August 16, 2012

FINAL

Canadian Zinc Prairie Creek Mine Contaminant Loading Management Plan

Submitted to:
David Harpley
Canadian Zinc Corporation

REPORT

Report Number: 12-1331-0017
Distribution:

Canadian Zinc - 1 Electronic Copy
Golder Associates - 2 Hard Copies

Golder Associates

Table of Contents

FIGURES

1.0 INTRODUCTION

Canadian Zinc Corporation (CZN) owns and operates the Prairie Creek Mine (Mine). The Mine site (Figure 1-1) is situated in the southern Mackenzie Mountains of the Northwest Territories, approximately 90 km northwest of Nahanni Butte. The Mine is 100% owned by CZN, and consists of significant mine infrastructure and facilities constructed in the early 1980s. The Mine received Land Use Permits in 1980 and an operating Water Licence in 1982 to allow production of concentrates of lead, zinc and a silver-bearing copper concentrate and use of a winter access road from the Mine to the Liard Highway. The Mine was three months from production when it was placed into receivership due to market conditions.

Current market conditions have made it feasible to undertake renewed effort to obtain the required permits to redevelop and operate the mine. A Developer's Assessment Report for the Mine was completed by Canadian Zinc (CZN 2010) and submitted to the Mackenzie Valley Environmental Impact Review Board (MVEIRB) in March 2010. The Board completed a review and stated "The Review Board has therefore concluded that an environmental impact review of this proposed development is not necessary and that the Prairie Creek mine project should proceed to the regulatory phase for approvals." (MVEIRB 2011).

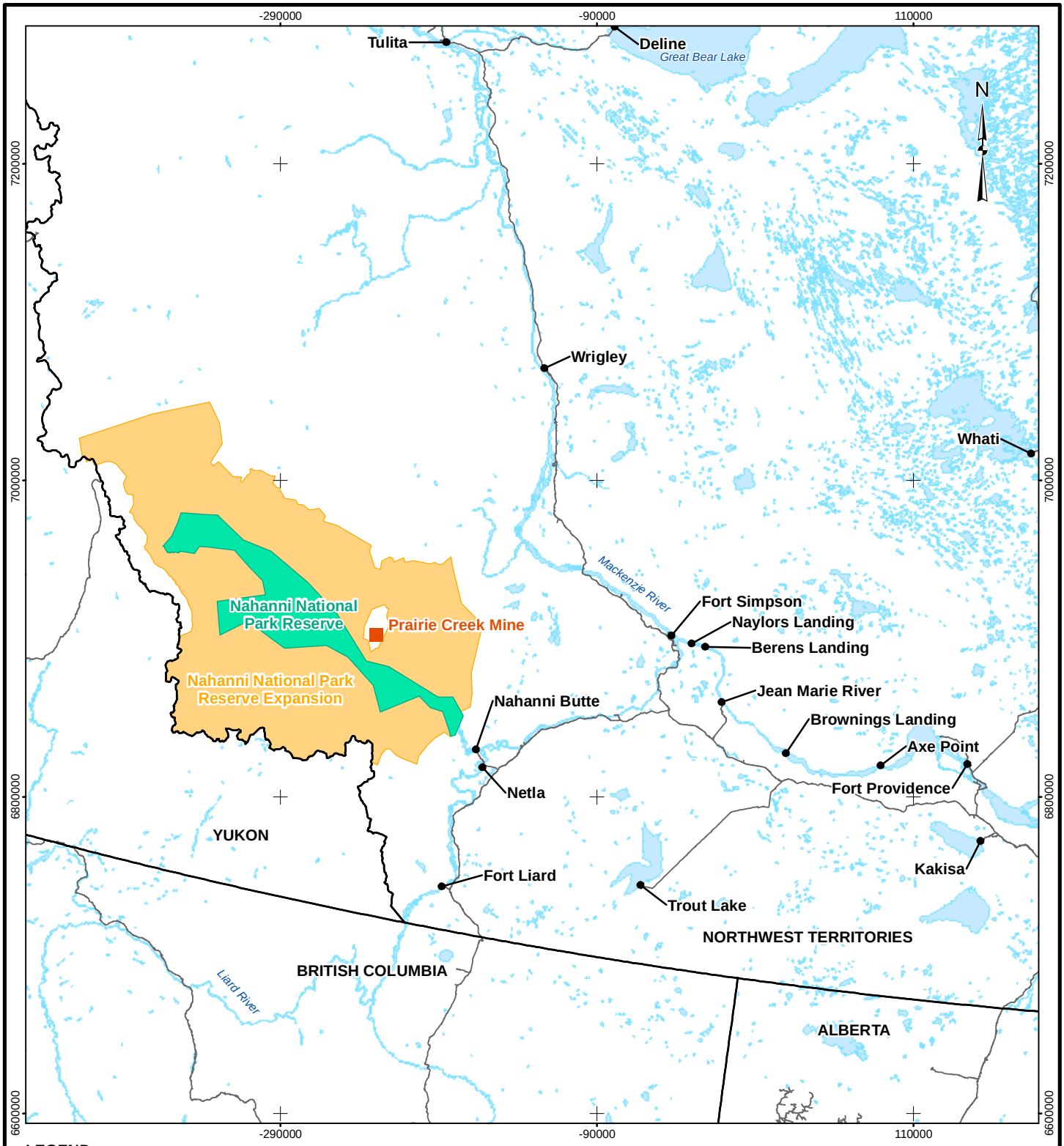
One of the commitments agreed to during the environmental assessment process was to develop an adaptive management plan for contaminant loading related to potential losses of concentrate from ore processing (concentrate) on the Mine site, at the two transfer facilities, and along the access road. This Contaminant Loading Management Plan (CLMP) includes a description of controls to be put in place to mitigate contaminant loading; a contaminant monitoring plan; and a description of measures to be carried out in response to identified potential contamination issues in locations of concern.

