Gartner Lee Limited

May 16, 2003

Mr. R. Carreau
CanZinco Ltd.
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Dear Mr. Carreau:

Re: Nanisivik Mine, Phase 2 Environmental Site Assessment, Response to Review Comments

This letter provides a response to the comments and questions raised in the regulatory and community reviews of our report, *Nanisivik Mine, Phase 2 Environmental Site Assessment* dated January 2003. Many of the comments and questions received from the reviewers were similar and the responses have been arranged according to topic area in order to avoid repetition.

Comment 1: Applicability of the 1985 Soil Data as "Background"

Soil metal concentrations data was collected in 1985 by the mine operator as part of a regional mineral exploration program. This data was included in the ESA report as part of the available historical information and it provides an indication of the natural (or "background") conditions. There were two issues raised regarding the 1985 data as presented in the ESA report: effects of mining activities on the data and quality control/accuracy of the data. These two issues are discussed separately below.

Effects of Mining Activities

Mining activities had been underway for approximately 9 years at the time that the data was collected. These activities included open pit mining at the West Open Pit, underground mining at the main lens, underground mining at Area 14 (2 years), underwater tailings deposition in West Twin Lake, operation of the concentrator plant and associated facilities, operation of the concentrate storage shed and ship loading facility, operation of the town and ancillary facilities, and operation of the landfill. These activities were considered, in the ESA report, to have had localized effects on soil metal concentrations and this is a critical factor for interpreting 1985 soil data.

There is no influence from wind dispersed tailings on the 1985 data set because the method of deposition of tailings into West Twin Lake was underwater placement until after the 1985 soil sampling program.

The effects of mining activities on the 1985 data is considered to be negligible with the exception of soil sampling locations within the immediate driving and working areas of the industrial complex, the concentrate storage and loading facility and the townsite. The effect of these "pre-1985" mining activities on soil metal concentrations was localized increases of lead and zinc directly related to vehicle tracking and spillage of concentrate dust. For example, Figure 4 of the ESA report shows a sample containing high metal concentrations within the concentrate storage and loading work area. This sample is clearly within the immediate area of concentrate handling activities and the high metal concentrations are attributed to those activities.

Several samples from the 1985 data set that are located to the immediate north and northeast of the town show high metal concentrations. These high concentrations correspond to historical and current observations of a zone of natural sulphide mineralization and the 1985 data are considered representative of natural conditions within this zone. In addition to the visible surface zone, there are several natural outcroppings of sulphide mineralization along the north bank of Twin Lakes Creek that are a part of the natural mineralization of the area.

Quality Control/Accuracy

The 1985 field sampling methodology was typical for the collection of mineral exploration information in the North. To complement the information provided in the ESA report, the Exploration Manager who was responsible for site operations at that time (Mr. Ron Sutherland, P.Eng.) was subsequently contacted and provided these additional details:

- The sample locations were determined by the exploration grid, which was usually laid out with an EDM theodolite;
- Samples were collected from the nearest place to the grid sample location that had fine surface material;
- Samples were collected using a geology pick to scrape surface material into a paper sample bag, meant for geochem samples;
- Rocks and other large fragments were picked out by hand; and
- The intent was to collect sufficient fine particulate material to be analysable.

This additional information confirms that the 1985 data collection methods were adequate for the proposed use of the data as part of the description of natural conditions.

This information also resolves a concern raised by reviewers regarding a potential bias (higher concentrations) in the 1985 data due to collection of material at the depth of the developed soil

horizon. The general absence of a developed soil horizon in the area is well documented (in the 1973 BC Research Inc. report and in the NTI review comments dated April 9, 2003) and the information provided above indicates that the samples were collected from surface.

