



May 6, 2011

Chuck Hubert
Environmental Assessment Officer
Mackenzie Valley Review Board
Suite 200, 5102 50th Avenue,
Yellowknife, NT
X1A 2N7

Dear Mr. Hubert

**RE: Environmental Assessment EA0809-002, Prairie Creek Mine
Commitments to Provide Information, April 12 Technical Meeting
PROGRESS REPORT**

I refer to your letter dated April 13, 2011 on the above noted subject. At the April 12, 2011 Technical Meeting in Yellowknife, Canadian Zinc Corporation (CZN) committed to provide additional information. This letter with appendices provides the information requested. Our reply refers to the items listed in your letter. Please note that this letter is a progress report since some items are not complete at this time. We expected to be able to provide the remaining items in the next few days.

1. *Review of error on Table F5, Appendix F for treated mine water during low flows (8L/s rather than 80L/s), including implications to Appendix D, Tables 5 and 8.*

Refer to letter attached from Northwest Hydraulics Consultants (NHC) in Appendix A. The implications regarding Appendix D of the IR2 reply are addressed in other documents referred to below.

2. *Analysis of the likelihood of the return period for the documented 1 in 16 year Prairie Creek low flow.*

Refer to letter attached from NHC in Appendix A. The answer is 1 in 25 years.

3. *Time periods between first and second set of TIE tests i.e., dates for each test.*

On January 28th, a cerio daphnia test was conducted a simulated effluent ratio of mine water to process water of 4:1. On Feb 15th, a 5% effluent strength was tested. Therefore, there was approximately 2.5 weeks between the two tests.

4. *Tailings management: volume of DMS waste rock diverted to waste rock pile.*

Not complete.

5. *Compile a list of operational contingency plans in the event that mine effluent cannot be discharged into Prairie Creek.*

Operational contingency plans regarding site water management and water discharge are explained in Table 1.

We also committed to updating our Commitments Table with cross-referencing. This is given as Table 2.

6. *Velocity of the effluent discharge for each exfiltration pipe. For each of the modelling scenarios (max, mean and minimum open water and max, mean, and minimum ice cover), the projected velocity increase at the boundary of the IDZ as result of flow and effluent.*

Refer to letter attached from NHC in Appendix B (data contained in their Table 3).

7. *Review of transcription error in Appendix L, table 1 (i.e., mean depth and max depth) and any implications this error may have to modelling.*

Refer to letter attached from NHC in Appendix A. There were no implications to modelling.

8. *Background information and examples of the use of exfiltration discharge design in other locations.*

Refer to letter attached from NHC in Appendix A.

9. *Cross sectional percentage of the discharge flow area relative to Prairie Creek as a whole for each flow scenarios (max, mean and minimum open water and max, mean, and minimum ice cover).*

Refer to letter attached from NHC in Appendix B (data contained in their Table 3).

10. *Expected effluent output parameters from the sewage treatment plant.*

Following communication with Environment Canada, we were informed that this issue relates to assumptions of sewage effluent quality based on 2009 data from Diavik, given that 2010 data are worse. As a result of other work undertaken since the Technical Meeting, Appendix F from the IR2 reply has been updated. The updated version is attached as Appendix C (not complete). The sewage effluent issue is addressed in this document.

11. *Examine Northern Species Sensitivity Distribution Approach to establishing SSWQO for Copper, Cadmium Zinc, and Mercury for fish relative to the general guidelines.*

Not complete.

12. *Predictions of impacts of nutrient enrichment to the receiving environment.*

Not complete.

13. *Ecological consequences of SSWQO for cadmium, zinc, and mercury.*

Not complete.

Other Items

Aerial surveys for wildlife occurrence in proximity to the access road were conducted over the 2010/2011 winter. A figure is attached (Figure X) showing the occurrence of caribou based on the surveys.

Conceptual engineering has been completed for a bridge structure over the incised tributary of Sundog Creek at Km 23 on the access road. A figure is attached showing a revised road alignment to tie into the proposed bridge location. Also attached are concept sketches of the bridge. Field survey will be completed this summer in order to further the engineering design.

Yours truly,
CANADIAN ZINC CORPORATION



David P. Harpley, P. Geo.
VP, Environment and Permitting Affairs

TABLE 1: CONTINGENCY TABLE (May 6, 2011)

ISSUE	CONTINGENCY
Discharge Water Quality	
Water quality of either treated mine water or treated process water does not meet specified criteria.	Recirculate offending stream, either within the WTP, or by pumping to the WSP.
Water quality of Catchment Pond does not meet EQC.	Stop discharge and pump back water to WSP.
Spill in Main Yard may affect Catchment Pond water quality.	Prepare to stop all discharge and pump back water to WSP.
Ammonia or nitrate concentrations rising in WSP to point where EQC could be exceeded.	Switch to stick explosives until concentrations abate.
Phosphate concentration rising in WSP to point where EQC could be exceeded.	Investigate cause. If necessary, explore tertiary treatment options.
Receiving Water Quality	
Monitoring indicates exceedence of objectives.	Review discharge water quality and AEMP results. Depending on cause, adaptive management as laid out in the AEMP may need to be employed.
Discharge Mechanism	
Efficiency of exfiltration pipe reduced.	Backwash. If not successful, switch to alternate pipe.
Gravity discharge not sufficient and discharge pumps off-line.	Pump back excess to WSP.
Pumps for discharge and pump back off-line.	Stop water treatment.
Intense rainfall and runoff overwhelms Catchment Pond.	Open emergency culvert to Harrison Creek.
Flood damages exfiltration pipes.	Use culvert to Harrison Creek until repaired.
Flood protection berm fails inundating site.	Stop treatment, open emergency culvert to Harrison Creek.
Water Treatment Plant Malfunction	
Power supply failure.	Switch to stand-by generators.
Problem occurs with one of two tanks for each of mine water and process water treatment circuits.	Switch all treatment to the other tank.
Problem with process water treatment circuit.	Stop process water treatment.
Problem with mine water treatment circuit.	Stop mine water treatment.
Problem with mine water treatment circuit and treatment needs to continue.	Stop process water treatment and use process water circuit for mine water.
Water Storage Limitations	
Process water cell at over-capacity.	Treat more process water and/or increase the proportion of process water recycled to the Mill (the recycle at 65% of the total feed is to prevent major ion build-up in the WSP, but the recycle can be 100% temporarily).
Mine water cell at over-capacity.	Treat more mine water and/or increase the proportion of mine water recycled to the Mill.