This CLMP is a "living" document that may need to be adapted as the Mine evolves.

1.1 Objectives

This document has been developed to address the following objectives:

- identify strategies to mitigate contaminant loading from ore concentrate handling and transport at the Mine site, at the Tetcela Transfer Facility (TTF) and Liard Transfer Facility (LTF), and along the winter access road;
- identify an approach for soil monitoring;
- demonstrate compliance with applicable Federal and Territorial soil quality standards;
- track trends in soil quality and contaminant loading; and
- outline response plans for increasing contaminant concentration trends, or exceedances of soil quality criteria.



LEGEND

- POPULATED PLACE
- PRAIRIE CREEK MINE
- ROAD
- WATERCOURSE
- PROVINCIAL / TERRITORIAL BOUNDARY
- NATIONAL PARK
- NAHANNI NATIONAL PARK RESERVE EXPANSION
- WATERBODY

100 0 100

SCALE 1:3,500,000 KILOMETRES

REFERENCE

Populated Places and National Parks © [2011] DMTI Spatial Inc. Hydrography and Provincial Boundaries obtained from GeoGratis, © Department of Natural Resources Canada. All rights reserved. Roads obtained from GeoBase®.
DATUM: NAD83 PROJECTION: UTM ZONE 12

PROJECT

PRAIRIE CREEK MINE CONTAMINANT LOADING MANAGEMENT PLANT

TITLE

LOCATION OF PRAIRIE CREEK MINE

Golder Associates

PROJECT NO. 12-1331-0017			FILE No.	
DESIGN	CH	29 May 2011	SCALE AS SHOWN	REV. 1
GIS	HP	15 Aug. 2012		
CHECK	CDM	01 Jun. 2012		
REVIEW	DP	15 Aug. 2012		

FIGURE: 1-1

I:\2012\12-1331\12-1331-0017\Mapping\MXD\Fig1.1_Prairie_Creek_Mine.mxd

1.2 Legislation, Regulatory and Policy Requirements

A Developer's Assessment Report for the Mine (CZN 2010) was completed and submitted to the MVEIRB in March 2010. The Board in turn completed a review, and recommended that the Mine proceed and that *"In the Review Board's view, the Prairie Creek Mine is not likely to have significant adverse impacts on the human environment of the Dehcho Region or the Northwest Territories provided the developer's commitments are followed and enforced and the Socio-economic Agreement is implemented"* (MVEIRB 2011). As the Mine moves forward to production, it is necessary to develop a series of management plans, including the following CLMP, to satisfy commitments made during the environmental assessment process.

The TTF and the portion of the access road from kilometre (km) 17 to km 101 are situated within the Nahanni National Park Reserve of Canada (NNPR), which is federally regulated. As such, the federal guidelines established by the Canadian Council of Ministers of the Environment (CCME) are considered to be the applicable guidelines for the locations within the NNPR. The CCME has established the Environmental Quality Guidelines (EQGs). The EQGs are primarily risk-based numerical guidelines set at levels at which it is believed that adverse effects on environmental or human health will not occur.

