol to apply and includes water source identification, bathymetric survey results and volume calculations. These details have not yet been provided by CZN. As per undertaking #16 from the technical session, CZN has committed to providing that information to DFO for Mosquito Lake prior to using it as a water source.

DFO also stated, during the technical sessions, that site-specific information is required for all watercourse withdrawals during the environmental assessment. DFO is concerned with water withdrawals in these river systems as they are known to be fish bearing and sensitive Bull Trout habitat. Impacts of water withdrawals from rivers, streams and creeks are difficult to predict without site-specific information and may lead to impacts on water temperatures, flow regimes, quantity and quality of over-wintering habitat, available oxygen levels, ice formation and fish survival.

In CZN's response to DFO_04 in Appendix E, groundwater upwelling or groundwater fed systems were also identified as potential water sources, specifically from Sundog Creek and Polje Creek. CZN also recognized that there is a potential for over-wintering fish in those areas and that DFO should be consulted before extraction occurs. Though we agree that consultation with DFO should occur, this does not address the need to collect baseline information, as part of the environmental assessment, in order to predict and mitigate any potential impacts.

Please also refer to PCA 2-1.

Request:

1) DFO still requires specific locations and annual volumes (per source) of water for the construction and maintenance of the road and crossings. This should also consider any additional spur roads needed to access aggregate sources (see DFO_2-2). All data should be site and seasonally specific, including bathymetric survey results as well as the calculation of the total available water volume (lakes) or flow (streams) under ice for each source.
2) Provide an assessment of potential impacts from water withdrawals at each watercourse locations, including potential effects on overwintering and spawning habitat for all the fish species found in those watercourses. CZN should also discuss potential changes to water temperatures, flow regimes, reduction in quantity and quality of over-wintering habitat, depletion of available oxygen, changes in ice formation and possibility of fish kills.
3) Provide water source alternatives or other road construction options in order to reduce water requirements (i.e more clear span bridges), in the event that the current water source options do not have insufficient flow to protect fish and fish habitat.

IR Number: **DFO_2-5**
Related IRs: **DFO_05; PCA 2-1**
Source: **Fisheries and Oceans Canada**
To: **Canadian Zinc Corporation**
Subject: **Access road – Erosion, Runoff and Extreme Events**
References:

- **Section 4.4.1 (p. 81), Section 9.3.2 (p. 292), 10.1.2 (p. 300-301) 10.2.5 (p. 307) DAR, CZN, March 2010**
- **IR Response to DFO_05**
- **Technical Session - Undertakings # 11 and 17**

Preamble:
During the technical sessions, CZN committed to developing a sediment and erosion control plan for the road (Undertaking #11). Though this commitment was supported by DFO, CZN must also provide details on how sediment and erosion prevention techniques have been incorporated into the overall design of the road and crossings. DFO also asked that CZN provide typical design plans for the road and crossing, including details on any physical footprints within the high water mark of crossings (i.e bank stabilization, abutments, etc). DFO requires this information during the environmental assessment in order to determine whether any of these works will require an authorization under the *Fisheries Act*.

Request:

1) Provide conceptual design plans for representative sections of the road and crossings, with special consideration for Funeral Creek, and any other area of the road that may be vulnerable to such things as extreme events, permafrost slumping, and erosion.
    a. list mitigation measures appropriate to those representative section and/or vulnerable locations and how they will mitigate impacts to fish and fish habitat.
    b. Clearly identify where sediment and erosion control prevention techniques have been incorporated into the road and crossing designs.
2) Describe monitoring activities for the road to ensure that it will not be a sediment source to the adjacent watercourses during the construction, operation, temporary closure in the summer and during extreme events.

IR Number: **DFO_2-6**
Related IRs: **DFO_06; DFO_04; INAC 03; PCA 13**
Source: **Fisheries and Oceans Canada**
To: **Canadian Zinc Corporation**
Subject: **Groundwater Discharge to Prairie Creek**
References:

- **Section 8.3 and Appendix 1, DAR;**
- **IR Response - Appendix E & H**

Preamble:
CZN has identified that a cone of groundwater depression around the Mine will occur as a result of mine dewatering and operations. In CZN's response to INAC03, it was indicated that this area of reduced groundwater would impact a segment of Harrison Creek, greatly reducing or eliminating surface flow.

Bull Trout have a strong association with groundwater discharge, often spawning in areas of groundwater upwellings. These areas are important for incubation of eggs, emergence and survival of juveniles as well as overwintering habitat.

Concern exists that the removal of groundwater may have an impact on the distribution and volume of groundwater upwellings in nearby streams, including Harrison and Prairie Creek. This may also impact the volume of surface water available and induce impacts on the direct and indirect fish habitat present around the mine site.
In order to predict potential impacts of a reduction in groundwater discharge to the system and impacts on direct and indirect habitat, DFO would require more information.