TABLE 1: CONTINGENCY TABLE (May 6, 2011)

Both cells at over-capacity.	Treat more and/or stop the Mill and have both WTP circuits treat mine water.
Intense rainfall event occurs when ponds full.	Temporarily use pond freeboard.
Process water cell dyke fails or cell inoperable.	Stop Mill until dyke repaired or cell operable.
Process water cell dyke fails releasing process water to site.	Close Catchment Pond. Stop Mill until dyke repaired and released water treated. Treat and discharge process water via closed 'winter' pipe.
Mine water cell dyke fails or cell inoperable.	Send mine water directly to Mill and WTP.
Mine water cell dyke fails releasing mine water to site.	Close Catchment Pond. Stop Mill until dyke repaired and released water treated. Treat and discharge mine water and process water via closed 'winter' pipe, or mine water only if additional capacity required.

TABLE 2: COMMITMENTS TABLE (May 6, 2011)

Consultation	Source
Continue to engage First Nations throughout the EA process.	DAR, section 7.2
Operate and participate in a Technical Advisory Committee (TAC) which will meet in the region three times annually to review and discuss mine operations and monitoring results, and other issues of mutual interest in the region.	DAR, section 7.3
Welcome NBDB, LKFN, other First Nation, and Government representation on the TAC.	Reply to IR2, Appendix J.
Appropriate collaborative monitoring initiatives with First Nations, Parks Canada and other regulatory agencies will be supported.	DAR, section 10.7.1
The Nahanni Butte community information representative position will be continued during operations.	DAR, section 11.3
Culture	
If possible heritage/cultural resources are found, they will be preserved and the authorities notified.	DAR, section 11.2
Deter and monitor un-authorized use of the access road and hunting.	DAR, sections 9.4.1 and 11.4
Employ an NBDB member as an environmental monitor.	Impact Benefits Agreement between NBDB and CZN, Jan. 20, 2011 (confidential).
Involve NBDB members in spill response training and inform the Band of any spills.	NBDB-CZN Meeting Report, June 10, 2010.
Regarding the proposed road re-alignments between the expanded NNPR boundary and the Liard River, an archaeological impact assessment will be conducted (hopefully in summer 2011). Note that this work will be done when the road alignment has been confirmed more accurately, and work will focus on the alignment from Nahanni Butte to Grainger Gap.	Reply to IR GNWT6
Socio-Economics	
Impact Benefit Agreements will be negotiated with the Nahanni Butte Dene Band and the Liidlii Kue First Nation.	DAR, Appendix 19
Negotiate a Socio-Economic Agreement with the GNWT	Technical Meeting, Oct. 6, 2010
A hire-first policy for qualified local (Nahanni Butte) residents, then Dehcho residents, then northern residents, will be adopted.	DAR, section 11.1
Services and supplies will be sourced locally and across the north, provided these are competitive.	DAR, section 11.1
Employment of Dehcho residents and social impacts will be monitored via annual IBA reports, and details of mine employment, training and contracts given out will be provided. Such reports will also be the basis for reporting to regulators.	DAR, section 11.3
Employees will be offered a variety of mine related training courses, including skills training in their area of employment and in safety. The Mine scholarship program will continue.	DAR, Appendix 19

TABLE 2: COMMITMENTS TABLE (May 6, 2011)

The Mine will work with communities and its leaders to develop and implement strategies to limit negative health outcomes, such as drug and alcohol abuse.	DAR, Appendix 19
The Mine will continue to be active in Study Area communities through sponsorship programs that will improve life for communities and those not benefiting from the Project directly.	DAR, Appendix 19
Applicants for work at the mine will be notified that should they be employed, they will have to make appropriate arrangements for child care in their absence.	Reply to IR GNWT7
Contractors and subcontractors will be required to sign an Employment Contract and Code of Conduct regarding adhering to policies such as northern employment criteria, which will be part of selection evaluation criteria. Information on potential employees will be passed on to contractors, and Study Area communities will be notified of construction and hiring timelines.	Reply to IR GNWT8
The Mine's socio-economic Adaptive Management System will consist of: a <i>Monitoring System</i> consisting principally of a year-long process of collecting and analysing data and trends regarding the outcomes from participation in the Project and more general socio-economic progress of the Study Area; and, a <i>Response System</i> consisting of a formal session to communicate results and receive input from representatives of the affected communities on areas where changes could improve outcomes and productivity.	Reply to IR GNWT10
After fulfilling obligations to IBA's and the Nahendeh Aboriginal Economic Council, the Mine will advertise its needs in regional newspapers and continue participation in regional NWT trade shows to communicate the opportunities associated with the project. A database of NWT qualified businesses related to various services and supplies will be maintained.	Reply to IR GNWT13
An annual operations report will be produced to provide the public with information regarding the production schedule at the Prairie Creek Mine, its employment record, and planned activities for the upcoming year. This report will inform Study Area, Deh Cho and NWT residents and regulators, and will include information on employment and business procurement.	Reply to IR GNWT15
Fish	
Any habitat losses will be replaced to the satisfaction of Fisheries and Oceans Canada (DFO).	DAR, section 10.2.4
DFO's <i>Operational Statements</i> for creek crossings, including span structures and ice bridges/snow-fills, will be adopted. Physical footprints will not be introduced within the high water mark of crossings, other than snow and ice.	DAR, section 10.2.4, and reply to IR2 DFO 2-5.
Disturbance of stream banks and riparian areas at stream crossings will be minimized. Stream banks will be protected as necessary, with the possible use of ice and/or matting. A stable road bed will be constructed adjacent to creeks and runoff control will be provided. Revegetation of riparian areas will be promoted.	DAR, sections 9.3.2 and 10.2.4

TABLE 2: COMMITMENTS TABLE (May 6, 2011)