The CCME *Canadian Soil Quality Guidelines for Protection of Environmental and Human Health* (CCME 1999) (Soil Quality Guidelines) include generic guidelines for metals and other inorganic parameters that are pertinent to the Mine site, transfer facilities, and haul road.

The Northwest Territories document "Environmental Guideline for Contaminated Site Remediation" (GNWT 2003) sets out territorial quality criteria for select parameters in soil. This guideline document describes the process that is used to manage contaminated or potentially contaminated sites on Commissioner's Land. Most of the Commissioner's Land in the Northwest Territories is located within municipalities. Since the Mine and associated lands are not located within a municipality, the Northwest Territories guidelines are likely not appropriate for the purposes of this CLMP. In any case, the Northwest Territories guidelines for metals and inorganic parameters, where established, are equivalent to the current CCME Soil Quality Guidelines.

The CCME Soil Quality Guidelines are established based on land use. Soil Quality Guidelines have been developed for agricultural, residential/parkland, commercial and industrial land uses. Based on CCME land use definitions, the land use at the Mine site and transfer facilities is classified as industrial. However, for the purposes of guideline selection, CCME indicates that "the proponent should also consider land uses at surrounding sites. This is important because the migration of contaminants off-site by soil erosion (by wind or water) or by the movement of surface water or groundwater may contaminate surrounding properties with more susceptible land uses". Based on current land use definitions, the access road and the land surrounding the Mine and transfer facilities is classified as agricultural land use, which the CCME considers as including habitat for resident and transitory wildlife and native flora. Based on land use surrounding the Mine facilities, the CCME Guidelines for agricultural land use are considered to be the most conservative of the potentially applicable guidelines and have therefore been selected for use in this CLMP.

At the time of future Mine closure, environmental site assessments and remediation, if required, will be carried out. The Mine and associated facilities may be absorbed into the NNPR and/or become wild lands. Based on CCME land use definitions, the agricultural land use guidelines are currently considered to be the most appropriate for the purposes of future environmental site assessment and remediation efforts. However,

guideline selection will be re-evaluated at the time of Mine closure in order to ensure the most appropriate guidelines of the time are applied.

For selected chemical parameters, soil grain size is also considered when assessing potential soil and groundwater effects and for groundwater transport of contaminants. However, for the contaminants of concern, namely metals and other inorganic parameters, CCME indicates that differentiation between coarse and fine soil texture is not applicable.

1.3 Locations of Concern

This CLMP has been developed with the understanding that environmental investigations, and remediation as necessary, will be carried out within the Mine facilities as part of the Mine's end-of-life activities. As such, this CLMP focuses on managing contaminant loading in the native soil areas outside the Mine facilities. The potential for releases of concentrate exists at the Mine site, at the two transfer facilities, and along the access road. The following sections describe the specific locations of concern where mitigation and/or monitoring efforts are warranted.

1.3.1 Mine Site

Concentrate is transferred by conveyor to the bagging plant. The 3,000 – 3,500 kg bags of concentrate will then be transferred to the concentrate storage building, which will have a capacity of 70,000 tonnes (CZN 2010). Bags of concentrate and transfer equipment will remain within interior areas during the transfer of concentrate from the bagging plant to the concentrate storage building. The bags of concentrate will be transported off-site by tractor truck using bin-type trailers with side walls, tail gates and a tarpaulin cover.

The potential exists for the tracking of concentrate dust from the concentrate storage building. As such, the exits from these areas have been identified as locations of concern. In order to assess the potential for contamination from truck traffic, the location where tractor trucks exit the Mine site has also been identified as a location that warrants monitoring.

1.3.2 Transfer Stations

In early winter, concentrate will be transported from the Mine site to the TTF, located 84 km from the Mine site. In late winter, concentrate will be transported from the Mine site and the TTF to the LTF, located approximately 1 km west of the Liard Highway. Each transfer facility will include covered storage structures. The bases of the structures will consist of a graded pad of gravel. Each storage structure will have capacity to store approximately 25,000 tonnes of concentrate. The road bed outside the structures will also consist of gravel. Forklifts or front end loaders will be used to load and unload bags of concentrate on and off the tractor trailers.

