April 13th, 2014

Phyllis Beaulieu
Manager of Licensing
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU
X0B 1J0

Email: licensing@nunavutwaterboard.org

Dear Ms. Beaulieu,

Re: Licence No. 1AR-NAN0914; Amendment-Renewal Application by Canzinco Ltd. for Continued Reclamation and Post-Closure Monitoring Activities at the Nanisivik Mine Site

This letter has been prepared in response to direction provided by the Nunavut Water Board (NWB) in its letter to CanZinco Ltd., dated April 2, 2014. In the correspondence, CanZinco was invited to respond to the Information Requests (IRs) submitted by Aboriginal Affairs and Northern Development Canada (AANDC), the Department of Fisheries and Oceans Canada (DFO), the Department of National Defence (DND), and Environment Canada (EC). CanZinco has prepared a table that presents our responses to the intervening parties, and which is attached to this letter. Where detailed responses have been prepared, these have been included as attachments to the table.

At the outset, it should be clearly noted that CanZinco has decided to abandon its intention to amend the remediation approach for hydrocarbon-contaminated soils as presented in the November 13, 2013 application for water licence amendment. In the water licence amendment application, five remedial options for the contaminated soil were identified and ranked according to a set of criteria. The preferred option identified in the application was a proposal to excavate and consolidate the contaminated soil from the tank farm site in an area determined not to be ecologically sensitive (the Upper Treatment Area), and then to cover the material with a 0.5m cap of clean soil. However, CanZinco is no longer in favour of that option and instead intends to continue with the currently employed method of soil aeration and bioremediation. This remediation approach was endorsed by the NWB as part of its April 26, 2010 approval of CanZinco's Abandonment and Reclamation Plan, Fuel Tank Farm, Former Nanisivik Mine Site. The decision to abandon the alternative remediation approach is largely driven by the feedback received from key stakeholders, in particular the DND, as part of this completeness review and other engagement processes. This feedback has suggested the DND has concerns with the alternative remediation approach that was proposed. As this approach was developed with the purpose of accommodating the DND's construction plans and considering the DND's likely future use and custodianship of the land in question, it is not feasible for CanZinco to proceed with a remediation strategy that does not have the DND's support. In addition, the extended processing time of CanZinco's water license application means that the timing benefits expected from the alternative remediation approach are no longer available. In respect to the implementation schedule of a modified remediation strategy, reference is made to the 2013 Soil Remediation Progress Report[1] which states that, should approval of the alternative remediation methodology not be received in time for the 2014 summer season, then the soil remediation shall continue as per the existing methodology applied since 2011.

[1] Nanisivik Mine Contaminated Soil Remediation 2013 Progress Report. SRK Consulting (Canada) Inc, February 2014. Report submitted as Appendix F to the 2013 Annual Report for Water Licence 1AR-NAN0914.

Given the decision to continue with the previously approved soil remediation method, CanZinco no longer seeks an amendment to its water licence for this aspect of the undertaking. It is noted that several of the IRs were focused on lines of inquiry related to the amended remediation approach; no further technical information is provided in relation to these IRs and reference has been made to the explanations provided in this cover letter.

For clarification, the remaining aspects of the proposed undertaking for which CanZinco seeks an amendment to the water licence are the following:

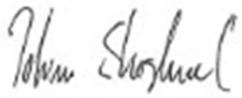
1. Given the successful results to date in the performance of completed surface reclamation covers and other geotechnical installations, CanZinco seeks a reduced geotechnical monitoring schedule for the amended licence.
2. The results of the water quality monitoring program demonstrate stable conditions and confirm that implemented closure measures are performing as expected. Consequently, CanZinco seeks a reduction in the number of monitoring stations, sample frequency and analytical parameters required.
3. CanZinco seeks the opportunity to establish a small (10m X 10m) landfill at the former mine site in order to dispose of the approximately 50 m^3 of inert scrap metal and other non-hazardous waste that has accumulated during reclamation. The precise location and specification of this proposed landfill are not currently available, but will be confirmed during the 2014 field season. Potential locations are described in the IR responses. In order to avoid triggering a subsequent licence amendment for this matter, CanZinco proposes a licence condition whereby the Board would require the submission of a Landfill Closure Plan for its review and approval prior to establishing this small landfill facility. A Waste Management Plan is included as an Attachment. This plan would also need to be approved prior to operating the landfill facility.
4. As a contingency measure to further enable the remediation timelines detailed in Attachment 6, studies will be undertaken to develop Tier 3 CCME soil quality remediation objectives. CanZinco seeks clarification from the NWB if conducting sufficient studies to develop Tier 3 CCME criteria is considered an amendment, when the current objectives are already derived from the CCME guidelines.

Regarding the requirements of the Nunavut Planning Commission (NPC) and the Nunavut Impact Review Board (NIRB) that were raised in the NWB's letter of April 2, no further information is available at this time. When CanZinco submitted its water licence application to the NWB on November 13, 2013, copies of the application were also sent to both NPC and NIRB. When the NWB formally received the application and commenced its review process on January 29, 2014, it was understood that the NWB had officially referred the application to the NPC for a conformity determination given that CanZinco's proposed undertaking is situated within the North Baffin Land Use Plan. Since that time, there has been no communication from NPC regarding CanZinco's licence application. On April 10, at letter was sent to NPC's Executive Director and the Director of Plan Implementation to determine conformity. This letter is included as Attachment 1.

At this point, we would also like to reiterate our request that any technical and public hearings being required by the NWB as part of the licence application process be conducted in writing. This is thought to be particularly appropriate when considering the modifications to the licence application discussed above and that the application, as now presented, only involves very minor amendments relative to the undertakings approved through the existing Water Licence 1AR-NAN0914.

Finally, we would like to take this opportunity to notify the NWB that the incorporation of CanZinco Ltd. has continued into British Columbia from the jurisdiction of Canada. As part of this change, the legal name has been changed to CanZinco Mines Ltd. The Certificate of Continuation is attached to this submission.

I look forward to working with you and your staff to complete the detailed technical phase of the licensing process. Should you have any questions or concerns regarding the foregoing, please do not hesitate to contact me at your earliest convenience.
Sincerely,



Johan Skoglund
CanZinco Mines Ltd.

Enclosures:

- Certificate of Continuation, CanZinco Mines Ltd.
- Table detailing CanZinco's responses to the Information Requests from the AANDC, DFO, DND and EC. The table is supported by the following Attachments:
    - Attachment 1: Letter to the NPC regarding conformity determination, 10 April 2014
    - Attachment 2: Addendum #1 to the amendment-renewal application for water licence 1AR-NAN0914, 3 March 2014
    - Attachment 3: Waste management plan
    - Attachment 4: Spill contingency plan, updated in April 2014
    - Attachment 5: Reclamation cost estimate as of April 2014
    - Attachment 6: Schedule of soil remediation activities
    - Attachment 7: Response to Environment Canada Information Requests #1 to #4 related to water quality monitoring
    - Attachment 8: Response to Environment Canada Information Request #5 related to geotechnical monitoring

Copied:

- David Hohnstein, NWB Director Technical Services
- Sean Joseph, NWB Technical Advisor
- Arlene Laudrum, SRK Consulting
- Patrick Duxbury, RT Associates

Certificate of Continuation, CanZinco Mines Ltd.

DUPLICATE

Number: C0989538

CERTIFICATE
OF
CONTINUATION

BUSINESS CORPORATIONS ACT

I Hereby Certify that CANZINCO LTD., has continued into British Columbia from the Jurisdiction of CANADA, under the Business Corporations Act, with the name CANZINCO MINES LTD. on December 27, 2013 at 10:22 AM Pacific Time.

