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## Memo

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<b>From:</b>	Arlene Laudrum, PGeo, FGC	<b>Project No:</b>	1CB002.002
<b>Cc:</b>	Randi Hay, DFO; Kevin Bill, DFO	<b>Date:</b>	August 13, 2014
<b>Subject:</b>	Concrete Pad Soil Movement Plan		

This memo provides an update to the July 20, 2013 Nanisivik concrete pad soil management plan. It takes into consideration the conditions outlined in the Memorandum of Agreement between the Ministry of Fisheries and Oceans Canada (DFO) and CanZinco Mines Ltd. (CanZinco) which became effective July 25, 2014.

### 1 Soil Movement

The pad is used for the temporary storage of soil that does not exceed the management limits for commercial land use established by the CCME Canada-Wide Standards (CWS) for Petroleum Hydrocarbons (PHC) for coarse-grained soil as listed in Table 1. The contaminant of concern in the soil being managed on the pad is PHC Fraction F2.

**Table 1: CCME commercial land use management limits for PHC in coarse-grained soil**

PHC Fraction	Management Limit mg/kg
F1 (C6-C10)	700
F2 (>C10-C16)	1,000
F3 (>C16-C34)	3,500
F4 (>C34)	10,000

Soil is moved to the pad from the following locations:

- Biopiles in the Upper Treatment Area (UTA) and the Lower Treatment Area (LTA);
- Fine stockpile (FSP) on Area 2; and
- Unscreened soil remaining within the footprint of the former fuel tank farm facility.

Soil with similar PHC concentrations and grain size are combined into stockpiles on the pad. The nature of the soil being placed on the pad is determined by prior laboratory test results, the field vapour concentration and maximum grain size of each load (10-12 m<sup>3</sup>) deposited onto the pad.

Soil that did not pass through the vibrating screener in 2012 and 2013 contains approximately 35% rock greater than 10 cm. The unscreened soil is stockpiled separately from the screened soil. During periods where there is open space available on the pad coarse rock is separated from the soil. Once the fine soil has been removed from the rock, the rock is then relocated to the coarse rock stockpile.

Prior to offloading soil from the pad soil samples are collected to determine the PHC concentration of the contaminants of concern. Soil that meets the soil quality remediation objectives is relocated to the former secondary containment area or used to repair water management structures or improve heavy equipment access to other areas being worked by CanZinco. Soil that exceeds the soil quality remediation objectives either remains on the pad or reports to the UTA or LTA for further treatment.

## 2 Modifications

Modifications made to the pad in 2013 are documented in Appendix B of the Memorandum of Agreement.

Prior to the use of an additional area of exposed concrete on the pad the area will be swept and the dust collected will be stored for future disposal off-site. The joints and holes in the pad are to be cleaned of accessible fill. The fill is considered to be contaminated with lead and zinc concentrate and will be stored with the dust for future disposal off-site. The joints in the pad will be sealed to prevent the transfer of hydrocarbon contaminated water below the pad. The surface water diversion berm along the east side of the pad will be extended to the southern edge of the pad. A portion of the ditch at the south end will be backfilled and a berm installed to allow vehicle access while continuing to divert surface water from entering the pad. A portion of the existing berm will be removed and a new berm will be installed to establish the western edge of the area being worked by CanZinco. The new berm will be at least 10 metres from the DND trailer.

## 3 Monitoring

The vapour concentrations, moisture content and laboratory results for F2-F4 are monitored for each stockpile. At a minimum, one composite sample is tested for every 250 m<sup>3</sup> of soil.

Ditches and berms to divert and contain water are installed on and adjacent to the pad. These structures are inspected at the start of each field season and during rainfall events and repaired as required to maintain drainage patterns during the field season. The condition of the surface of the pad is inspected to detect deterioration in the surface and repaired as required to ensure the structural integrity of the concrete pad is maintained.

Soil samples and water from the sump at the down gradient (north) end of the storage area are tested to determine if CanZinco's use of the pad is impacting the adjacent covered portion of the

pad. Baseline conditions were established in 2013 and are documented in Appendix B of the Memorandum of Agreement. Monitoring results are included in bi-weekly reports provided to DFO and the annual remediation progress report submitted to the Nunavut Water Board (NWB).

Prior to evacuating the pad in 2015, sampling and analysis in the immediate surroundings of the pad will be conducted applying CanZinco's NWB-approved confirmatory sampling protocol.

## **4 Mitigation Measures**

Prior to demobilization for winter the condition of the ditches and berms will be inspected and, if needed, reinforced in an effort to accommodate the spring runoff. Should the water diversion structures fail soil samples will be collected adjacent to the pad to determine if the contamination has spread. Contaminated soil will be directed to the treatment facilities and remediation confirmation samples collected.

Should the use of tracked equipment on the pad cause the surface of the pad to deteriorate a layer of soil will be maintained between the tracks and the pad to protect it.

Should the seals of the cracks and holes in the pad become compromised repairs will be made using the sealant and liner available on site. If the cracks or holes are covered with a liner, a layer of soil is to be maintained on top of the liner to protect the liner from becoming ripped.

If monitoring measures detect tracking of hydrocarbon-impacted soils outside the area of the pad being worked by CanZinco then the contaminated soil will be directed to the treatment facilities and remediation confirmation samples collected.

## **5 Water Management**

The berms and ditches are maintained to minimize the amount of surface water coming in contact with the contaminated soil. Contact water reports to the catch basin at the north end of the area being utilized by CanZinco. Water that is found to pond in this area is allowed to evaporate following a rainfall event. If there is excess water ponding it will be pumped into a tote and transferred to the stormwater retention ponds at the treatment areas or applied to the biopiles to improve their moisture content.

## **6 Scheduling**

The 2014 soil remediation season commenced June 27, 2014. On July 25, 2014 permission was received to stockpile soil that was less than the CCME management limits on the pad and to utilize additional space on the uncovered portion of the pad. SRK demobilized from site for a scheduled mid-season break the day this notification was received.

SRK is scheduled to return to site on August 10, 2014. The additional modifications to the pad described in this Plan will be commenced immediately upon SRK's arrival on site.

Commencing August 10, 2014, soil that meets the current remediation objectives will be offloaded from the pad. A visual inspection of the surface of the pad and repairs will be made as necessary prior to reloading the pad with contaminated soil. All stockpiles of soil remaining on the pad will be tested for vapour concentrations and samples submitted for laboratory analysis if the field readings suggest the soil may now meet the remediation objectives.

Commencing August 14, 2014 additional contaminated soil from the footprint of the former tank farm will be relocated to the pad. Based on the available equipment, manpower and anticipated weather conditions it is estimated that seven to ten days will be required to relocate the contaminated soil within the footprint of the former tank farm.

Stockpile characterization samples will be collected and stockpiles of similar quality material (grain size and PHC concentrations) will be merged and water management structures will be winterized prior to SRK demobilizing from site. SRK is scheduled to leave site August 26, 2014.

In 2015, the removal of the stockpiles of soil on the pad will commence prior to July 15 in order to accommodate the targeted evacuation of the pad by August 1, 2015. Prior to August 1, 2015 the stockpiles and water diversion structures will be removed and the final condition of the pad documented in a memo that includes a photographic record and a tabulation of soil sample results. The repairs made to the cracks and holes in the pad will not be intentionally destroyed and the residual lead and zinc concentrate removed from the surface of the pad and the cracks and holes will not be returned, otherwise the pad will be restored to the condition that existed on May 31, 2014

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