The potential exists for the tracking of concentrate dust from the storage structures at the transfer facilities. As such, the exits from these structures have been identified as locations of concern. In order to assess the potential for contamination from truck traffic, the locations where tractor trucks exit the transfer stations have also been identified as locations that warrant monitoring.

1.3.3 Access Road

The access road will be used to transport concentrate from the Mine site to the Liard Highway. The access road is approximately 180 km in length. Approximately 84 km of the road are situated within the Nahanni National Park Reserve. Realignments are planned for four sections of the road. Once the Mine is in full operation, approximately 120,000 tonnes of concentrate will be transported along the access road each year.

There are a number of locations along the access road where the road crosses or runs adjacent to a watercourse. Canadian Zinc completed a risk assessment for spills along the access road. For each section of the access road, the assessment included an evaluation of the potential for spills to occur, the potential consequences of spills if they occurred, and the difficulty of containing potential spills (CZN 2010).

The selection of locations of concern along the access road was based on the results of the risk assessment. The primary factor in the selection of locations of concern was proximity of surface water bodies to the access road. Locations where streams will be crossed by the access road, or are adjacent to the access road, were prioritized. The second factor considered was the potential for spills, with specific consideration of road conditions, such as grades and turns. Other risk assessment factors were considered, but to a lesser degree.

The following locations of concern were identified along the access road:

- Prairie/Fast Creek Section – This section of the road is situated between the Mine site and km 7. There are two portions of this section that are immediately adjacent to surface water. The risk of spills along this section of road is considered to be low due to relatively flat grade and straight alignment. As such, one of the two portions immediately adjacent to surface water, between km 4.9 and km 5.1, has been selected as a representative location of concern for this section of road.
- Funeral Creek Section – This section is located between km 7 and km 17. Along this section the road runs parallel to Funeral Creek and at km 13 there is a switchback crossing of Funeral Creek. The road between km 13 and km 16 has been identified as having a higher risk of spills.
- Sundog Creek Section – This section is situated between km 17 and km 39. A tributary of Sundog Creek is present between km 22.7 and km 23 where the road ramps steeply into a canyon and back up. Locations where the road crosses tributaries of Sundog Creek have been identified as locations of concern for this section of road.
- Polje Creek Realignment Section – This section is situated between km 43 and km 57. The road crosses Polje Creek at km 53. The location where the road crosses Polje Creek has been identified as a location of concern for this section of road.
- Tetcela River and Fishtrap Creek Section – This section is located between km 86 and km 92. The section crosses Tetcela and Fishtrap valleys, including wetlands. The wetland area has been identified as a location of concern for this section of road.
- Wolverine Pass to Grainger Gap Section – This section is located between km 101 and km 123. No surface water bodies are proximal to this section of the access road except for a lake (Gap Lake) at km 112-113. As such, this is the only location of concern identified along this section of road.

- Grainger Gap to Liard River Section – This section is located between km 123 and km 156. The Grainger River headwaters are crossed by/adjacent to the access road between km 123 and km 126. The length of road proximate to the headwaters has been identified as a location of concern for this section of road.
- Liard Ice Bridge and Old Logging Road Section – This section of road is located between km 150 and km 170. The Liard ice bridge is the only significant surface water body crossing in this section. No significant surface water bodies are proximate to the access road/old logging road beyond the ice bridge. The Liard River crossing, between km 156 and km 157, has been identified as a location of concern for this section of road.

1.4 Contaminants of Concern

According to geochemical characterization carried out by MESH Environmental Inc. (MESH 2008), the concentrate that will be generated at the Mine will consist of lead and zinc sulphides, which are potentially acid generating, and lead carbonate, which has uncertain acid generating potential. Concentrates have elevated metals concentrations and leach testing has indicated that sulphate, cadmium, lead and zinc, and to a lesser extent mercury, copper, nickel and silver, may be in a relatively soluble form at neutral pH.

Based on the solid state of the concentrate, soil quality monitoring is considered to be the most effective approach for identifying contamination in the areas of concern identified above. Sampling of other media such as groundwater, surface water, and sediment has been considered in terms of response planning (see Section 4.0).

2.0 CONTAMINANT LOADING MITIGATION STRATEGIES

There are a number of mitigation measures that will be integrated into the operation of the Mine site, transfer facilities and access road to minimize contaminant loading from concentrate. Measures that will be used to mitigate contaminant loading are described below.