Issued under my hand at Victoria, British Columbia
On December 27, 2013

CAROL PREST
Registrar of Companies
Province of British Columbia
Canada

Information Requests Response Table

Responses to Information Requests

NWB Reference #	Intervener Reference #	Intervener	Information Request	Reference to Application	Linkages	Comments/Direction
1	1	AANDC	AANDC requests that the proponent submit to the NWB the aforementioned approvals when received from both NPC and NIRB. Otherwise the application is incomplete	Application form blocks 7 and 8		CanZinco Ltd. submitted its application to the NPC and NIRB on November 13, 2013. On January 29, 2014 the NWB advised CanZinco that the NWB had also forwarded the application to NPC and NIRB. A letter sent by CanZinco to the NPC on 10 April, 2014, is included as Attachment 1.
2	2	AANDC	AANDC requests that the proponent submit to the NWB updated solid and sewage waste management plans including how they intend to treat or dispose of sewage and solid waste generated on site.	Application Form Block 14. WASTE Application Form Block 15 QUANTITY AND QUALITY OF WASTE INVOLVED	NWB IR10 NWB IR12l NWB IR13 NWB IR14f NWB IR15	Alternative plans for the disposal of sewage and solid waste should the Hamlet of Arctic Bay not be able to accept the material were provided in Canzinco's amendment #1, item 2 submitted March 3, 2014 which is included as Attachment 2. A Waste Management Plan is included as Attachment 3.
3	3	AANDC	AANDC requests submitting an updated spill contingency plan with the renewal/amendment application as the proponent has identified several additional options for the remediation of the contaminated soils on site. The spill contingency plan should include contingency plans for all remediation alternatives outlined, in the event that the proponent's preferred option is not approved.			The existing spill contingency plan applies to all operations envisioned at the former Nanisivik Mine site. The 2012 plan has been updated to reflect new contact information and included as Attachment 4.
4	4	AANDC	AANDC requests that the proponent submit more information that clearly demonstrates how this risk-based remedial approach will be effective in limiting and/or eliminating risks to water and in turn to humans, wildlife and the environment.		NWB IR25	The risk-based remedial approach is no longer being pursued. Please refer to the cover letter supporting these IR responses.
			AANDC also requests that the proponent demonstrate how each of the other options is viable. All options outlined in the application need to be sufficiently developed to assess the potential impacts to water.			The risk-based remedial approach is no longer being pursued. Please refer to the cover letter supporting these IR responses.
5	5	AANDC	AANDC also requests that the proponent provide additional details such as; how they intend to confirm that all contaminated soils have been excavated and how they will confirm that the contaminated soils being remediated have been appropriately treated.		NWB IR12d	The soil sampling plan to confirm the success of contaminated soil excavation is described in the NWB approved *Nanisivik Mine 2004 Reclamation and Closure Plan* (CanZinco Ltd. 2004), and its appendix F, *Nanisivik Mine Reclamation and Closure Monitoring Plan* (Gartner Lee Limited 2004). This plan is referenced in the 2011, 2012 and 2013 annual reports. The plan calls for the capture of at least 95% of soil containing contaminants in excess of the SQRO's in each remediation area and that no residual contaminant concentrations in soils exceed twice the SQRO's. Excavation remediation confirmation soil samples are collected in a consistent 25 m grid-based pattern. The soil sampling plan to confirm biopile remediation was described in the *Nanisivik Mine Contaminated Soil 2012 Progress Report* (SRK and WESA 2013). Biopile remediation confirmation soil samples are collected based on the volume of soil treated (per 250 m^3).

Responses to Information Requests

NWB Reference #	Intervener Reference #	Intervener	Information Request	Reference to Application	Linkages	Comments/Direction
6	6	AANDC	AANDC requests that the proponent provide details on how they will ensure that there is no contaminate transfer by air or water vectors while remediating soils or while the soils remain stockpiled.		NWB IR14a NWB IR22 1.)	Water management controls for the constructed treatment cells are described in Section 3.2 of the *Construction Summary Report* (WESA 2012). Stormwater diversion berms are maintained elsewhere on site to reduce the amount of freshwater coming into contact with contaminated soil. Sumps adjacent to contaminated soil stockpiles collect contact water. The sumps are dewatered by pumping the contact water onto the stockpiles of contaminated soil, thereby helping to maintain optimal moisture to promote bioremediation. The approved contaminated soil remediation methodology involves soil aeration and bioremediation. Aeration promotes the evaporation of the volatile hydrocarbon compounds into the atmosphere. Soil quality monitoring samples are collected adjacent to biopiles, such as those reported in Table 5.2 of the *Nanisivik Mine Contaminated Soil Remediation 2013 Progress Report* (SRK 2014), to assess if mitigative measures are necessary to address contaminant transfer by air or water. The coarse grain size of the soil being remediated reduces the risk of contaminate transfer by dust.
7	7	AANDC	AANDC requests that the proponent provide details as to the source location and amount of soil that will be used as cover for the contaminated soil. AANDC would like to advise the proponent that depending on the source of the quarry/borrow area for the soil that further permits may be required.			The risk-based remedial approach is no longer being pursued. Please refer to the cover letter supporting these IR responses.
8	8	AANDC	AANDC requests the proponent provide further details on the backfilling of Area 4. If backfilling is to occur, what material would be used; where will this material come from; when would the backfilling occur? Does the other on-site proponent want this area back-filled if they are going to use this area? How will backfilling be coordinated with other proposed land uses at the site?			Excavations are to be recontoured and filled to complement the surrounding drainage patterns. Area 4 will require the placement of 1,000 to 2,000 m^3 of clean fill to prevent the ponding of water at this location. The clean fill will be sourced for the stockpiles material created during site reclamation activities that has been tested to confirm that it meets the SQROs. The waste concrete recovered during the demolition of the fuel tank farm will be broken into blocks 30 cm or less and placed in the bottom of the excavation prior to backfilling the excavation with boulders and sand and gravel from stockpiles. The sand and gravel will be added in lifts or mixed with the larger material to prevent the development of voids in the backfill. Additional excavation of contaminated soil remaining in the northwest wall of Area 4 is to commence in late June 2014. Backfilling of portions of the area where access is not required to excavate the contaminated soil is also to commence in late June 2014. Based on discussions facilitated by the land custodian (DFO), it is Canzinco's understanding that the excavation within the proposed DND development footprint are to remain open. It is Canzinco's intention to recontour that area so as to not to pond water and not add clean fill.