Temporary crossing structures and snow-fills will be removed at break-up.	DAR, section 10.2.4
Best management practice sediment controls will be adopted at the Mine and along the access road.	DAR, section 10.2.5
A sediment and erosion control plan will be developed for construction and operation of the access road as a condition of a new road LUP.	Technical Meeting, Day 2, Oct. 7, 2010
The 'DFO Protocol for Winter Water Withdrawal from Ice-Covered Waterbodies in the NWT' will be adopted for water supply from lakes for road construction. Appropriate data will be provided to DFO for approval before extraction occurs. Assessment data for creeks will be collected and DFO consulted for approval before extracting water from creeks. Expected water sources are the Mine well, Mosquito Lake and the Liard River. A short spur road to Mosquito Lake already exists and will be utilized. Other lakes will be quantified and water extracted based on the protocol. The main water use is expected to be for road bed construction. Creek crossings will be primarily by snow-fill. Clear span structures will be considered if conditions vary from those expected.	Reply to IR2 DFO 2-4.
Disruption of the only known spawning location in the area (bull trout in Funeral Creek) during the spawning period (mid-August) will be avoided.	DAR, section 10.2.4
The site policy of no fishing and any other unnecessary disturbance of the aquatic environment will be continued.	DAR, section 10.2.4
Sources of aggregate will not be situated in river beds or within the high water mark of alluvial fans. No additional access roads and/or crossings will be required to access aggregate sources.	Reply to IR DFO2, and IR2 DFO 2-2.
To reclaim the Funeral Creek road after Mine closure, coarse material or organic material will be placed adjacent to the creek to prevent sediment discharge until vegetation has established. Any channels flowing over the re-contoured road area will be armoured. Silt fence will be used where necessary to control sediment immediately after re-contouring. Materials will be placed on the road bed and not the bed of Funeral Creek	Reply to IR DFO9
For exfiltration trench construction, measures for isolation of the work area and protection of the creek will be further developed after a positive EA outcome and during detailed design, to the satisfaction of DFO. A construction water management plan and spill contingency plan would also be developed.	Reply to IR2 DFO 2-3.
A detailed habitat assessment of the proposed location of the exfiltration trench will be conducted in 2011. Design modifications and/or the incorporation of additional elements will be considered as part of detailed design to avoid habitat loss. If it is determined that habitat loss is unavoidable, a suitable habitat compensation plan will be developed, also during detailed design.	Reply to IR2 DFO 2-3.
On mine closure, the approach to decommissioning of the exfiltration trench will be determined in consultation with DFO.	Reply to IR2 DFO 2-3.
Wildlife	
The Nahanni Butte Dene Band will be consulted in the development of a wildlife management plan.	Technical Meeting, Day 2, Oct. 7, 2010

TABLE 2: COMMITMENTS TABLE (May 6, 2011)

The draft Wildlife Mitigation and Monitoring Plan (WMMP) will be updated during the permitting process. The plan will be considered a 'living' document, and further changes will be considered as necessary during operations, such changes being considered and discussed in the forum of the Technical Advisory Committee.	Reply to IR2 EC 2-3.
Guidelines found in the "Safety in Grizzly and Black Bear Country" document will be followed to prevent and mitigate bear-human interactions.	Reply to IR2, Appendix K.
All relevant observations of wildlife (particularly of Dall's sheep, caribou, grey wolf, wolverine and grizzly bear) will be reported to mine environmental staff.	Reply to IR2, Appendix K.
If a nesting bird is found on site and eggs are present, monitoring will be conducted and efforts will be made to avoid the area. Any raptor nesting activity observed within 1.5 km of the Project will be reported to GNWT ENR.	Reply to IR2, Appendix K.
An effective Waste Management Plan will be implemented, particularly as it relates to the disposal of food waste.	Reply to IR2, Appendix K.
Hunting, trapping and harvesting by site employees and contractors will be prohibited.	DAR, section 11.2
The transfer facilities will be closed, all fuel, waste and sewage removed, and free of all attractants outside of the haul season.	DAR, section 6.24.3 and Technical Meeting, Day 2
Non-mine vehicles, including all terrain vehicles (ATVs) and snowmobiles will be prohibited on site.	Reply to IR2, Appendix K.
Pets will be prohibited on site.	Reply to IR2, Appendix K.
The guidelines for responding to bear encounters (contained in the Health and Safety Plan) will be reviewed and updated.	DAR, section 10.3
On-site personnel will receive basic bear awareness and safety training, including information on bear behaviour, how to avoid bear encounters, and how to respond to bears in the case of an encounter. Site environmental officers will be tasked with overseeing the program in terms of enforcement and effectiveness.	Reply to IR2 PC2-7.
On-site personnel will be educated on the applicable policies and practices contained in the Wildlife Mitigation and Monitoring Plan.	Reply to IR2, Appendix K.
On-site personnel will be discouraged from using areas outside of immediate work sites.	Reply to IR2, Appendix K.
Wildlife sightings in proximity to the Mine site and access road will be recorded in a wildlife sightings log, including location, numbers observed and reactions .	DAR, section 10.3
The appropriate regulatory agencies (<i>e.g.</i> , GNWT ENR and Parks Canada) will be informed of any incidents with problem bears or other wildlife prior to action, unless imminent worker safety is at risk.	Reply to IR2, Appendix K.
Bear use of habitats near mining infrastructure (<i>e.g.</i> spring foraging by bears in disturbed areas) will be documented.	Reply to IR2, Appendix K.

TABLE 2: COMMITMENTS TABLE (May 6, 2011)

A warning system will be developed for site workers in connection with bear sightings, as well as a structure for reporting bear-human encounters.	DAR, section 10.3.1
Dead wildlife encountered in proximity to the mine site and access road will be recorded and geo-referenced.	Reply to IR2, Appendix K.
Site workers will be encouraged to eat only in designated areas, . Workers will be made aware as part of site orientation when they start that food, food waste and wrappings are not to be left around the site or in buildings where un-controlled entry is possible.	Reply to IR2 PC2-7.
Food waste will be collected and incinerated on a daily basis.	Reply to IR2 PC2-7.
All food and garbage/waste will be stored in bear-proof areas or bear-proof containers, including at the transfer facilities.	Reply to IR2 PC2-7.
All chemicals and supplies will be stored in an enclosed Warehouse structure. Small quantities will be transferred to their point of use (in the Mill or shops) as required.	Reply to IR2 PC2-7.
Measures aimed at reducing the number of birds that use the water storage pond (WSP) will be implemented.	Reply to IR2, Appendix K.
To reduce noise along the access road, the use of engine retarders will be discouraged.	Reply to IR2, Appendix K.
Flight paths to and from the mine will be considered according to the recommended guidelines for flying in caribou and sheep country, where feasible and within topographic and safety constraints.	Reply to IR2, Appendix K.
The Flight Impact Management Plan will be reviewed and updated.	DAR, section 10.3
A Dall's sheep monitoring program will be implemented to ensure that Project-related effects on sheep are minimized. A monitoring plan is described in the draft Wildlife Mitigation and Monitoring Plan, and this is considered to be a response to Undertaking 23 from the Oct. 7, 2010 Technical Meeting.	Reply to IR2, Appendix K.
High snow banks along the access road will be avoided so that wildlife can avoid traffic. Failing this, lower snow banks will be left every 100 m to facilitate wildlife moving off the road surface.	DAR, section 9.4.1 and 10.3
Maximum traffic speeds for all sections of the access road will be implemented accounting for road grade, curvature, adjacent sensitivities and sight-lines. Lower maximum speeds may be posted in the vicinity of sensitive wildlife areas.	Reply to IR PC4
Salt will not be used on the road alignment.	Reply to IR PC4
Vehicle operators will yield right-of-way to wildlife and will take all reasonable measures to avoid vehicle-wildlife incidents.	Reply to IR2, Appendix K.
When any SARA species is visible on the road, vehicle activity will cease until the animals have moved a safe distance away or are no longer visible.	Reply to IR2, Appendix K.
A signage system will be employed along the access road to inform vehicle operators of vehicle/wildlife conflict areas.	Reply to IR2, Appendix K.
All vehicles will be equipped with two-way radios. Wildlife sightings along the access road will be geo-referenced and reported to road supervisors.	Reply to IR2, Appendix K.