The 1985 laboratory analyses of metal concentrations were conducted in the Nanisivik assay laboratory. The laboratory operated under the supervision of an accredited analytical chemist and employed 5 fulltime persons. Equipment for analyses included an atomic absorption spectrophotometer, a graphite furnace, and a nuclear source analyzer. A QA/QC program was in place at the laboratory which included regular cross-checking with outside laboratories to confirm accuracy of analyses. It should also be noted that Nanisivik participated in the NWT Inter-lab Comparison Study for many years and was approved for environmental sampling. Analytical procedures were typical laboratory methodologies and are considered to be appropriate for the proposed use of the data as part of the description of natural conditions.

Comment 2. 2002 ESA Field Methodologies

Sample Selection for Analyses

The ESA process is iterative and typically involves multiple phases of excavation and analyses. For remote sites such as the Nanisivik mine, emphasis is placed on conducting an intense initial stage of sample collection because of the difficult logistics and costs of implementing a series of small sampling programs. Therefore, as reported in the ESA report, not all of the soil samples that were collected as part of the 2002 ESA work were analysed and this is the same approach that was applied by Gartner Lee for the 1999/2000 ESA investigations at the Polaris mine. This approach provides for the initial collection of a large number of samples of which a subset is initially analysed and the remainder are placed into storage for possible future analyses, if necessary.

Requests were made by the reviewers for further clarification of the field methods that were employed for selecting soil samples for initial laboratory analysis for the 2002 Nanisivik ESA investigation. The guiding objective for the selection of samples for laboratory analysis for the Nanisivik ESA were to:

- investigate areas of potential environmental concern;
- follow up on observations made in the field during the investigation; and
- provide a general coverage of potentially affected areas.

The methods employed for the screening of samples for analysis included:

- the observations and judgement of the field investigator including: knowledge of the mine development and operational history; observed surface staining; observed ground

disturbances; material or particle size anomalies; olfactory (odour) indications of hydrocarbons;
- the indications from field testing instruments for hydrocarbon vapours (i.e. Photo Ionization Detector);
- consultation with the client and review of existing information regarding previous activity, testing, analyses and assessment reports; and
- providing a general coverage of all areas of the mine site.

Some of the samples that were collected in 2002 but not analysed will be analysed in the future to provide further delineation of remediation targets. Due to the volatile nature of hydrocarbon compounds however, the samples would be analyzed only for metals. Additional analyses for hydrocarbons will require the collection of additional (fresh) samples.

Stream Sediment Sampling

Samples of sediment from the streambed of Twin Lakes Creek were collected and the results are described in the ESA report. The ESA report does not specifically describe the sampling methodology for stream sediment and we apologize for this oversight.

The methodology for sampling of stream sediments followed the same general methodology for sampling of test pits and surface soils. Sampling consisted of the collection of sediment from surface (less than 0.3 m depth) using a stainless steel trowel or shovel. The sampler wore disposable latex gloves. Samples of approximately 0.5 kg were collected into labeled polyethylene bags. Particles greater than approximate gravel size were excluded from the sample. Standard chain-of-custody forms were completed for each sample and the form accompanied the samples to the laboratory.

On-Site Laboratory

Some of the initial analyses of metal concentrations in soils for the 2002 ESA samples were conducted using the on-site laboratory. This was initiated with the intent of providing a rapid turn around of results that would help to direct the 2002 sample collection work, with quality control provided by the off-site laboratory (Accutest, Ottawa). However, the large number of samples generated for the ESA exceeded the physical capability of the on-site laboratory for a rapid turn around of results and, therefore, the approach to analysis of samples was amended to select samples for analysis using the methods described above and to have these analyses all conducted at the off-site laboratory. The amended approach provided for consistency of methodology.

In order to maintain consistency in the data used for assessing the results of the ESA investigation, the limited data provided by the on-site laboratory was not utilized in the report conclusions or illustrated on Figure 7 of the ESA report. Further, all of the metal concentrations that are illustrated on Figure 6 of the ESA report are data provided from the off-site laboratory (Accutest).

Nonetheless, the data provided from the on-site laboratory is of interest and is a component of the information available for assessing the site. Therefore, the data from the on-site laboratory was referred to in the discussion of results (Section 5.3 of the ESA report) as a means of documenting and utilizing all of the available information. Table 12 of the ESA report provides a complete listing of the data provided by the on-site laboratory.