Request:

1) Provide predicted impacts of the removal or reduction of groundwater flow to Harrison and Prairie Creek from mine dewatering and operation on the fish (i.e. Bull Trout and arctic grayling during their various life stages) and their habitat.
2) Provide mitigation measures to reduce or eliminate impacts to fish.

IR Number: **DFO_2-7**
Related IRs: **DFO_08, DFO_2-2; PCA 2-1**
Source: **Fisheries and Oceans Canada**
To: **Canadian Zinc Corporation**
Subject: **Access Road - Fish Habitat Assessment**
References:

- **Section 9.3.2 (p. 292); Appendix 14 DAR, CZN, March 2010**
- **Response to IR DFO_08**
- **CZN Responses to Information Requests, Appendix E**
- **Technical Session – Undertakings # 12**

Preamble:
DFO requested as part of DFO_08 that CZN provide additional details on each water crossing including crossing locations, crossing structures and size, where DFO Operational Statements will be used, methods for installation and mitigation measures to reduce or eliminate impacts to fish and fish habitat. CZN provided Table E1 in Appendix E of the IR response showing information about each of the 48 crossings. As noted in DFO_2-2, DFO noticed that additional roads may be needed to access aggregate sources and may require new watercourse crossings. These should be included in table E1.

Additionally in CZN response to our IR, they committed to ensuring that the channel, bed and banks of the stream, for all crossings and abutments, are protected. For completely frozen conditions, simple snowfill should be adequate most of the time; however, stream banks may still require protection. If stream banks are not completely frozen, additional protection may be required to support the weight of trucks and heavy equipment.

Request:

1) Photos were provided in Appendix E of the IR response, but location of the crossing and specific kilometre markers were not clearly identified. These should be provided.

2) Please provide an updated table E1 to ensure that all water course crossings. This includes all watercourse crossings for any new crossings to access borrow sources.

IR Number: **DFO_2-8**
Related IRs: **DFO_09**
Source: **Fisheries and Oceans Canada**
To: **Canadian Zinc Corporation**
Subject: **Closure and Reclamation Plan**
References:

- **Appendix 27 DAR, CZN, March 2010**
- **Response to IR DFO_09**
- **CZN Responses to Information Requests, p.58**
- **Linked to Technical Session – Undertaking #11 & 18**

Preamble:
As part of our review of the DAR and Appendix 27, DFO noticed that some activities related to closure and reclamation may potentially impact fish and fish habitat, particularly those related to the reclamation of portions of the access road along Funeral Creek, and may require an Authorization under the *Fisheries Act*. DFO had asked CZN (IR DFO_09) to describe measures to prevent sediment from entering the creek, methods for road bed and culvert removal as well as how fish (i.e. Bull Trout) and their habitat would not be impacted by these activities.

In the responses to this information request , CZN proposed to the following measures:

- Coarse or/and organic materials would be place adjacent to the creek to prevent sediment discharge until vegetation has established;
- re-contouring of the road bed to create natural slopes, and may include armouring or silt fencing to control sediment ;
- where a road bed crosses a channel, the road bed would be removed.

Requests:

1) What other methods will be used, during decommissioning, to provide long term stability, prevent mobilization of sediment and to reduce erosion along Funeral Creek? As an example, a description of timing windows for decommissioning of the road, consideration of bioengineering solutions, details on re-vegetation (or a commitment to developing a long term sediment and erosion control plan), etc. should also be provided.
2) How will CZN ensure the effectiveness of the proposed mitigation measures during and after closure? And what adaptive management options have CZN considered?

IR Number: **DFO_2-9**
Related IRs: **DFO_11**
Source: **Fisheries and Oceans Canada**
To: **Canadian Zinc Corporation**
Subject: **Impact Assessment - Fish and fish habitat**
References:

- **Section 10.2 (p.302) DAR, CZN, March 2010**
- **Section 7.0 of the Addendum**
- **IR Response to DFO_11 , p. 59-60**
- **Technical Session – Undertaking # 18**

Preamble:
In CZN response to DFO_11, they provided a revised version of Table 5 from the DAR which summarized the potential for significant impacts to fish and fish habitat.

Request:

1) In the revised version of Table 5, water quality post-closure was identified as having a "low" impacts to fish and fish habitat even though the criteria in the matrix was characterized as follows:
    a. Geographic Extent – **Moderate** (Portion of Prairie Creek)
    b. Duration – **High** (Perpetuity)
    c. Frequency – **High** (Perpetually continuous)
    d. Variance – **Moderate** (flow variation)
    e. Reversibility – **High** (hard to resolve)

Considering that all of the criteria ranked either high (3 out of 5) or moderate (2 out of 5), it is not clear why the impacts were characterized as "low". CZN should provide a rational for this conclusion as well as a description of acceptable mitigation measures in order to minimize impacts to fish and fish habitat.