Responses to Information Requests

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			AANDC requests that the proponent submit an updated Abandonment and Reclamation plan including all requests made above in 4 through 8 for the effective remediation of the contaminated soil on site.		NWB IR4 thru 8 NWB IR11 NWB IR12 NWB IR14 NWB IR25	CanZinco will await direction from the NWB as to whether an updated Abandonment and Reclamation Plan is required for this application. However, CanZinco is of the opinion that the *Nanisivik Mine 2004 Reclamation and Closure Plan* (CanZinco 2004) as approved by the NWB on July 6, 2004 and as subsequently revised and implemented will continue to be effective for all proposed activies within the scope of this licence application. In addition to the updated *Spill Contingency Plan* (Nyrstar 2014) and the *Waste Management Plan* (Nyrstar 2014) included as attachments 3 and 4, this also includes: the *Post Closure Geotechnical Monitoring Contingency Plan* (BGC 2009); the *Contingency Plan for Water Quality Exceedances, Former Nanisivik Mine Site* (Stantec 2009); and the *Abandonment and Reclamation Plan, Fuel Tank Farm, Former Nanisivik Mine Site* (Stantec 2010) .
9	9	AANDC	AANDC requests that the proponent submit an updated security review as part of their renewal application for the whole former Nanisivik Mine Site, including but not limited to, the continued reclamation of the contaminated soil and all of its associated contingencies, any continued upgrades and maintenance to reclamation activities already undertaken and completed, all post closure activities as well as any new facilities being undertaken (i.e. new landfill).	Application Form Block 21. SECURITY INFORMATION	NWB IR12h NWB IR14b	A detailed model for estimating the closure and monitoring costs as summarized in Block 21 of the application is provided in Attachment 5. Given that the closure plan for the landfill is yet to be developed, the landfill reclamation costs included in the model are highly conceptual at this stage. The cost estimate assumes that post-closure monitoring activities will be required for an additional 10 years.
10	10	AANDC	AANDC requests that the proponent provide additional details about its proposed landfill before a water license is issued, including location, size where would the cover material come from, borrow/quarry areas, etc.	Application Form Block 14. WASTE Application Form Block 15 QUANTITY AND QUALITY OF WASTE INVOLVED	NWB IR2 NWB IR13 NWB IR15	Canzinco will be evaluating potential landfill locations in 2014 on Commissioners' Land leases that have yet to be surrendered for the disposal of inert bulky, non-hazardous waste that has been recovered during site wide post closure monitoring and maintenance activities. Possible locations include: on Lease No. L-8008T below the former Pamo Building footprint; on Lease No. L-8677T below the former Dome Building footprint; on Lease No. L-40043T in the West Twin shale/dolostone quarry on the west side of the WTDA (former quarry permit No. 03-708-003); and on Lease L-40041T within the former warehouse yard. The waste will fit in a pit 10 m by 10 m by 1 m or against a high bedrock wall in the quarry or warehouse yard. Cover material will be sourced from the material excavated for a pit or from aggregate stockpiled during mine operations immediately adjacent to the high walls. If finer cover material is required it will be sourced from the stockpiles of sand and gravel that meet the SQROs at the dock or from the Landfill Quarry (former quarry permit No. 07-708-001). The former quarries are described in Nanisivik Mine 2004 Reclamation and Closure Plan (CanZinco Ltd. 2004), and its appendix C, Quarry Development and Reclamation Plan (BGC Engineering 2004). The West Twin Quarry was not used during earlier mine reclamation activities. The Landfill Quarry has been used by the GN for road maintenance work in recent years. A Waste Management Plan is included as Attachment 3.

Responses to Information Requests

NWB Reference #	Intervener Reference #	Intervener	Information Request	Reference to Application	Linkages	Comments/Direction
11		DFO	In general, we would request more detail on the proposed remedial plan (including, but not limited to, the schedule of soil movement, construction of risk management structures, demonstration of contaminant degradation, sample locations and monitoring), as well as a contingency plan, and the 2013 Annual Report.		NWB IR8 NWB IR12 NWB IR14	A response to this general information request is provided below in responses to specific requests referred to as NWB IR12a thru NWB IR12m.
12a)	B.11	DFO	The proposed timetable for plans has been identified as in compliance, however, this was not provided in the application. Please provide more detail on timelines of the risk management plan and specific tasks (e.g. excavation, confirmatory sampling and soil stockpile preparation).	Appendix P: Compliance Assessment. Licence No. 1AR-NAN0914 Part B, Item 11	NWB IR12e NWB IR12m	Appendix P is a compliance assessment with the existing licence. It is designed to determine if information or conditions required historically were met. An updated schedule for remedial activities and studies is included as Attachment 6. Please note that the schedule presented in Attachment 6 assumes that use of the concrete pad for soil handling and storage activities can continue through July 31, 2015.
12b)	D.8	DFO	It was noted that construction of engineered earthworks is supervised and field checked by a qualified engineer, however, this is not specifically mentioned in the application. Please confirm and clarify what engineering controls will be put in place for environmental protection/water management for each activity.	Appendix P: Compliance Assessment. Licence No. 1AR-NAN0914 Part D, Item 8	NWB IR12g	Engineering controls put in place for the soil remediation treatment facility are described in the *Construction Summary Report, Nanisivik Mine* (WESA Inc. 2013) submitted to the NWB on November 29, 2012. Recommended construction and engineering supervision practices are described in *Nanisivik Mine 2004 Closure and Reclamation Plan* (CanZinco 2004), Appendix D and Appendix J. The *Hydraulic Structures As-Built Report* (BGC 2008), *Reclamation of Mine Openings As-Built Report* (BGC 2008) and the *Surface Reclamation Covers As-Built Report* (BGC 2008) provide the engineering controls put in place for other remediation earthworks.
12c)	G.3(b)	DFO	The proposed location of the structures was not provided. Please provide location (description and figures) for all on-site structures, specifically the proposed location for the impacted soil with an outline of how this location meets the risk assessor's recommendations.	Appendix P: Compliance Assessment. Licence No. 1AR-NAN0914 Part G, Item 3.b	NWB IR12f NWB IR14h	The risk-based remedial approach is no longer being pursued. Please refer to the cover letter supporting these IR responses.

Responses to Information Requests

NWB Reference #	Intervener Reference #	Intervener	Information Request	Reference to Application	Linkages	Comments/Direction
12d)	G.3(d)	DFO	A description of any monitoring required, including sampling locations, parameters measured, and frequencies of sampling, has not been included. Please include this information and clarify the confirmatory sampling approach and methodology that will be undertaken.	Appendix P: Compliance Assessment. Licence No. 1AR-NAN0914 Part G, Item 3.d	NWB IR5	Part G of water licence 1AR-NAN0914 refers to conditions applying to modifications. The risk-based remedial approach is no longer being pursued. Please refer to the cover letter supporting these IR responses. The soil sampling plan to confirm the success of contaminated soil excavation is described in the NWB approved Nanisivik Mine 2004 Reclamation and Closure Plan (CanZinco Ltd. 2004), and its appendix F, Nanisivik Mine Reclamation and Closure Monitoring Plan (Gartner Lee Limited 2004). This plan is referenced in the 2011, 2012 and 2013 annual reports. The plan calls for the capture of at least 95% of soil containing contaminants in excess of the SQRO's in each remediation area and that no residual contaminant concentrations in soils exceed twice the SQRO's. Excavation remediation confirmation soil samples are collected in a consistent 25 m grid-based pattern. The soil sampling plan to confirm biopile remediation was described in the Nanisivik Mine Contaminated Soil 2012 Progress Report (SRK and WESA 2013). Biopile remediation confirmation soil samples are collected based on the volume of soil treated (per 250 m3).
12e)	G.3(e)	DFO	The schedule for construction has not been included. Please include schedule (refer to B.11 comment).	Appendix P: Compliance Assessment. Licence No. 1AR-NAN0914 Part B, Item 11 Part G, Item 3.e	NWB IR12a NWB IR12m	Part G of water licence 1AR-NAN0914 refers to conditions applying to modifications. An updated schedule for remedial activities and studies is included as Attachment 6. Please note that the schedule presented in Attachment 6 assumes that use of the concrete pad for soil handling and storage activities can continue through July 31, 2015.
12f)	G.3(f)	DFO	The drawings of engineered structures stamped by a Professional Engineer have not been included. Please provide drawings of structures, including requirements outlined in D.8 and G.3.b.	Appendix P: Compliance Assessment. Licence No. 1AR-NAN0914 Part D, Item 8 Part G, Item 3.f	NWB IR12b NWB IR12c	Part G of water licence 1AR-NAN0914 refers to conditions applying to modifications. The risk-based remedial approach is no longer being pursued. Please refer to the cover letter supporting these IR responses.
12g)	J.2(a)	DFO	Detailed engineering designs, stamped by an Engineer, for the closure have not been included and should be provided for review.	Appendix P: Compliance Assessment. Licence No. 1AR-NAN0914 Part J, Item 2.a	NWB IR12b	The plan referred to in Part J, Item 2.a of Water Licence 1AR-NAN0914 was submitted and accepted by the NWB April 26, 2010. No detailed engineering designs, stamped by an Engineer were required for approval of the *Abandonment and Reclamation Plan, Fuel Tank Farm, Former Nanisivik Mine Site* (Stantec 2010). As the risk-based remedial approach is no longer being pursued, the request for an amendment to Part J.2 of the Water Licence as listed in Block 9 of the application is no longer required.