In the event that the use of the on-site laboratory had been on-going throughout the ESA investigation as initially intended, then the designed program for quality control checks of the data would have been implemented to verify the accuracy of the data.

Assessment of Roads

The roads around the mine site (excluding the main road from the dock to the town) are constructed of the locally available materials, which is primarily shale. Shale has been used as the main construction material due to its availability and ease of working. Several shale borrow areas have been developed around the mine site (i.e. along the Area14 road), in part, to provide construction material for roads. Shale has favourable geochemical characteristics as determined through testing conducted and reported on by LORAX Environmental and referenced in the ESA report. The shale is slightly acid consuming and therefore is not potentially acid generating and not an acid rock drainage concern.

Dolostone is a harder rock than shale that has also been used for road construction but to a much lesser extent than shale. Dolostone contains, by definition, a relatively large concentration of acid consuming carbonate minerals and is, therefore, appropriate for road construction. Dolostone was not used as extensively as shale for road construction because it is not as locally abundant on surface as shale and is more difficult to work. Dolostone is the common rock type for use as rip rap for erosion protection.

Rock containing sulphide mineralization was not used extensively for road construction because of the lost economic potential of the rock as ore, the cost of hauling mineralized rock around the mine site relative to developing local shale borrow areas and the potential for acid generation and metal leaching. The ARD testing reports prepared by LORAX Environmental that are referenced in the ESA report describe that the short road segment from the west adit area to the industrial complex contains some sulphide mineralization.

The Nanisivik road construction materials are visually distinct and can be readily identified from visual observation. Therefore, as part of the Phase 2 ESA, the Oceanview and Area14 roads were visually inspected by a geologist experienced in acid rock drainage assessments. The results of the inspection are illustrated on Figure 6 of the ESA report. The inspection identified several isolated areas where small quantities of mineralized rock were observed on the roadside due, presumably, to rocks falling out of the haul trucks. This residual material occurred in limited quantities and there is no indication that it was used for road construction.

Several test pits were excavated into the roadfill along the road to Area14. One test pit was excavated in an area where red, hematite staining is visible on surface on either side of the roadway. The roadfill at this location also contained some red stained rock and the sample returned elevated metal concentrations. This location will be considered for follow up investigation to confirm the result and to identify, if confirmed, the source of metals. The other test pit samples returned very low metal concentrations, as anticipated for the shale construction material.

Comment 3: Reference to "Tier 1" CCME Guidelines

One of the stated objectives of the Phase 2 ESA investigation was to determine the extent, nature and concentration of contaminants for use in the subsequent Human Health and Ecological Risk Assessment (HHERA), which was completed by Jacques Whitford Environment Limited (JWEL), for the purpose of determining site specific soil quality remediation objectives (SQRO's).

The procedures for using a risk-based approach to determine SQRO's is provided for as "Tier 3" of the CCME soil quality guidelines.

In the Phase 2 ESA report, reference is made to the generic or "Tier 1" CCME soil quality guidelines. This was done strictly to provide context for an initial understanding of the investigative results with recognition that the subsequently developed SQRO's would be proposed as the soil remediation objectives rather than the generic Tier 1 guidelines. The JWEL report, *Human Health and Ecological Risk Assessment*, describes the ultimate use of the Tier 1 guidelines as a screening tool for the determination of SQRO's.

Therefore, the reference in the ESA report to the Tier 1 guidelines was neither intended nor stated to be used as a remedial objective but rather to provide context for an initial understanding of the results pending the subsequent HHERA.

Comment 4: Potential Contaminants of Concern

Chlorinated Ethenes

Xanthate is a common sulphide flotation reagent that was used at the Nanisivik mine. The procedures for handling xanthate at Nanisivik were for xanthate to be transported and stored as a dry powder in drums which was mixed with water in the mill prior to addition into the flotation process. The transportation and storage of the dry product could have been a potential source of contamination via spills.