TABLE 2: COMMITMENTS TABLE (May 6, 2011)

Non-mine road traffic will be deterred from using the road by signage and operating a check-point and screening station near the south-eastern terminus of the access road, manned by representatives from the Nahanni Butte Dene Band.	Reply to IR2, Appendix K.
Public use of the access road and evidence of land use, such as hunting, fishing, camping, or firewood harvesting will be noted and reported.	Reply to IR2, Appendix K.
The south-eastern end of the access road will be blocked at specified locations after each hauling season with gates, berms, pits and/or boulders to discourage use.	Reply to IR2, Appendix K.
Wildlife monitors will conduct ground surveillance during the initial mine start up and production period.	Reply to IR2, Appendix K.
Wildlife Monitors will conduct ground-based surveys of the access road (during winter operation), mine infrastructure sites, and the airstrip to assess caribou presence and identify caribou aggregations in the Project area.	Reply to IR2, Appendix K.
A radio call-in procedure will be implemented so that observations of caribou along the access road can immediately be relayed to the Road Operations Supervisor.	Reply to IR2, Appendix K.
A procedure will be implemented so that caribou observations made by aircraft pilots during transport of crews and materials will be reported to the Wildlife Monitor.	Reply to IR2, Appendix K.
Wildlife Monitors will contribute to a detailed quarterly report of wildlife observations and incidents that occurred during the monitoring period. Reports will be submitted to First Nations, GNWT ENR, Environment Canada and Parks Canada.	Reply to IR2, Appendix K.
For caribou, wood bison, grizzly bear, wolverine, peregrine falcon, short-eared owl, horned grebe, rusty blackbird, olive-sided flycatcher, and common nighthawk, any mortality directly relating to the operation of the mine site or access road will trigger a review of mitigation strategies.	Reply to IR2, Appendix K.
Summer maintenance work on the all season road will be voluntarily restricted to the period July-September. Wildlife monitors will check for nesting birds before work commences.	Reply to IR2, Appendix K.
Operations Management	
Existing Prairie Creek Mine buildings and structures were designed and constructed by Kilborn Engineering Ltd. to the National Building Code. All new facilities will be also.	IR reply, Appendix D.
During the detailed design phase, a deterministic hazard assessment (DHA) for the project site will be undertaken, including review of ground acceleration coefficients.	IR reply, Appendix D.
All personnel will receive appropriate training to ensure they are fully aware of health, safety and environmental policies and practices and able to perform tasks in compliance with established policies and legislation; and to ensure employees are fully aware and trained to respond to an emergency.	DAR, section 6.25

TABLE 2: COMMITMENTS TABLE (May 6, 2011)

Aggregates for the Mine would be sourced from the on-site quarry and possibly other local sources. Any crushing required will occur set back from the creek with a buffer for runoff.	DAR, section 8.2.5
Explosives for Mine operations will be exclusively emulsions or sticks.	Reply to IR NRCan1
Reagents currently stored on the Reagent Storage Pad south of the Mine will be consumed during operations or taken off-site for disposal.	DAR, section 6.3.11.
Due care and precautions will be taken during the winter transfer of sulphuric acid from tankers to storage tanks.	DAR, section 8.2.4
All concentrates will be shipped in bags free of external concentrate dust . Any torn bags will be double-bagged, and any spillage cleaned-up completely.	DAR, section 6.24.3
Water for fire suppression will be taken from the water ring main.	DAR, section 6.3.15
Drummed hazardous waste will be collected in the Waste Transfer Area for off-site disposal by a registered carrier following all applicable regulations.	DAR, section 6.14
Waste motor and lubricating oil will either be blended with diesel fuel or used for incinerator ignition.	DAR, section 6.14
Existing infrastructure will be surveyed for asbestos-containing material, and any such material found will be removed and landfilled within the Waste Rock Pile footprint.	DAR, section 6.14
A solid waste facility will be operated consisting of a solid waste landfill for inert material, a fenced sewage sludge landfill and a landfarm for hydrocarbon contaminated soil.	DAR, sections 6.14 and 8.2.5
Heat traced pipe will carry process water and mine water to and from the Water Storage Pond. Lines will be inspected frequently, and will run along the access road and not next to Prairie Creek.	DAR, sections 6.3.15 and 8.8.4
A spill contingency plan for the Mine and access road will be reviewed and updated. The plan will include the transport, manufacture and use of explosives and components of explosives.	Reply to IR NRCan1 and IR2, Appendix I
Water treatment sludge will be combined with the backfill mix and taken underground, as will ash from the incinerator. In the unlikely event that monitoring and assessments during operations indicate that a period of water treatment needs to continue after mine closure, any sludge will be stabilized with cement and taken to a suitable disposal location. This might be a mine portal that has not been completely backfilled in order to accommodate the sludge, or part of the Waste Rock Pile before cover placement.	Reply to IR2 NRCan 2-6.
Annual geotechnical inspections of major structures (Water Storage Pond, Waste Rock Pile, Flood Protection Berm), and terrain in and around them, will be undertaken.	DAR, section 10.4.4
The Catchment Pond will be lined with a low permeability geomembrane, and the existing culvert to Harrison Creek will be retained for emergency use only.	DAR, section 8.7.2

TABLE 2: COMMITMENTS TABLE (May 6, 2011)