Responses to Information Requests

NWB Reference #	Intervener Reference #	Intervener	Information Request	Reference to Application	Linkages	Comments/Direction
12h)	J.2(e)	DFO	Discuss potential closure issues and liabilities including anticipated costs of all remediation activities. Please provide more specific information as well as a detailed contingency plan should the proposed option be unsuccessful.	Appendix P: Compliance Assessment. Licence No. 1AR-NAN0914 Part J, Item 2.e Application Form Block 21. SECURITY INFORMATION	NWB IR9 NWB IR14b	As the risk-based remedial approach is no longer being pursued, the request for an amendment to Part J.2 of the Water Licence as listed in Block 9 of the application is no longer required. A detailed model for estimating the closure and monitoring costs as summarized in Block 21 of the application is provided in Attachment 5. Given that the closure plan for the landfill is yet to be developed, the landfill reclamation costs included in the model are highly conceptual at this stage. The cost estimate assumes that post-closure monitoring activities will be required for an additional 10 years. Contaminated soil remediation progress reports were submitted with the 2012 and 2013 Annual Report, in addition to a summary of the general reclamaiton and remediation work completed (Water Licence 1AR-NAN0914 condition Part B, Item 3; Shedule B, Items 13 and 15). The remediation performance monitoring results presented in these reports demonstrate clear evidence of successful soil remediation.
12i)	J.2(f)	DFO	Identify a plan to delineate, treat, and dispose of hydrocarbon contaminated soils located within, beneath, and adjacent to the Fuel Tank Farm. This has not been included. Please provide this information including clarification on the soil quantity estimation approach and methodology.	Appendix P: Compliance Assessment. Licence No. 1AR-NAN0914 Part J, Item 2.f	NWB IR14i	As the risk-based remedial approach is no longer being pursued, the request for an amendment to Part J.2 of the Water Licence as listed in Block 9 of the application is no longer required. Delineation of the contaminated soils was completed in 2011 as reported in the 2011 Annual Report. Figure 2 of the *Contaminated Soil Remediation 2012 Progress Report* (SRK and WESA 2013) presents the areas delineated. The volume of contaminated soil stockpiled as listed in Table 6.2 of the *Contaminated Soil Remediation 2013 Progress Report* (SRK 2014) has been updated when compared to the table provided in Section 3.2 of Appendix I of the Application to reflect the receipt of confirmation sample results that show one of the biopiles currently meets the SQROs. The methodology used to estimate exsitu quantities of contaminated soil is described in Section 4.2.4 and 4.3 of the 2013 Progress Report. The estimated insitu volume of contaminated soil is updated based on production monitoring of the dilution actually achieved to extract the contaminated soil and a detailed understanding of the processes that governed the deposition of the contamination and its migration.

Responses to Information Requests

NWB Reference #	Intervener Reference #	Intervener	Information Request	Reference to Application	Linkages	Comments/Direction
12j)	J.2.(g)	DFO	Confirmation of Soil Quality Remediation Objectives (SQRO's) for the tank farm area. Confirmation of SQRO's for all contaminants of concern should be included in the revised plan.	Appendix P: Compliance Assessment. Licence No. 1AR-NAN0914 Part J, Item 2.g	NWB IR14d NWB IR17	As the risk-based remedial approach is no longer being pursued, the request for an amendment to Part J.2 of the Water Licence as listed in Block 9 of the application is no longer required. The remediation approach described in the Abandonment and Reclamation Plan, Fuel Tank Farm, Former Nanisivik Mine Site (Stantec 2010) approved by the NWB will continue. The SQROs for the contaminants of concern at the former fuel tank farm are derived from the Canadian Council of Minister of the Environment (CCME) Canadian Environmental Quality Guidelines (1999 - Updated to November 2013) and the Canada-Wide Standards for Petroleum Hydrocarbons in Soil (2001, Revised 2008). As stated in the 2010 Abandonment and Reclamation Plan, the SQROs are based on Tier 1 CCME guidelines because there was insufficient information to calculate Tier 3 CCME criteria. CanZinco intends to collect the information necessary to calculate Tier 3 guidelines during the 2014 field season.
12k)	J.2.(i)	DFO	Confirmatory soil analysis for Total Petroleum Hydrocarbons (TPH) has not been included and should be provided for review.	Appendix P: Compliance Assessment. Licence No. 1AR-NAN0914 Part J, Item 2.i	NWB IR14e	As the risk-based remedial approach is no longer being pursued, the request for an amendment to Part J.2 of the Water Licence as listed in Block 9 of the application is no longer required. Confirmatory soil analysis results are included in the 2012 and 2013 Progress Reports submitted with the Annual Reports. DFO has been provided with soil sample results directly since remediation activities commenced in 2011. Initial excavation confirmatory soil sampling results are reported in the Contaminated Soil Remediation 2013 Progress Report submitted with the 2013 Annual Report to the NWB March 4, 2014.
12 l)	J.2.(j)	DFO	Decontamination and removal procedures for the tank and liner. Removal procedures for liners that remain on site should be included in the revised plan.	Appendix P: Compliance Assessment. Licence No. 1AR-NAN0914 Part J, Item 2.j	NWB IR2 NWB IR14f	Use of an on-site rubble pit for the disposal of liners as described in the approved *Abandonment and Reclamation Plan, Fuel Tank Farm, Former Nanisivik Mine Site* (Stantec 2010) has not been implemented. All liners from the fuel tank farm demolition are to be disposed of in an approved facility, either on-site or in the South. A Waste Management Plan is included as Attachment 3.
12m)	J.2.(l)	DFO	Detailed implementation schedule for all tasks and activities has not been included and should be provided for review.	Appendix P: Compliance Assessment. Licence No. 1AR-NAN0914 Part J, Item 2.l	NWB IR12b NWB IR12a	An updated schedule for remedial activities and studies is included as Attachment 6. Please note that the schedule presented in Attachment 6 assumes that use of the concrete pad for soil handling and storage activities can continue through July 31, 2015.

Responses to Information Requests

NWB Reference #	Intervener Reference #	Intervener	Information Request	Reference to Application	Linkages	Comments/Direction
13		DFO	Also, the application indicates that approximately 30 m3 of non-hazardous waste materials have accumulated on site and Canzinco has requested an amendment to Part F conditions of the licence to allow for disposal of these materials in an on-site landfill. We request that additional information on the proposed location of the landfill be provided.	Application Form Block 14. WASTE Application Form Block 15 QUANTITY AND QUALITY OF WASTE INVOLVED	NWB IR2 NWB IR10 NWB IR15	Canzinco will be evaluating potential landfill locations in 2014 on Commissioners' Land leases that have yet to be surrendered for the disposal of inert bulky, non-hazardous waste that has been recovered during site wide post closure monitoring and maintenance activities. Possible locations include: on Lease No. L-8008T below the former Pamo Building footprint; on Lease No. L-8677T below the former Dome Building footprint; on Lease No. L-40043T in the West Twin shale/dolostone quarry on the west side of the WTDA (former quarry permit No. 03-708-003); and on Lease L-40041T within the former warehouse yard. The waste will fit in a pit 10 m by 10 m by 1 m or against a high bedrock wall in the quarry or warehouse yard. Cover material will be sourced from the material excavated for a pit or aggregate stockpiled during mine operations immediately adjacent to the high walls. If finer cover material is required it will be sourced from the stockpiles of sand and gravel that meet the SQROs at the dock or from the Landfill Quarry (former quarry permit No. 07-708-001). The former quarries are described in Nanisivik Mine 2004 Reclamation and Closure Plan (CanZinco Ltd. 2004), and its appendix C, Quarry Development and Reclamation Plan (BGC Engineering 2004). The West Twin Quarry was not used during earlier mine reclamation activities. The Landfill Quarry has been used by the GN for road maintenance work in recent years. A Waste Management Plan is included as Attachment 3.
14a	a	DND	Appendix P, Item J2.a - Detailed engineering designs for the revised remedial approach: The preparation / construction / maintenance / monitoring of a new location to receive impacted soils for risk management, with proper engineering controls to mitigate environmental (air*, water, soil) and human health impacts should be outlined. The monitoring and maintenance plan should include an evaluation of the effectiveness of the engineering controls over time, and address the soil, air and water quality monitoring that will be undertaken (scope, frequency, methodology, and schedule). The contingency plan, should the risk management plan not succeed, should also be included.	Appendix P: Compliance Assessment. Licence No. 1AR-NAN0914 Part J, Item 2.a	NWB IR6 NWB IR12h NWB IR14c	Appendix P is a compliance assessment with the existing licence. It is designed to determine if information or conditions required historically were met. As the risk-based remedial approach is no longer being pursued, the request for an amendment to Part J.2 of the Water Licence as listed in Block 9 of the application is no longer required.
14b	b	DND	Appendix P. Item J2.e- Potential closure issues and liabilities including anticipated costs of all remediation activities: Costs are recommended to be broken down by tasks/activity (J2.1), and be supported by the cost estimate basis utilized. This information would be valuable for ascertaining an appropriate financial security (Application Section 21).	Appendix P: Compliance Assessment. Licence No. 1AR-NAN0914 Part J, Item 2.e Application Form Block 21. SECURITY INFORMATION	NWB IR9 NWB IR12h	As the risk-based remedial approach is no longer being pursued, the request for an amendment to Part J.2 of the Water Licence as listed in Block 9 of the application is no longer required. A detailed model for estimating the closure and monitoring costs as summarized in Block 21 of the application is provided in Attachment 5. Given that the closure plan for the landfill is yet to be developed, the landfill reclamation costs included in the model are highly conceptual at this stage. The cost estimate assumes that post-closure monitoring activities will be required for an additional 10 years.