Chlorinated ethenes were initially identified in the ESA report as a potential contaminant of concern based on their presence in xanthate. Soil quality guidelines for chlorinated ethenes are provided in the 1999 CCME *Canadian Environmental Quality Guidelines*.

The Phase 2 investigations did not specifically investigate for the presence of chlorinated ethenes, based on the absence of any documented or anecdotal indications of spills or concerns regarding the use of xanthate. The NTI/AMEC review of the ESA report suggested that it may not be appropriate to list chlorinated ethenes on the summary table of contaminants of concern and we agree with this suggestion.

Therefore, we suggest that chlorinated ethenes not be considered to be a contaminant of concern resulting from the 2002 Phase 2 ESA.

PCB's

Electrical equipment containing PCB's was historically used at the mine site and there is currently an approved PCB storage container at the mine site.

PCB concentrations in soil were not specifically investigated as part of the Phase 2 ESA. The available information did not indicate any previous spills of PCB-containing oils or any documented past or present deficiencies regarding the PCB storage container (i.e. inspection reports by Environment Canada). Therefore, in the context of the Phase 2 ESA, there was no indicated need or benefit to testing for PCB concentrations in soil samples selected on a somewhat random basis in the absence of any indications of areas of contamination.

Nitrogen Compounds

Compounds of nitrogen such as ammonia, nitrites and nitrates are not included in the CCME (1999) guidelines for soil or sediment quality. These compounds can be of concern for the

protection of water quality but are not generally of concern in soil unless, perhaps, the soil acts as a direct source of contaminants to a sensitive receiving environment.

Compounds of nitrogen in soil were not specifically investigated as part of the Nanisivik 2002 ESA because of the absence of guidelines for soil quality and because Twin Lakes Creek does not contain fish or other aquatic species that are likely to be adversely affected by nitrogen loading. Further, water quality information at the mouth of Twin Lakes Creek during 2000, when the mine was operating and ANFO was being used, did not contain concentrations of total ammonia-NH_3 that would be indicative of a need for investigation of soil contamination (i.e. all SNP 159-6, mouth of Twin Lakes Creek, results were less than 0.95 mg/L).

Comment 5: Report Format

ESA Protocols

Standard protocols are available that provide direction and consistency for the environmental site assessment process. The protocols include the CSA standard referenced in the ESA report and in the review comments. The protocols are guidance documents, as opposed to regulatory requirements, and are intended to provide direction and suggestions for reporting procedures.

A fundamental component of the environmental site assessment process is that the investigations be designed to satisfy the specific requirements of each individual site. While this approach is essential for any site, its importance is highlighted further when assessing mine sites and particularly mine sites in the Canadian North. Mine sites in the Canadian North are designed to meet specific operational and logistical needs and are often in locations with unique environmental considerations. Therefore, a unique and site specific approach to the ESA process is essential to ensure that potential areas and contaminants of environmental concern are adequately investigated.

Qualifications

Phase 1, 2 and 3 Environmental Site Assessments have been a fundamental strength of Gartner Lee Limited for over 20 years. In addition to numerous urban and general industrial projects in Southern and Northern Canada, Gartner Lee has industry leading experience specific to mine sites in Northern Canada, managed from offices located in Yellowknife and Whitehorse. Several recent examples of Gartner Lee's experience in this field are listed below:

- 1999 Phase 1, 2 ESA's of the closed Faro mine complex, Yukon
- 1999 Phase 1 ESA of the closed Ketza River gold mine, Yukon
- 2000/2001 Phase 1, 2 ESA's of the Polaris mine, NU
- 2002 Phase 2 ESA of the closed Nanisivik mine, NU

- 2002 Phase 1 ESA of the operating CanTung mine, NT
- 2002 Phase 1 ESA of the closed Prairie Creek mine, NT

References and details of these projects can be provided, if desired. Gatrtner Lee Limited is registered with NAPEGG to practice engineering in the Northwest Territories and Nunavut.