The Catchment Pond discharge mechanism will include pumps on stand-by which can be activated to ensure sufficient discharge. The outfall line will have a valve or gate which can be temporarily closed, if necessary. Discharge of treated water to Prairie Creek during winter will occur via a pipeline from the WTP connected to the outlet culvert in the Catchment Pond. The pond would be isolated from the line to avoid freezing effects. There will be a safety return line from the Catchment Pond to the Water Storage Pond with installed pumps. The outfall line will have a valve or gate which can be temporarily closed, if necessary.	DAR, section 8.7.2, and reply to IR2 INAC 2-11.
The following plans will be developed: Water Storage, Treatment and Discharge Monitoring and Management Plan; Solid and Hazardous Waste Management Plan; Explosives Management Plan; Aquatic Effects Monitoring Plan.	DAR, section 10.7.3
Medical personnel will be on call 24/7 to provide medical, educational and counselling services..	Reply to IR GNWT7
Sub-contractors will be required to adhere to all of the Mine's commitments.	CZN May 6, 2011 letter to MVRB
Road	
The existing Cat and Grainger Camp sites will be reclaimed. A small tote road to Grainger Camp from the new road alignment would be built for temporary access.	DAR, section 6.3.16
Kledo's general approach to road construction (Appendix B) will be adopted (although CZN is not committed to use Kledo).	Reply to IR2 PC2-1.
The western flank of the Silent Hills contains historic failures, and permafrost may exist along the Polje alignment. These areas will be examined in more detail during the detailed design phase of the project.	DAR, Appendix 16
Side hill cuts and fills will generally be avoided except where the evidence is that the ground is free of ice rich permafrost. Cut material will be used if appropriate, or used elsewhere, but not discarded downslope.	IR reply, Appendix D, and reply to IR2 PC 2-1.
The Polje re-alignment will include fill placement, but gaps/swales will be left so natural runoff flow directions are not significantly modified.	Reply to IR2 PC2-1.
Polje Creek will be spanned with a bridge structure which would remain for the duration of the Mine. The base of the deck will be at least 1 m above the normal high water mark. Abutments will be set-back from the top of bank.	Reply to IR2 PC2-1 and DFO 2-5.
All new road alignments will retain the organic layer as much as possible to insulate the underlying soil and limit the potential for permafrost thaw. Adequate drainage will also be provided to avoid unstable slopes.	DAR, section 10.4.2
A level road bed will be created using dozers with shoes fitted on the bottom of the blades. This will ensure minimal disturbance of the organic layer.	IR reply, Appendix E.
Regarding the accumulation of debris on the existing road from upslope, the information will be used to plan the road location with respect to the toe of the slope (in active debris areas).	IR reply, Appendix D.

TABLE 2: COMMITMENTS TABLE (May 6, 2011)

A geotechnical investigation is proposed to support the final design of the access road. The investigation will focus on portions of the access route west of Km 85, specifically, the proposed polje by-pass and immediately west of Wolverine Pass.	IR reply, Appendix D.
The route east of Km 85 will be visually reviewed annually before the following winter. After the first winter of road operations, drainage management at and west of Wolverine Pass will be reviewed, as will the route west of Km 85 to assess the function of cross-road drainage.	IR reply, Appendix D.
Construction and maintenance activities will be continually overseen by supervisors who will ensure appropriate techniques are used such that sediment will not be produced during periods of thaw. This will also apply to seasonal road closure activities, including snow-fill removal.	Reply to IR2 DFO 2-5.
Road monitoring will occur during both construction and operation. During construction, monitoring will be daily to assess how recently constructed portions are performing, and to determine requirements for portions being constructed. During operations, monitoring would initially be daily, with a reduction in frequency as road performance becomes better defined. Drivers will report on road conditions and any areas of difficulty or requiring repair. Snow accumulations will also be monitored to assess the potential for avalanches.	Reply to IR2 PC2-1.
After the first year of construction, and following extreme rainfall events at any time, the re-alignments will be checked for areas of instability, specifically the creek crossings, areas of fill placement, and the switch-backs in the Silent Hills. Low over-flights of these areas are initially proposed to allow for inspection. If problem areas are suspected, follow-up inspections will be made by helicopter, and will include set-downs and the use of small tools (e.g. shovels) and readily transportable materials (e.g. silt fence), as necessary. More significant remedial work would be undertaken during construction in the subsequent road season.	Reply to IR2 DFO 2-5.
Closure activities for side hill cut areas will be formulated using the observations and experience gained during the operating period. It is envisaged that material replacement will occur in order to restore a stable natural slope and provide a suitable medium for revegetation. Measures will be incorporated into the restored slopes to maintain stable surfaces until a vegetation cover has been established	Reply to IR2 PC2-1.
All trucks on the access road will carry spill kits, and drivers must have read the spill contingency plan and be prepared for an appropriate spill response in relation to their load. Drivers must be suitably qualified and experienced.	DAR, section 10.1
All trucks will have communications, will be on alert for on-coming traffic or wildlife presence in the roadway and will be in contact with a controller.	DAR, section 10.1
All of the vehicles and equipment using the access road will be properly maintained and free of leaks. Stationary equipment will use drip pans.	DAR, section 10.1
Road use (including vehicle speeds and driving conditions) will be monitored by radio and inspections. A journey management system (JMS) will be used (see Appendix I of the IR2 response for details).	DAR, section 10.1

TABLE 2: COMMITMENTS TABLE (May 6, 2011)