2.1 Concentrate Bagging and Storage

Concentrate will be placed into 3,000 – 3,500 kg bags in the bagging plant at the Mine site. The bags will be sealed and any concentrate on the exterior of the bags will be removed using a pressurized air blast. The concentrate as produced will have a moisture content of 8% to 10%. This will limit dust dispersal and enable the concentrate to freeze inside the bags.

The bagged concentrate will be transferred to the concentrate storage building using mobile equipment such as a front-end loader equipped with a hook or a forklift. To prevent tracking of concentrate from the bagging plant, the mobile equipment will be dedicated to operating exterior to the bagging plant and concentrate storage building. While transporting concentrate between the bagging plant and concentrate storage building, the wheels of the equipment will not enter the bagging plant building. The concentrate storage building at the Mine site will be unheated to allow the concentrate to remain in a frozen state in winter.

The floor surface of the bagging plant will be constructed of concrete, which will prevent impacts to the subsurface beneath this area. The floor will be cleaned on a regular basis. Mobile equipment used for transporting bags of concentrate within the Mine site will be washed on a regular basis in a dedicated washing area with water collection.

The bagged concentrate will be loaded from the concentrate storage building onto transport truck trailers using mobile equipment such as a front-end loader equipped with a lifting hook, or a forklift. To prevent track-out of concentrate from the concentrate storage building, trailers will be pulled through a loading bay next to the building and the mobile equipment will load the trailer without having to exit the building. The mobile equipment in the concentrate storage building will be dedicated to operating inside the building. Since transport trucks and trailers will not enter the building, and mobile equipment will not exit the building, the risk of track-out of concentrate will be minimized.

Similar to the concentrate storage building at the Mine site, the transfer facility storage structures will be unheated to allow the concentrate to remain in a frozen state.

Inspections of the locations of concern at the Mine site and transfer facilities should be undertaken regularly to identify or rule out evidence of soil contamination from concentrate handling or transport.

2.2 Transportation

Approximately 120,000 tonnes of concentrate will be transported along the access road per year, once the Mine is in full operation. The bagged concentrate will be transported by tractor trucks equipped with bin-type trailers with side walls and a tail gate. The bags of concentrate will be strapped down inside the trailers and the trailers will be covered with tarpaulins.

Bags of concentrate should be inspected for evidence of damage prior to placement in trailers. Trucks and trailers should be inspected prior to transporting concentrate off-site to assess the potential for track-out of concentrate, and to assess potential issues with trailer integrity.

Access road conditions will be monitored on a continuous basis during road operations and temporary closures will occur if hazardous conditions such as poor visibility are identified. Speed limits will be set for each section of the road based on the risk of accidents, including spills. Speed limits will be posted in prominent locations along the road. Truck drivers will receive an orientation regarding the various road sections and conditions prior to being permitted to drive on the road. Communication systems will be in place between drivers and the road traffic coordinator.

The road will be regularly inspected and maintained during the operating season to minimize the risk of accidents and spills from poor road conditions. The road will also be inspected on a regular basis to identify evidence of contamination, or the lack thereof, along the road from the transport of concentrate.

2.3 Spill Response

CZN will develop and implement a Spill Contingency Plan (SCP) that will address potential spills at the Mine site, transfer facilities, and along the access road. CZN has committed to ensuring that a SCP will be in place prior to the commencement of operations.

Spill kits will be placed at the Mine site, the transfer facilities, and at Cat Camp. An additional spill kit location will be established approximately mid-distance between the transfer facilities so that spill response equipment is available within 50 km of any spill site.

Various levels of spill response training will be provided to personnel at the Mine site and transfer facilities. Training will include classroom study, as well as equipment deployment instruction and mock spill exercises. Spill response refresher training should be conducted on an annual basis.

If a bag of concentrate is damaged in the bagging plant or concentrate storage building at the Mine site or within one of the storage structures at the transfer facilities, the damaged bag will be immediately double bagged and the spilled material will be cleaned up and returned to the Mill.

In the event of a spill of concentrate in exterior areas, including along the access road, the spilled material will be cleaned up using means that are appropriate to the location and size of the spill. Soil or sediment that is identified as likely to be contaminated will be collected and processed through the Mill, provided that the soil or sediment does not contain material that could interfere with Mill operation. In the event that remediation of water is required, water contaminated with metals can be treated at the Mine's Water Treatment Plant.