Responses to Information Requests

NWB Reference #	Intervener Reference #	Intervener	Information Request	Reference to Application	Linkages	Comments/Direction
14c	c	DND	Appendix P Item J2.f- The plan to delineate, treat and dispose of hydrocarbon contaminated soils located within, beneath and adjacent to the Fuel Tank farm: The Application Section 9 (Description of the Undertaking) "proposes an amendment to Part J.2 of the Water Licence requiring the development and submission to the Water Board for approval of a new Abandonment and Reclamation Plan that reflects the preferred remedial approach described in Appendix J" of the Application (Appendix J Section 5.0). Receipt of this 'new Abandonment and Reclamation Plan' is necessary to complete a technical review of the Application, and should include a detailed outline of the contingency remediation plan should the risk management approach being proposed not succeed.	Appendix P: Compliance Assessment. Licence No. 1AR-NAN0914 Part J, Item 2.f Application form Block 9 Application, Appendix J Section 5.0	NWB IR12h NWB IR14a	As the risk-based remedial approach is no longer being pursued, the request for an amendment to Part J.2 of the Water Licence as listed in Block 9 of the application is no longer required. CanZinco will await direction from the NWB as to whether an updated Abandonment and Reclamation Plan is required for this application. However, CanZinco is of the opinion that the Nanisivik Mine 2004 Reclamation and Closure Plan (CanZinco 2004) as approved by the NWB on July 6, 2004 and as subsequently revised and implemented will continue to be effective for all proposed activies within the scope of this licence application. In addition to the updated Spill Contingency Plan (Nyrstar 2014) and the Waste Management Plan (Nyrstar 2014) included as attachments 3 and 4, this also includes: the Post Closure Geotecnical Monitoring Contingency Plan (BGC 2009); the Contingency Plan for Water Quality Exceedances, Former Nanisivik Mine Site (Stantec 2009); and the Abandonment and Reclamation Plan, Fuel Tank Farm, Former Nanisivik Mine Site (Stantec 2010) .
14d	d	DND	Appendix P Item J.2 g- Confirmation of Soil Quality Remediation Objectives (SQROs) for the tank farm area: The SQROs should be confirmed for all contaminants of concern. DND would like all soils that exceed the current SQROs approved to date, utilized for all soil excavation and confirmatory sampling activities.	Appendix P: Compliance Assessment. Licence No. 1AR-NAN0914 Part J, Item 2.g	NWB IR12j	The remediation approach described in the Abandonment and Reclamation Plan, Fuel Tank Farm, Former Nanisivik Mine Site (Stantec 2010) approved by the NWB will continue. The SQROs for the contaminants of concern at the former fuel tank farm are derived from the Canadian Council of Minister of the Environment (CCME) Canadian Environmental Quality Guidelines (1999 - Updated to November 2013) and the Canada-Wide Standards for Petroleum Hydrocarbons in Soil (2001, Revised 2008). As stated in the 2010 Abandonment and Reclamation Plan the SQROs are based on Tier 1 CCME guidelines because there was insufficient information to calculate Tier 3 CCME criteria. CanZinco intends to collect the information necessary to calculate Tier 3 guidelines during the 2014 field season.
14e	e	DND	Appendix P Item J2.i- Confirmatory Soil analysis: DND has concerns with the confirmatory soil and (absence of) water quality analysis conducted to date and would like to see a more comprehensive and representative approach and methodology outlined for review and acceptance.	Appendix P: Compliance Assessment. Licence No. 1AR-NAN0914 Part J, Item 2.i	NWB IR12k NWB IR22	As the risk-based remedial approach is no longer being pursued, the request for an amendment to Part J.2 of the Water Licence as listed in Block 9 of the application is no longer required. Confirmatory soil analysis results are included in the 2012 and 2013 Progress Reports submitted with the Annual Reports. DFO has been provided with soil sample results directly since remediation activities commenced in 2011. Initial excavation confirmatory soil sampling results are reported in the Contaminated Soil Remediation 2013 Progress Report submitted with the 2013 Annual Report to the NWB March 4, 2014. Water quality monitoring results are reported in the Water Quality Monitoring Report submitted annually to the NWB.

Responses to Information Requests

NWB Reference #	Intervener Reference #	Intervener	Information Request	Reference to Application	Linkages	Comments/Direction
14f	f	DND	Appendix P, Item J2.j- Decontamination and removal procedures for the tank and liner: It is DND's understanding that liners remain on site and therefore should be addressed in the revised plan.	Appendix P: Compliance Assessment. Licence No. 1AR-NAN0914 Part J, Item 2.j	NWB IR2 NWB IR12l	As the risk-based remedial approach is no longer being pursued, the request for an amendment to Part J.2 of the Water Licence as listed in Block 9 of the application is no longer required. Use of an on-site rubble pit for the disposal of liners as described in the approved *Abandonment and Reclamation Plan, Fuel Tank Farm, Former Nanisivik Mine Site* (Stantec 2010) has not been implemented. All liners from the fuel tank farm demolition are to be disposed of in an approved facility, either on-site or in the South. A Waste Management Plan is included as Attachment 3.
14g	g (i-x)	DND	Specifically, DND is looking for information on the tasks and activities; the associated environmental mitigation measures / engineering controls; and the associated timelines for implementation (initiation and completion) for the following: (1) the baseline site assessment of the new location intended to accept stockpiled impacted soils; (2) the identification of the geographic area / preparation / construction of a new location to accept impacted soils with proper engineering controls; (3) the excavation of all impacted soils (exceeding any remedial objective as identified by the Federal Custodian or Nunavut Water Board) associated with the tank farm; (4) the handling of screened soil materials (e.g. screened out rocks); (5) the handling of any on-site generated waste; (6) the relocation of all impacted soils to the new engineered location; (7) all confirmatory soil and water sampling to be undertaken, including but not limited to: the excavation base, excavation sidewalls, soil stockpiles, treated soil, areas potentially impacted by stockpiled soil locations, and screened rocks; (8) the development / implementation of the risk assessment approach and the triggers for implementing the contingency remedial approach; (9) the plan for the lower and upper treatment areas; and (10) All planned reporting (scope, schedule, and frequency).	Appendix P: Compliance Assessment. Licence No. 1AR-NAN0914 Part J, Item 2.l	NWB IR12b NWB IR12e NWB IR12m	As the risk-based remedial approach is no longer being pursued, the request for an amendment to Part J.2 of the Water Licence as listed in Block 9 of the application is no longer required. The remediation approach described in the Abandonment and Reclamation Plan, Fuel Tank Farm, Former Nanisivik Mine Site (Stantec 2010) approved by the NWB will continue. An updated schedule for remedial activities and studies is included as Attachment 6. Please note that the schedule presented in Attachment 6 assumes that use of the concrete pad for soil handling and storage activities can continue through July 31, 2015.
14h	h	DND	A scientific rationale outlining how the proposed location for the impacted soils meets the risk assessor's recommendations (Appendix J, Section 5.0)	Application, Appendix J, Section 5	NWB IR12c NWB IR14c	As the risk-based remedial approach is no longer being pursued, the request for an amendment to Part J.2 of the Water Licence as listed in Block 9 of the application is no longer required.