The access road bed will be sampled before and after the seasonal haul period as a check on potential contamination from concentrate losses.	DAR, section 10.1
Haul trucks collecting the bags (from the Mine) will pass through a wheel wash before leaving the concentrate storage shed.	DAR, section 9.2
The existing Controlled Road Use Plan will be modified for access road operations to promote safety and minimize the risk of accidents.	DAR, section 10.2
Potentially unstable areas and karst features within 200 m of the access road will be inspected at a frequency dependent on observed conditions and changes or lack thereof of those conditions.	DAR, section 10.4
Temporary crossing structures and snow-fills will be removed at break-up to avoid blockage and erosion.	DAR, section 10.2
A stable road bed will be constructed adjacent to creeks and provide for runoff control and minimize the dispersal of sediment during precipitation events.	DAR, section 10.2
Re-vegetation of riparian areas will be promoted to further reduce the potential for sediment dispersal.	DAR, section 10.2
Chemicals will be transported and stored in approved containers.	DAR, section 10.3.1
The Spill Contingency Plan (SCP) will address all potentially hazardous substances used at the Mine or transported along the road. The SCP will contain information that clearly states the responsible party for spill response and clean-up.	Reply to IR2, Appendix I.
Portable spill response equipment will be maintained no more than 50 km from any location along the road.	Reply to IR2, Appendix I.
The SCP will include details of spill responses for all types of ground conditions, including frozen and non-frozen ground, and with and without snow cover. Opportunities for the rapid spread of contaminants will also be considered, such as in karst areas.	Reply to IR2, Appendix I.
A trained spill response team will be maintained at the Mine. Operators at the Transfer Facilities will also receive appropriate spill response training. Training will include classroom study, equipment deployment instruction and spill exercises.	Reply to IR2, Appendix I.
Spill exercises will be undertaken in summer (initial training) and winter (final training) conditions, and in locations representing the range of environmental conditions that will exist on the road.	Reply to IR2, Appendix I.
The erection of a guard rail-type barrier on the outer edge of the road from Km 11-16 will be evaluated to reduce the risk of spills along this section where the grade is steep and a tributary of Funeral Creek exists below.	Reply to IR2, Appendix I.
Suitable locations for the construction of run-away lanes will be investigated for sections Km 11-16 and 19-22.	Reply to IR2, Appendix I.
Specific speed limits may be set for specific types of trucks and loads through sensitive sections.	Reply to IR2, Appendix I.
The road operations supervisor will place limits on hours of driving over a prescribed period.	Reply to IR2, Appendix I.
The road will be regularly inspected and maintained during the operating season to ensure optimal performance and minimize risks from poor road bed conditions.	Reply to IR2, Appendix I.

TABLE 2: COMMITMENTS TABLE (May 6, 2011)

Trucks will be required to use chains from Km 0 to Km 29.	Reply to IR2, Appendix I.
To respond to spills, an Incident Command System (ICS) will be used that is widely used by governments and industry (see Appendix I of the IR2 reply for details).	Reply to IR2, Appendix I.
A silt or other form of curtain will be stored approximately mid-point between the mine and Funeral Creek ready for deployment to reduce flow in part of Prairie Creek adjacent to a spill.	Reply to IR2, Appendix I.
Control points will be established at key locations, and will include material to create temporary dams, absorbents, booms, board weirs and sand bags. Control points locations will include two upstream tributaries to Funeral Creek, on Sundog Creek just above the main falls and just before the fluvial outwash plain, and downstream of the Tetcela River and Fishtrap Creek crossings.	Reply to IR2, Appendix I.
Spill kits will be carried on vehicles with materials appropriate for the loads (i.e. type of sorbent). Comprehensive spill kits will be maintained at the mine site, Cat Camp, the Tetcela Transfer Facility, Grainger Gap, and the Liard Transfer Facility. Custom built and stocked road trailers dedicated to spill response, containing equipment, materials and tools will be considered.	Reply to IR2, Appendix I.
Water Storage Pond	
Mine water will be pumped up to the final sump on the 880 m level, 300 m from the 870 portal. From there, the water will be pumped to the Water Storage Pond. Back-up pumps will be available at the sump to ensure continuous pumping.	DAR, section 6.16.7
The existing pond will be converted into the Water Storage Pond (WSP), with remedial works to stabilize the backslope and a new synthetic liner.	DAR, section 6.3.7.
Repairs to the armour of the flood protection berm will continue when factors are favourable. Critical armour placement is complete. Follow-up work can be completed when circumstances permit, followed by embankment slope reconstruction.	DAR, Appendices 18C and 18D
The crest of the WSP will be at elevation 881 m. The operating water level will be between elevations 877 m and 880 m. The dam emergency spillway will be incrementally below the 881 m crest elevation. The spillway will be located in the eastern dyke of the WSP so that in the highly unlikely event of an emergency controlled discharge, flows would report to the site surface water management system inside the flood protection berm.	Reply to IR PC41
The WSP will be operated with a 1 metre freeboard which will be maintained at all times, unless a short-term emergency storage requirement occurs.	CZN May 6, 2011 letter to MVRB
Detailed design of WSP surface water diversion ditches will be completed after site grading plans have been prepared as part of final design. The ditches will be lined. Monitoring plans will be included. The upslope area will be graded. The frequency and magnitude of extreme events (rainfall, snowmelt) in terms of stability analysis and design of diversions will be considered further as part of detailed design.	IR reply, Appendix D, and reply to IR2 INAC 2-6 and NRCAN 2-2.

TABLE 2: COMMITMENTS TABLE (May 6, 2011)

Water	
A new Mine Water Contingency Plan will be developed.	DAR, section 10.7.2
Seepage from the Waste Rock Pile will be collected in a lined pond and transferred to the Water Storage Pond, as will drainage from the lined DMS rock and ore stockpiles. Pond size and emergency spillway details will be confirmed during final design.	DAR, sections 6.16.8 and 8.9.1, and IR reply, Appendix D.
The Waste Rock Pile lined seepage collection pond will be connected to the site water management system, either by pipeline or by borehole to the underground Mine workings. The pond will be sized to store 6500 m ³ with a 1 m freeboard (accommodating the 1 in 100 year storm event). The pond will have a spillway to discharge flows that exceed pond capacity. The spillway will be located to discharge the peak flows entering the pond without displacing the water already in the pond. Sediment accumulations will be monitored and removed, as necessary. The WRP will have diversions around the pile footprint to prevent runoff from outside the footprint reporting to the pile collection pond. WRP site preparation and pond construction will include oversight and approval by a qualified engineer. The operation plan will include adjacent vegetation preservation to maintain the slope cover	DAR, section 8.7.4 and Appendix 11, and IR reply, Appendix D.
Flows in Prairie Creek will be monitored continuously, and information relayed to the control room in the Water Treatment Plant.	IR2 reply, Appendix F.
Further investigation of the WSP will be undertaken to determine the northern extent of the clay layer and condition of embankment clay. During construction, a quality assurance program will be implemented to ensure the intent of the design is achieved. A maintenance program for the north slope and embankments will be developed and will form part of an Operations and Maintenance Manual. A series of slope inclinometers, thermistor strings and piezometers will be installed after construction. Results will be analysed by a qualified engineer. Measures will be taken to control vegetation growth and to monitor for erosion.	DAR, Appendix 12
A 1 metre freeboard will be maintained in the Water Storage Pond, and a lower operating level will be selected to maintain backslope stability. The water level will be closely monitored. Runoff from upslope will be diverted in lined ditches, west to Prairie Creek and east to the main camp ditch.	DAR, sections 8.7.5 and 8.8.1
If the dyke between the WSP and the Mine site were to fail, contaminated water could be released. The Catchment Pond outlets would be closed to contain the release. The Mill would stop operating so that process effluent is not being sent to the WSP or the treatment plant. The treatment plant would treat only Mine water and the water released from the WSP until the pond is repaired.	DAR section, 8.8.3
If a failure occurs upslope of the WSP putting it out of commission, Mill operations may be stopped and all Mine water treated and discharged until the WSP is back in operation.	DAR, section 9.2