The lead investigator and author for the Nanisivik Phase 2 ESA was Arlene Laudrum. Ms. Laudrum is a registered professional geologist (NT/NU) with over 16 years of industry and consulting experience. Ms. Laudrum has abundant experience regarding environmental site assessments for all nature of sites including northern mine sites. Ms. Laudrum's CVC can be provided, if desired.

Comment 6: Marine Environment

A primary objective of the ESA investigations was to investigate soil contamination to provide information required for the ultimate development of a soil remediation plan. Therefore, the 2002 ESA investigations were restricted to soils on land. Investigation of environmental effects in the marine receiving environment was not part of the scope of this ESA and assessment of effects in the receiving environment is not generally included into the scope of an ESA.

A summary of metal concentrations in marine sediments in Strathcona Sound from a number of studies that were conducted by various organizations prior to and during mine operations was included into the ESA report as part of the "environmental setting". The most recent study was conducted in 2000 by Dr. Bo Elberling of the University of Copenhagen. Details regarding the sampling methodolgy have not been specifically documented.

The purpose of providing this information in the ESA report was to provide a complete description of the site and the local environment. This information will be of direct interest to future investigations of environmental effects in the receiving environment.

Comment 7: Landfill Contents

Prior to the July 2002 Public Hearing in Arctic Bay, some documentation regarding the contents of the landfill suggested, due to poor wording, that there was a large cache of used oil buried in drums in the landfill (approximately 2,000). The erroneous suggestion was that the used oil was contained within intact drums that were somehow stacked or otherwise present in the landfill in their entirety.

At the July 2002 Hearing, R. Carreau provided a verbal clarification to this issue that stated, in short, that while the estimate of "2,000 drums" of used oil may have been correct (there were no

records to confirm or refute this), they were deposited into the landfill gradually over the operating life of the mine. The oil had been disposed of in the landfill (largely prior to 1990) in regular amounts as part of the daily garbage collection routine. Used oil which was collected in barrels, many of these open-topped, around the Nanisivik site (including the government garages) became part of the municipal waste stream. This practice was commonly employed at most municipal and industrial landfill sites in that timeframe.

The "bottom line" of the presentation was that there is not an intact 2,000 drum cache of used oil buried in the landfill. The Phase 2 ESA was designed and executed with this clarification in mind and focussed on soil and water sampling downgradient of the landfill, as described in the ESA report. The 2002 Phase 2 ESA investigations did not identify petroleum hydrocarbon contamination downgradient of the landfill area.

Comment 8: Follow Up Field Investigations

An Environmental Site Assessment process can be undertaken in a series of iterations, with each stage providing focus and direction for subsequent, follow up investigations. For the Nanisivik site, the need for follow up investigations is being evaluated in light of the results of the 2002 work, the results of the subsequent HHERA and the comment received from the regulatory agencies. For example, the review comments include suggestions for follow up investigations related to: the STOL airstrip, the landfill, the 2000 hydrocarbon spill at the Carpenter Shop, roadways, and the area south and east of West/East Twin Lakes. These areas will all be considered in the design of the follow up investigations.

A compilation of spills reported by Nanisivik to the 24 Hour Spill Line was created and circulated by INAC in July 2002, and was subsequently posted on the NWB's ftp site as part of the public consultation process. The spills involved various unauthorized releases including tailings along the pipeline route, non-compliant water from the East Adit Treatment Facility, wind dispersion of tailings from the West Twin Disposal Area and spills of hydrocarbons. These releases were investigated through the 2002 ESA and, along with all of the available information from the 2002 ESA and the reviewer comments, are included in the considerations for follow up investigations recommended for the summer of 2003.

The results of the follow up investigations would then be incorporated into the Final Closure and Reclamation Plan that is scheduled for submission in December 2003.

Closing

We trust that this letter will satisfy the comments and requests for clarification in the review comments. Please let us know if we can be of further assistance.

Sincerely,
GARTNER LEE LIMITED

(via email)

Eric Denholm
Senior Mining Consultant