Responses to Information Requests

NWB Reference #	Intervener Reference #	Intervener	Information Request	Reference to Application	Linkages	Comments/Direction
14i	i)	DND	An approach and methodology for tracking and reporting on soil location, quantity and quality should be established for review and acceptance.		NWB IR12i	The location, quantity and quality of soil is reported annually in the Contaminated Soil Remediation progress reports. The methodology used to estimate exsitu quantity of contaminated soil is described in Section 4.2.4 and 4.3 of the Nanisivik Mine Contaminated Soil Remediation 2013 Progress Report (SRK 2014). The estimated insitu volume of contaminated soil is updated based on production monitoring of the dilution actually achieved to extract the contaminated soil and a detailed understanding of the processes that governed the deposition of the contamination and its migration.
15	2	DND	From the Application (Section 14), DND understands that Canzinco is seeking an amendment to allow for the disposal of scrap metal and other bulky non-hazardous materials in an on-site landfill. Details for this proposed on-site landfill are requested.	Application Form Block 14. WASTE Application Form Block 15 QUANTITY AND QUALITY OF WASTE INVOLVED	NWB IR2 NWB IR10 NWB IR13	Canzinco will be evaluating potential landfill locations in 2014 on Commissioners' Land leases that have yet to be surrendered for the disposal of inert bulky, non-hazardous waste that has been recovered during site wide post closure monitoring and maintenance activities. Possible locations include: on Lease No. L-8008T below the former Pamo Building footprint; on Lease No. L-8677T below the former Dome Building footprint; on Lease No. L-40043T in the West Twin shale/dolostone quarry on the west side of the WTDA (former quarry permit No. 03-708-003); and on Lease L-40041T within the former warehouse yard. The waste will fit in a pit 10 m by 10 m by 1 m or against a high bedrock wall in the quarry or warehouse yard. Cover material will be sourced from the material excavated for a pit or aggregate stockpiled during mine operations immediately adjacent to the high walls. If finer cover material is required it will be sourced from the stockpiles of sand and gravel that meet the SQROs at the dock or from the Landfill Quarry (former quarry permit No. 07-708-001). The former quarries are described in Nanisivik Mine 2004 Reclamation and Closure Plan (CanZinco Ltd. 2004), and its appendix C, Quarry Development and Reclamation Plan (BGC Engineering 2004). The West Twin Quarry was not used during earlier mine reclamation activities. The Landfill Quarry has been used by the GN for road maintenance work in recent years. A Waste Management Plan is included as Attachment 3.
16	3	DND	From the Application (Section 20), DND would like to clarify that concerns for the remedial approach were raised at these meetings. DND would like to see these concerns, along with the mitigative measures CanZinco Ltd. is proposing, outlined in this section of the Application.	Application Form Block 20. Consultation		Please refer to CanZinco's cover letter submitted in support of the IR responses. Addressing the concerns of the DND, the risk-based remedial approach is no longer being pursued.
17	4	DND	Regarding Appendix J of the application which is a 'Remedial Options Analysis', DND would like to see all contaminants of concern addressed in the remedial approach proposed, or if excluded, better support for any recommendations for their exclusion (including citing of all references and the associated scientific basis).	Application Appendix J: Preferred Remedial Option	NWB IR12j	The risk-based remedial approach is no longer being pursued. Please refer to the cover letter supporting these IR responses. The remediation approach described in the *Abandonment and Reclamation Plan, Fuel Tank Farm, Former Nanisivik Mine Site* (Stantec 2010) approved by the NWB will continue to be followed.

Responses to Information Requests

NWB Reference #	Intervener Reference #	Intervener	Information Request	Reference to Application	Linkages	Comments/Direction
18	5	DND	Finally the Appendix K concordance table refers to the former Abandonment and Reclamation Plan for the Fuel Tank Farm (2010) and will need to be revisited once the new Abandonment and Reclamation plan is submitted.	Application Appendix K: Concordance Table		The risk-based remedial approach is no longer being pursued. Please refer to the cover letter supporting these IR responses.
19	1	EC	EC asks the proponent to provide information on the geochemistry of the area and justification for their conclusions regarding the neutralization potential of the surrounding environment.	Application Appendix H: Water Quality Monitoring Schedule, Twin Lakes Creek Watershed, Station NML-23 pp. 3		Please refer to Attachment 7.
			In addition, please provide 2013 sampling data from Station ELO and Station NML-23 for comparison.			2013 sampling data was provided in the 2013 Annual Report submitted to the NWB on March 5, 2014.
20	2	EC	EC requests the trace metal (NAN-4) monitoring data from Station 159- 4, and further justification from the proponent for their recommendation to discontinue trace metal sampling	Application Appendix H: Water Quality Monitoring Schedule, Twin Lakes Creek Watershed, Station 159-4	NWB IR22 2.)	Please refer to Attachment 7.
21	3	EC	EC requests the Proponent provide further rationale for discontinuing monitoring at this station altogether, and recommends maintaining annual sampling and analysis	Application Appendix H: Water Quality Monitoring Schedule, Twin Lakes Creek Watershed, Station 159-10		Please refer to Attachment 7.
22	4	EC	1) EC requests the proponent consider bi-weekly sampling at the site during planned future earth-moving reclamation activities of the stockpiled soils undergoing bioremediation, or provide justification for not doing so.	Application Appendix H: Water Quality Monitoring Schedule, Twin Lakes Creek Watershed, Station 159-6	NWB IR6 NWB 14e	Please refer to Attachment 7.
			2.) EC requests the proponent provide justification for discontinuing NAN-4 sampling at this site.		NWB IR20	Please refer to Attachment 7.

Responses to Information Requests

NWB Reference #	Intervener Reference #	Intervener	Information Request	Reference to Application	Linkages	Comments/Direction
23	5	EC	Please provide further justification for this decision, utilizing any historic data from groundwater monitoring in these two locations	Application Appendix G: Geotechnical Monitoring Schedule 2014-2018 pp. 4		Please refer to Attachment 8.
24	6	EC	Please provide further information on the scoring for the "Repercussions for other land uses and administrative/management entities" and the "Environmental and socio- economic impact" criterion.	Application Appendix J: Remedial Options Analysis, Section 4.3, Table 2 - Summary of Remedial Options Analysis pp. 10		Appendix J of the application was provided to support a risk-based remedial approach of the hydrocarbon contaminated soil. As this approach is no longer being pursued, the options analysis is not relevant. Please refer to the cover letter supporting these IR responses.
25	7	EC	Please provide information to support that a cap of 0.5 m of clean soil will eliminate the risks to receptors at this site.	Application Appendix J: Preferred Remedial Option, Section 5.0, pp. 15	NWB IR4	The risk-based remedial approach is no longer being pursued. Please refer to the cover letter supporting these IR responses.