TABLE 2: COMMITMENTS TABLE (May 6, 2011)

Only phosphate-free detergents will be used on-site. Alum will be added to precipitate phosphates. Sewage effluent will be pumped to the Water Storage Pond. Nitrogen concentrations will be minimized by using emulsion explosives with strict explosive management practices	DAR, sections 6.16.6 and 6.16.8, and reply to IR2 EC 2-1.
Sewage produced in outlying areas will be collected and transported to the Sewage Treatment Plant. Grey water will be treated the same as sewage.	DAR, section 6.16.6, and reply to IR2 PC2-7.
During construction, sedimentation from the WRP will be controlled using silt fencing, erosion control blankets or other technologies, as necessary. The completed drainage channels will include erosion and sedimentation control technologies. The performance of these channels will be monitored.	IR reply, Appendix D.
Discharge water quality and the receiving environment's ability to absorb the discharge will be closely monitored. Metals analysis capability will be available on site.	DAR, section 8.6 and NBDB-CZN Meeting Report, June 10, 2010.
During operations, data on actual and potential metal release from the Mine and WRP will be collected and assessed to further develop mitigation and monitoring plans for closure.	DAR, section 8.6
The Mine water treatment plant will be initially sized to treat 134 L/sec, but can be readily expanded to double the capacity (268 L/sec).	DAR, section 8.7.3
The WTP will include a clarifier to remove suspended matter and ensure discharge has low TSS.	DAR Addendum, section 7.1
The water treatment plants will have double pumping systems (one operating and one on stand-by). Stand-by power would operate both plants if power was lost from the main power plant	DAR, section 8.7.3
Treated water quality will be monitored closely to ensure discharge quality meets specified criteria. If water quality is unacceptable, discharge would be stopped by re-circulating the treated water inside the plant, then either the treatment capacity will be increased, or inflows from outside the plant will be stopped and flows will be diverted to the Water Storage Pond.	DAR, section 8.7.3
If discharge concentrations (to Prairie Creek) are higher than predicted, or monitoring detects changes which were not predicted, the response will depend on the parameters considered to be causing the problems, and when they occur. A review of water treatment schedule and performance will be undertaken in conjunction with toxicity studies in order to define the source of the variance from predictions.	Reply to IR2 EC 2-1.
An AEMP will be designed and implemented for the project in accordance with INAC's "Guidelines for Designing and Implementing Aquatic Effects Monitoring Programs for Development Projects in the Northwest Territories - 2007."	CZN May 6, 2011 letter to MVRB
Once water quality objectives (WQO's) for Prairie Creek have been determined and agreed to, the Mine will manage the project so that they are met consistently, unless un-related circumstances occur (such as unforeseen natural events) that prevent the Mine from doing so.	CZN May 6, 2011 letter to MVRB

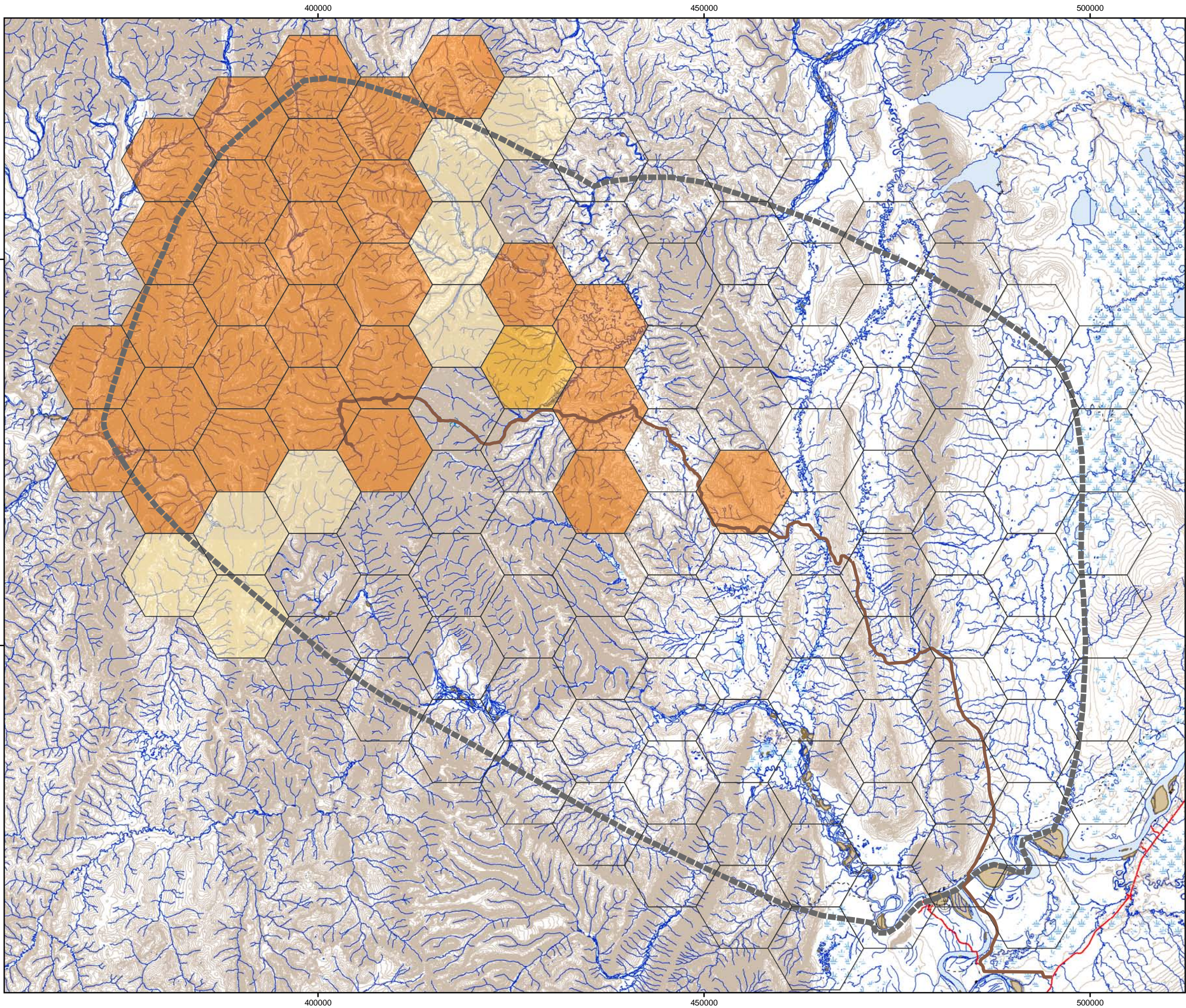
TABLE 2: COMMITMENTS TABLE (May 6, 2011)