The SCP will include procedures for initiating further investigation of spill areas, if warranted. Procedures may include delineation of soil impacts and sampling of other media. Further investigation may identify areas that require further management, in which case a plan for remediation or risk management will be developed and implemented.

3.0 SOIL QUALITY MONITORING

3.1 Baseline Sampling

Prior to operation of the Mine, transfer stations and access road, baseline soil quality will be assessed by collecting native soil samples in accordance with Sections 3.1.2 through 3.1.4. The baseline soil sampling event will take place in the spring to correspond with the timing of future, annual monitoring events. The concentrations of contaminants of concern detected during this baseline sampling event will be compared to subsequent soil quality data generated during annual monitoring events.

3.2 Sampling Locations

Soil samples will be collected at the Mine site, transfer stations, and along the access road. At these locations, fill materials will be present over native soil, muskeg, and/or bedrock, depending on location. Only native soil samples will be collected for baseline sampling. During operations, samples will be collected from all locations, irrespective of whether they are native soil or fill.

At the Mine site, soil samples will be collected from the following areas:

- Five soil sampling locations will be advanced outside the exit of the concentrate storage building to assess potential impacts from the transport of concentrate out of the storage building. Samples will be collected from native soil areas outside the building. .
- Five soil sampling locations will be advanced along the route of where transport trucks will exit the Mine to assess potential impacts from the transport of concentrate.

At each of the two transfer stations, soil samples will be collected from gravel or bare ground areas as follows:

- Five soil sampling locations will be advanced outside the exit of each concentrate storage building to assess potential impacts from the transport of concentrate out of the storage buildings. Samples will be collected from native soil areas outside the buildings.
- Five soil sampling locations will be advanced along the route of haul trucks exiting the transfer facilities to assess potential impacts from the transport of concentrate.

Along the access road, soil samples will be collected from the road bed material, whether this is soil or fill. If snow or ice is present at the time of sampling, samples will be collected from below this. Soil samples will be collected from selected locations of concern identified in Section 1.1 to assess potential impacts from the transport of concentrate along the access road. Sample location selection and the number of samples will be based on previous sample results, the occurrence and locations of any spills, and any visual evidence of contamination. A minimum of ten samples will be collected annually. The number of samples collected during each sampling event will be sufficient to adequately assess potential impacts along the road and allow for the assessment of concentration trends.

3.3 Sampling Methods

For sampling along the access road and at the transfer facilities, sampling will occur at the end of each road operating period. This will enable vehicle access by the sampling team.

At each sampling location, surface soil or fill samples will be collected from the ground surface to a depth of approximately 5 and 10 cm. Samples will be collected using equipment such as a hand-auger or pick/shovel.

The samples will be placed in laboratory-supplied containers and delivered under chain of custody to a Canadian Association for Laboratory Accreditation (CALA) certified laboratory. Samples will be analyzed for the following contaminants of concern:

- Metals (by ICP)
  - Antimony
  - Arsenic
  - Cadmium
  - Chromium
  - Copper
  - Lead
  - Nickel
  - Selenium
  - Silver
  - Zinc
  - Mercury
- pH

Global Positioning System (GPS) coordinates will be recorded for each soil sampling location. Each year, samples will be collected from approximately the same location in order to be able to assess changes over time.

3.4 Quality Control Procedures

All field activities will be completed in accordance with accepted industry standards. All field activities will be documented with field notes and photographs.

All field equipment involved in the soil sampling will be decontaminated between sampling locations to prevent cross-contamination between soil samples and sampling locations. Quality control samples will be collected as part of each sampling event.

3.5 Sampling Frequency

Soil sampling will be conducted on an annual basis. Concentrate will be transported on the access road between November and April of each year, depending on conditions (CZN 2010). Samples will be collected in early spring of each year to correspond with the end of the seasonal use of the access road.

3.6 Data Analysis

Data from locations where five soil samples are collected will be assessed collectively, by calculating an average concentration and identifying a range of concentrations for each location. For each soil sampling location, the analytical results from each sampling event will be assessed in comparison to baseline concentrations and other previous analytical results for the same approximate location. This comparison of data will be used to identify potential trends that may indicate an increase in concentrations of contaminants of concern over time. If an increasing trend in concentrations of any contaminants of concern is identified, the response measures outlined in Section 4.0 will be implemented.