Attachment 1

Letter to the NPC regarding conformity determination

April 10th, 2014

Ms. Sharon Ehaloak
Executive Director
Nunavut Planning Commission
29 Mitik Street, PO Box 2101
Cambridge Bay, NU
X0B 0C0

Dear Ms. Ehaloak,

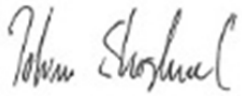
Re: NPC Conformity Determination for Renewal of Water Licence 1AR-NANA0914 (Reclamation and Post-Closure Monitoring of the Nanisivik Mine Site)

On November 13, 2013, CanZinco Ltd. submitted an application for water licence amendment/renewal to the Nunavut Water Board (NWB). A copy of the application was forwarded directly to the Nunavut Planning Commission (NPC) at that time. A conformity determination by the NPC to the North Baffin Regional Land Use Plan is requested.

CanZinco's application to the NWB included a copy of the positive conformity determination issued by the NPC on June 19, 2008. In an email to me dated June 12, 2013 (and included in Appendix E of the application), the NPC advised that another conformity determination will only be required if the scope of the original project has changed. If NPC determined that the project conformed to the original 2008 licence application for reclamation and closure then a positive conformity determination would be issued.

I thank you for your consideration of this matter and I look forward to your response.

Sincerely,



Johan Skoglund
CanZinco Ltd.

Copied:

- Brian Aglukark, Director of Plan Implementation, Nunavut Planning Commission
- Phyllis Beaulieu, Manager of Licensing, Nunavut Water Board
- Ryan Barry, Executive Director, Nunavut Impact Review Board
- Arlene Laudrum, SRK Consulting
- Patrick Duxbury, RT Associates

Attachment 2

Addendum #1 to the amendment-renewal application for water licence 1AR-NAN0914

March 3rd, 2014

Phyllis Beaulieu
Manager of Licensing
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0B 1J0

Dear Ms. Beaulieu,

Re: Water Licence 1AR-NAN0914: Addendum #1 to Amendment-Renewal Application

This addendum is provided in response to the Nunavut Water Board (NWB) letter dated January 29, 2014, acknowledging receipt of Canzinco's application for an amended water licence at the Nanisivik Mine. The NWB's letter highlights two items for which additional information is requested from Canzinco. These information requests are addressed below.

1. 2013 Annual Report

   The 2013 Annual Report is in the final stages of preparation and will be submitted to the NWB shortly.

2. Authorization from the Hamlet of Arctic Bay

   It is our understanding that the Hamlet of Arctic Bay is in the process of seeking a water licence and that deficiencies in this licence application was addressed by the Hamlet of Arctic Bay in December 2013. Based on the status of this water licence application, it is anticipated that the Hamlet will be in a position to accept sewage and solid waste generated by Nanisivik by the time Zancinco's water licence is renewed.

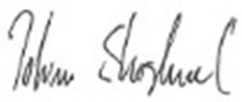
   As a contingency measure should use of the Arctic Bay landfill not be feasible, Canzinco respectfully requests that clauses be included in the Canzinco water licence to allow for the disposal of sewage and solid waste on site. This request involves the following:

   - Sewage waste:
     Approval for the disposal of sewage in latrine pits is requested. Latrine pits would be located at least thirty one (31) metres above the ordinary high water mark of any water body, treated with lime and covered with native material to achieve the pre-existing natural contours of the land prior to abandonment.

   - Solid waste:
     Approval for open burning of paper products, paperboard packing including boxboard and cardboard, untreated wood including lumber and plywood and natural fiber textiles is requested.
     In order to minimize the risk of attracting wildlife, food waste will be burned in open barrels along with the other products approved for open burning. Ash generated from the burning of food waste will be disposed of in a designated pit to be located at least thirty one (31) metres above the ordinary high water mark of any water body and covered with native material to achieve the pre-existing natural contours of the land prior to abandonment.

The disposal of food packaging waste that is unsuitable for open burning will be incorporated with the disposal of scrap metal and other bulky non-hazardous solid waste as proposed in the renewal-amendment application.

Sincerely,



Johan Skoglund
Group Manager Environment

Attachment 3

Waste management plan

Former Nanisivik Mine Site

Waste Management Plan

April 2014

Document Control

	Description	Date
(1)	Original version	13 April 2014
(2)		
(3)		
(4)		
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(7)		
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Contents

TABLES

FIGURES

APPENDICES

1 Introduction

1.1 Purpose

Nyrstar has developed this Waste Management Plan (WMP) for activities associated with the remediation of contaminated soil at the former fuel tank farm, along with site-wide post closure monitoring and maintenance of the former Nanisivik Mine site. The WMP provides information for the identification, segregation, handling and disposal of sewage, solid waste and hazardous waste for the former Nanisivik Mine site. This WMP provides an update to solid and sewage waste management measures previously implemented under the *Nanisivik Mine 2004 Reclamation and Closure Plan* (Canzinco 2004) as approved by the Nunavut Water Board on July 6, 2004, or as subsequently revised under the water licence. The former Nanisivik Mine site is managed by Canzinco Mines Ltd. (Canzinco), a wholly owned subsidiary of Nyrstar.

The WMP follows the Government of Nunavut's (GN), *Environmental Guideline for the General Management of Hazardous Waste, Revised October 2010*, as well as the *Environmental Guideline for the Burning and Incineration of Solid Waste, Revised January* 2012.

The objectives of the WMP are to:

- Provide guidance for sewage, solid and hazardous waste management at the former Nanisivik Mine site; and
- Describe the responsibility and tasks involved with Waste Management.

The removal of food, food waste and sewage from active areas of the site and proper disposal daily is a critical component of polar bear safety.

1.2 Canzinco Contact Information

Johan Skoglund, Group Manager Environment, Nyrstar

Johan.skoglund@nyrstar.com
T +41 44 745 8210
F +41 44 745 8110

Tessinerplatz 7
CH-8002
Zurich
Switzerland

1.3 Nyrstar Environmental Policy

nyrstar

Nyrstar Environment Policy Statement

We are a global leader in mining, metals processing and recycling with operations across multiple cultures and continents. Our metal products meet society's needs worldwide and are inherently recyclable. We are located within communities who have expectations of us, which we must meet.

We operate our business in an environmentally responsible way. Our aim is to prevent harm to the environment and the community. We will build trust with our key stakeholders by meeting our commitments and maintaining open and honest communications.

To achieve this, we will:

- Minimise the environmental impact of our operations by applying leading practice, innovation and sound science
- Continually improve our performance through the identification and management of environmental risks and establishment of measurable objectives and targets
- Comply with legal obligations as a minimum and meet the requirements of our voluntary agreements
- Provide material stewardship through efficient and responsible use of resources, minimizing waste and expanding recycling options
- Recognize the environmental impact from past operations and address legacy issues
- Develop a culture of environmental ownership through integration of business goals and by increased awareness, skills and competency of our people.
- Engage with our stakeholders, understand and respond to their expectations and effectively communicate our environmental performance

We believe that these commitments provide the foundation for a sustainable business.

Roland Junck – Chief Executive Officer
November 2013

1.4 Project Description

1.4.1 Site Description

The former lead zinc Nanisivik Mine is located in the Canadian Arctic on northern Baffin Island, on the south shore of Strathcona Sound, on the Borden Peninsula, at latitude 73°02'N and longitude 84°31'W. The site is located approximately 33 kilometres by road from the Hamlet of Arctic Bay, which is located on the shore of Arctic Bay on the Adams Sound. This community has a population of about 825 people, composed of a majority of Inuit.

Access to the site is via scheduled air service from Iqaluit and Resolute Bay to Arctic Bay. The road from Arctic Bay to Nanisivik is open during snow free periods from mid-June to mid-September. Freight is delivered to Nanisivik via ship during the 14-week open water season.

The environment around the site is typical of the High Arctic region, characterized by extremely cold temperatures, low precipitation, continuous permafrost and largely barren surface soils, which results in the mine area having minimal vegetation coverage and wildlife usage.