The Mine will manage the project so that the WQO's are met at the assessment boundary, unless other circumstances occur beyond the Mine's control.	CZN May 6, 2011 letter to MVRB
The WQO's will be considered applicable for all mechanisms of effluent discharge from the project (e.g. one or two exfiltration pipes, etc.).	CZN May 6, 2011 letter to MVRB
The discharge of treated process water will not occur during the months of February and March.	CZN May 6, 2011 letter to MVRB
Treated process water discharge during other winter months will be less than in other seasons, and will be managed to ensure a minimum dilution ratio with creek water flow (see Appendix C) is maintained.	CZN May 6, 2011 letter to MVRB
Effluent that is acutely toxic will not be discharged.	CZN May 6, 2011 letter to MVRB
Effluent that does not meet the conditions of the Water Licence (e.g. EQC's) will not be discharged.	CZN May 6, 2011 letter to MVRB
Air	
The existing power generating units will be replaced with fuel efficient, compact generators with lower emissions. The existing exhaust stacks will be replaced with a single stack.	DAR, section 6.3.1
A new, low emission incinerator will be brought in to incinerate Camp waste daily. The waste stream will not include plastics or sewage sludge.	DAR, section 6.3.9.
Mitigation and adaptive management strategies and plans will be developed to minimize emissions related to fugitive dust and incineration.	DAR, section 10.5.
Air quality monitoring will likely include sampling for TSP, PM10 and PM2.5 at a minimum of one location on the project boundary (perhaps adjacent to the creek). Passive monitoring stations for SO2 and NO2 would likely be co-located with the particulate monitoring station(s). A dust-fall monitoring program on the project boundary and adjacent (off-site) to significant material handling locations would also be proposed. Assessment of program requirements will be conducted in consultation with EC/ENR	IR reply, Appendix M.
Closure	
Hydrogeological and geochemical data will be collected routinely during operations in order to update predictions of the behaviour of the backfill and groundwater and surface water quality after mine closure. Post-closure monitoring will include wells that monitor the mine 'pool', wells that monitor groundwater quality along the flow-path of metal release in bedrock and in the alluvial aquifers (HCAA and PCAA), and stations on Prairie Creek. Trigger levels linked to specified response actions will be set for selected monitoring wells to give an 'early warning' of a developing issue. Further study will be required during the operating period to better quantify the flow-path and attenuation mechanisms.	Reply to IR GNWT2, and reply to IR2 INAC 2-3.
All flotation tailings will ultimately be placed underground as a paste backfill. No mine waste will remain on the Prairie Creek floodplain after closure.	DAR, section 6.12.2
All sediment and tailings residues remaining in the WSP after closure will be recovered and included in underground backfill.	DAR Addendum, section 2

TABLE 2: COMMITMENTS TABLE (May 6, 2011)

A natural cover will be placed on the WRP to limit infiltration and seepage and promote revegetation. The final composition of the cover will be based on WRP monitoring during operations. The water management ditches and other water control facilities will be upgraded, re-constructed or decommissioned as necessary. The seepage collection pond will be decommissioned once testing of runoff meets criteria. The Waste Rock Pile (WRP) final slope angle, cover design and runoff diversion structures will be designed to be stable in perpetuity	DAR, section 12 and Appendix 11, and reply to IR2 INAC 2-16.
Revegetation of the Mine site will rely on natural invasion to avoid introducing exotic species. Observations of natural revegetation around the mine site and along unused portions of the access road will be recorded to justify the adoption of this approach to reclaim disturbed areas.	DAR, section 12 and reply to IR GNWT2
Parks Canada wishes to initiate a study prior to road operations concerning techniques that might be used to improve revegetation and reclamation. Collaboration from the Mine was requested and agreed to in the form of accommodation/meals and assistance with transport.	Technical Meeting, Day 2, Oct. 7, 2010
For the first 3 years after closure, monitoring and inspections will occur monthly over the period March to November. Annual reports will be produced. In the following 5 years, monitoring and inspections will occur bi-monthly from May to September. In the final 5 years, monitoring and inspections will occur once a year in July (post-freshet). However, post-closure monitoring will continue until conditions have reached an equilibrium and stabilized, and it has been conclusively determined that no further closure activities are required.	DAR, section 8.9.4, and reply to IR2 NRCan 2-6.
Updates to the closure and reclamation plan, including updated water quality predictions, are proposed for the time of Water Licence renewal, normally every 5 years.	Reply to IR GNWT2

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LEGEND

Access Road Alignment

Hexagon (100 km²)

Study Area

Predicted Probability of Caribou Occurrence¹

0.0 - 0.25

0.26 - 0.50

0.51 - 0.75

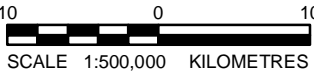
0.76 - 1.0

¹ NOTE

Predicted Probability of Caribou Occurrence
(i.e., the probability that a caribou may occupy a particular hexagon during the winter period -- based on surveys undertaken from mid December 2010 to late February 2011. Range 0-1 inclusive; 0 being least probable, 1 being most probable.)

REFERENCE

Project features obtained from Canadian Zinc Corporation. Base features obtained from Natural Resources Canada, Geogratis.
Projection: UTM Zone 10 Datum: NAD 83



PROJECT

CANADIAN ZINC CORPORATION
PRAIRIE CREEK MINE
NORTHWEST TERRITORIES

TITLE

CARIBOU PATTERN OF OCCURRENCE PROBABILITIES
BASED ON REPEATED SURVEYS, WINTER 2010/2011

Golder Associates
Greater Vancouver Office, B.C.

PROJECT NO.	09-1422-5007	PHASE No.	1000/1040		
DESIGN	DG 21 Dec. 2010	SCALE	AS SHOWN	REV.	0
GIS	JW 03 May 2011				
CHECK	DG 03 May 2011				
REVIEW	CHS 03 May 2011				

FIGURE X