Analytical results from each sampling event will also be compared to the CCME Soil Quality Guidelines and territorial soil quality criteria. Concentrations of contaminants exceeding the applicable guidelines and criteria will be identified. If concentrations exceeding the applicable guidelines and criteria are identified, the response measures outlined in Section 4.0 will be implemented.

4.0 RESPONSE PLANNING

One of the purposes of the CLMP is to identify trends in contaminant concentrations in soil at locations of concern and to use this information to inform management decisions around contaminant loading mitigation and response. This type of proactive management requires that a clear and well-documented system be established. This section provides details on how such a system would operate.

For the system to operate effectively, the following parameters must be clearly defined:

- the methodology for determining trends and identifying when further investigation and/or mitigation of contamination is necessary;
- the monitoring timeframe over which decisions will be made with respect to contaminant management; and
- the action levels at which further investigation, remediation and/or additional mitigation strategies will be employed.

Each year, the annual concentrations for each of the monitored compounds will be summarized as part of an annual report. To evaluate the magnitude and trends in concentrations, a series of pre-determined action levels has been developed. These action levels comprise CCME Soil Quality Guidelines and territorial soil quality criteria, percent changes in concentrations from baseline conditions, and/or percent changes in concentrations year to year, at which further investigation, contamination management and/or additional mitigation strategies should be considered. A description of how the action levels should be applied to each of the contaminants of concern is provided below.

- Action Level I:
  - Annual concentrations below applicable CCME Soil Quality Guidelines and territorial soil quality criteria; and
  - Annual concentrations less than 20% greater than baseline concentrations; and
  - Annual concentrations demonstrating less than 10% increase year to year.
- Action Level II:
  - Annual concentrations below applicable CCME Soil Quality Guidelines and territorial soil quality criteria; and
  - Annual concentrations more than 20%, but less than 50%, greater than baseline concentrations; or
  - Annual concentrations demonstrating more than 10%, but less than 30%, increase year to year.
- Action Level III:
  - Annual concentrations exceeding CCME Soil Quality Guidelines or territorial soil quality criteria; or
  - Annual concentrations more than 50% greater than baseline concentrations[1]; or
  - Annual concentrations demonstrating more than 30% increase year to year for two or more consecutive years.

[1] This trigger applies in circumstances where, based on professional opinion, the concentration truly exceeds background conditions in soil and the concentration is approaching the applicable Guidelines. This trigger also applies in circumstances where baseline concentrations were above applicable Guidelines and, therefore, the Guidelines do not represent realistic action levels for the CLMP.

If baseline sampling identifies concentrations above CCME Soil Quality Guidelines and/or territorial soil quality criteria at any particular location of concern, the first bullet for each action level listed above will not apply for that particular location. The management action that will be implemented for each of the action levels is described in the following sections.

4.1 Action Level I Response

If annual concentrations meet the Action Level I criteria, soil quality monitoring will continue on an annual basis. No further investigation, contamination management, or additional mitigation measures are considered to be warranted at this action level.

4.2 Action Level II Response

If annual concentrations trigger an Action Level II response, an internal review of concentrate handling and transport procedures will be conducted to identify potential deficiencies leading to the increasing contaminant concentrations. Corrective actions and additional mitigation strategies will be developed and implemented in a timely manner to prevent further increases in concentrations. If concentrations continue to increase, an Action Level III response will be considered.

4.3 Action Level III Response

If annual concentrations trigger an Action Level III response, the concentrations will first be confirmed by conducting additional sampling in the area(s) of concern where the triggering concentrations were identified.

If the concentrations are confirmed, further sampling will be carried out to delineate the area of soil contamination both vertically and laterally. Additional investigation may also include sampling of other media, as appropriate, in the vicinity of the soil contamination.

As previously described, the sampling locations along the access road will be locations where the road crosses or is in close proximity to surface water bodies. If contamination triggering an Action Level III response is identified at a location of concern along the access road, surface water and sediment sampling of the corresponding surface water body will be considered.

Based on the results of the delineation of soil contamination and sampling of other media, if conducted, a Contamination Management Response (CMR) will be developed. The CMR may include the following management options:

- Review of concentrate handling and transport procedures and implementation of additional contaminant loading mitigation measures;
- Increasing the frequency of soil monitoring;
- Monitoring of other media, as appropriate;
- Remediation of soil and other impacted media; and/or
- Implementation of risk management measures consisting of engineered/physical controls and/or institutional/administrative controls to protect human and ecological receptors.

5.0 ANNUAL REPORT

CZN will provide an annual report that summarizes the soil quality monitoring data collected each year. The annual report will be submitted to regulatory authorities and participants of the Technical Advisory Committee. The annual report will include figures showing sampling locations, tables summarizing analytical results, and graphs showing the magnitude and trends of contaminant concentrations over time.

The annual report will include the following information:

- annual concentrations of contaminants of concern in soil;
- comparisons of annual contaminant concentrations in soil to the CCME Soil Quality Guidelines and territorial soil quality criteria;
- comparisons of annual contaminant concentrations in soil to baseline conditions;
- comparisons of annual contaminant concentrations in soil to previous years' concentrations;
- an analysis of soil quality concentrations and trends to determine if further investigation, contamination management, or additional mitigation strategies are necessary;
- a detailed description of responses implemented to address contaminant concentrations triggering Action Level II or III responses;
- a description of deviations from, or modifications to, the soil monitoring approach described herein including the rationale and implications of the deviations or modifications;
- an assessment of the effectiveness of the measures in place to mitigate contamination from concentrate; and
- a description of modifications to concentrate handling and transport procedures and contaminant loading mitigation strategies, including the rationale and implications of the modifications.

6.0 CONTAMINANT LOADING MANAGEMENT PLAN REVIEW

The CLMP will be reviewed annually by management to ensure that the objectives of the CLMP are relevant and that the mitigation measures, monitoring approach, and response measures outlined within the plan continue to be effective. The review will also serve to verify that the plan is kept up-to-date with respect to regulatory requirements, policy commitments, and industry standards.

Signature Page

GOLDER ASSOCIATES LTD.

Prepared by:

Lee-Anne Bell, B.Sc.
Environmental Scientist

Reviewed by:

David G. Pritchard, P.Geol.
Principal and Senior Geologist

LB/DGP/km

r:\active_2012\1331\12-1331-0017 canadian zinc\clmp\final\fnl 12-1331-0017 prairie creek clmp_16aug2012.docx

7.0 REFERENCES

Canadian Council of Ministers of the Environment (CCME). 1999. Canadian soil quality guidelines for the protection of environmental and human health.

Canadian Zinc Corporation (CZN). 2010. Canadian Zinc Corporation Developers Assessment Report. March 2010.

Government of the Northwest Territories (GNWT). 2003. Environmental Guideline for Contaminated Site Remediation. November 2003.

MESH Environmental Inc. (MESH). 2008. Geochemical Characterization Report for the Prairie Creek Project, NWT. April 2008.

MVEIRB (Mackenzie Valley Environmental Impact Review Board). 2011. Report of Environmental Assessment and Reasons for Decision. EA0809-002: Canadian Zinc Corporation Prairie Creek Mine. December 8, 2011.

8.0 ACRONYMS

CALA	Canadian Association for Laboratory Accreditation
CCME	Canadian Council of Ministers of the Environment
CLMP	Contaminant Loading Management Plan
CMR	Contamination Management Response
CZN	Canadian Zinc Corporation
EQG	Environmental Quality Guidelines
GNWT	Government of the Northwest Territories
GPS	Global Positioning System
LTF	Liard Transfer Facility
MVEIRB	Mackenzie Valley Environmental Impact Review Board
NNPR	Nahanni National Park Reserve of Canada
SCP	Spill Contingency Plan
TTF	Tetcela Transfer Facility

9.0 UNITS

%	percent
cm	centimetre
kg	kilogram
km	kilometre(s)
m	metres
tonnes	tonnes

At Golder Associates we strive to be the most respected global company providing consulting, design, and construction services in earth, environment, and related areas of energy. Employee owned since our formation in 1960, our focus, unique culture and operating environment offer opportunities and the freedom to excel, which attracts the leading specialists in our fields. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees who operate from offices located throughout Africa, Asia, Australasia, Europe, North America, and South America.

Africa	+ 27 11 254 4800
Asia	+ 86 21 6258 5522
Australasia	+ 61 3 8862 3500
Europe	+ 356 21 42 30 20
North America	+ 1 800 275 3281
South America	+ 55 21 3095 9500

solutions@golder.com
www.golder.com

Golder Associates Ltd.
102, 2535 - 3rd Avenue S.E.
Calgary, Alberta, T2A 7W5
Canada
T: +1 (403) 299 5600

Golder Associates

Attachment 16