1.4.2 Site Infrastructure and Activities

The Nanisivik Mine landfill and underground mine waste disposal areas were closed and reclaimed in 2008. Reusable mine and mill components, scrap metal and hazardous wastes were shipped off-site by Canzinco in 2008 and 2011. In 2013, a local entrepreneur shipped additional valuable waste material off-site. Since the closure of the landfill and underground mine waste disposal areas in 2008, additional waste has been gathered, particularly from remote areas. The sewage treatment plant was demolished and temporary sewage and greywater pits reclaimed by September 2008.

The Nanisivik mine infrastructure remaining on-site includes:

- Water conveyance structures including the West Twin dike spillway, West Twin outlet channel and the East Twin Creek diversion berm and channel;
- Thermal covers over the tailings surface cell, test cell, toe of West Twin dike, landfill, West Open Pit waste rock, East Open Pit waste rock, East Trench waste rock, Oceanview Open Pit waste rock, Area 14 waste rock, Upper Dump Pond, and the Industrial Complex foundation;
- Embankments including remnant dikes at East Adit Treatment Facility and remnant berms of the fuel tank farm. The West Twin dike and Test Cell dike have been incorporated into the Surface Cell and Test Cell tailings covers;
- Shale and armour borrow areas;
- Covers over mine openings 00/01 Portals and Crown Pillar, 17 North Portal, Oceanview Portal, K-Baseline Portal, Area 14 Portal, 09 South Portal, Lower Adit, Portal to Mill Foundation, Shale Hill raise, Oceanview East raise, Oceanview West raise, Area 14 Raise;
- Service roads around the former mine site as required for post-closure monitoring;
- Lined treatment facilities for petroleum hydrocarbon contaminated soil remediation; and
- Trailers, sheds and a portable outhouse rented for the monitoring and remediation activities.

The Nanisivik wharf structure, general laydown pad at the Nanisivik wharf; and the concrete floor slab of the former concentrate storage shed are managed by the surface lease holder, the Department of Fisheries and Oceans (DFO). The soil treatment facilities located on DFOs surface lease are operated by Canzinco. Figure 1 shows the infrastructure on the DFO surface lease.

Other infrastructure at the former Nanisivik Mine site include:

- The Department of National Defence Canada trailers at the dock site;
- A garage in the former townsite owned by the Government of Nunavut;
- The road from Arctic Bay to future site of the Nanisivik Port and the spur road to the East Twin Lake are owned by the Government of Nunavut; and
- The Canadian Coast Guard and residents of Arctic Bay maintain sheds at the port.

Ongoing reclamation and post-closure activities include:

- Surface water quality monitoring as per Schedule I, Table 2 of the water licence;
- Geotechnical monitoring all year as per Schedule I, Table 3 of the water licence;
- Excavation of petroleum hydrocarbon contaminated soils in the former fuel tank farm area;
- Operation of petroleum hydrocarbon contaminated soil treatment facilities;
- Stockpiling of clean soil for future use; and
- General site maintenance as needed.

Figure 1: Location of infrastructure and spill response equipment on the DFO surface lease

1.5 Plan Review

This WMP is a working document. It will be reviewed annually or as required to accommodate any changes to site conditions or work practices. A copy of the WMP will be posted and reviewed for all staff, contractors, and visitors to the site as part of the site orientation program.

Copies of the most recent WMP can be obtained from Nyrstar's Environment Manager, Johan Skoglund, at Johan.skoglund@nyrstar.com.

2 General Waste Management

2.1 Waste Identification

Typical waste generated on site during reclamation and post-closure monitoring and maintenance includes sewage, solid and hazardous waste. All site workers are instructed to call the soil remediation project manager or their on-site designate if uncertain about waste products and their storage and disposal methods. All wastes generated by Canzinco's activities are classified by appropriately trained personnel. Common knowledge can be used to determine that materials such as paper, untreated wood, concrete and food scraps are not hazardous waste.

2.1.1 Solid Waste

Solid waste includes unwanted solid materials discarded from the lunchroom, the office trailer, the soil treatment facility and as discovered during post-closure monitoring and maintenance activities. For clarity, solid waste does not include hazardous waste or sewage.

2.1.2 Hazardous Waste

Hazardous waste is a contaminant that is a dangerous good and that is no longer wanted or is unusable for its original intended purpose. In order to determine if a waste is a hazardous waste, Canzinco shall:

- Refer to the material safety data sheets (MSDS) for the material in question,
- Conduct tests and analyses to determine whether a waste is hazardous,
- Maintain an inventory of materials on site and their classification, and
- Review the materials inventory on an annual basis.

2.1.3 Sewage

Between two and twelve workers commute daily from Arctic Bay during periods of activity, therefore the generation of human waste is restricted to day use only.

2.2 Waste Segregation

After the waste is identified, it is segregated at the source. The following waste streams are currently being segregated: food waste; scrap metal; combustibles; scrap liner/rubber; demolition concrete waste, oily waste; aerosols; batteries; spent canisters (propane, hexane); plastics; glass; sewage and contaminated soil.

2.3 Waste Diversion

Where possible, waste diversion, including material re-use, will occur; for example site workers are encouraged to bring their lunches in reusable containers and to use water jugs instead of single use water bottles.

2.4 Training

The soil remediation project manager (with SRK Consulting) or their on-site designate will train site workers to refer to the appropriate MSDS before handling and using any chemicals and to determine what PPE is required for the handling of materials and sewage. Canzinco conducts site inspections and observe waste periodically to verify that the training is effective.

3 Solid Waste Management

Solid waste includes unwanted solid materials discarded from the lunchroom, the office trailer, and the operation of soil treatment facilities at the former fuel tank farm, along with materials recovered during site wide inspections during post-closure monitoring and maintenance activities.

3.1 Disposal Facilities

Food waste, combustible waste, plastics and glass are disposed of in the Arctic Bay solid waste disposal facility. The remaining waste streams are stored on site for future disposal at an approved facility. Approval for the operation of a small landfill for the disposal of non-hazardous materials is to be applied for by Canzinco.

In the event that the Arctic Bay solid waste disposal facility is unable to accept solid non-hazardous waste from Nanisivik, then the following disposal routes shall apply:

- The food waste will be burnt along with sufficient combustible waste to ensure that it is completely burned. Two burn barrels are available for use on site. The ash will be disposed of in a designated pit. The pit will be closed out at the end of each field season by covering it with native material to achieve the pre-existing natural contours of the land. Ash pits will be located at least thirty one (31) metres above the ordinary high water mark of any water body and as far away as practical form the areas of activity to reduce the risk of attracting wildlife to the jobsites. The locations of ash pits will be reported in the Annual Report.
- The plastic and glass waste will be cleaned of food residues and stored such that it is inaccessible to wildlife prior to disposal in an approved landfill (either on site or off-site).

In the event of a spill of petroleum hydrocarbons, impacted soil will be managed within the existing soil treatment facilities (spill response measures are described in the *Spill Contingency Plan*, Nyrstar 2014).

The destination and estimated quantities of various waste is summarized in Table 1.

Table 1: Fate of non-hazardous solid waste generated at Nanisivik

Material	Source	Destination	Estimated Quantity
Paper products	Office supplies, shipping supplies	Arctic Bay, burn barrel or approved on-site landfill	< 1 m^3 annually
Paperboard packing	Boxboard and cardboard used in shipping supplies	Arctic Bay, burn barrel or approved on-site landfill	1 m^3 annually
Untreated wood	Shipping supplies	Arctic Bay, burn barrel or approved on-site landfill	< 1 m^3 annually
Food waste	Lunches	Arctic Bay or burn barrel	1.5 m^3 annually
Ash	Burn barrels	Ash pits	< 1 m^3 annually
Glass	Sample containers, lunches	Arctic Bay or approved on-site landfill	< 1 m^3 annually
Tin and aluminium	Lunches	Arctic Bay or approved on-site landfill	< 1 m^3 annually

Material	Source	Destination	Estimated Quantity
Light plastics	Plastic sample bags, lunches	Arctic Bay or approved on-site landfill	1 m^3 annually
Heavy plastics	Water pails	Arctic Bay or approved on-site landfill	< 1 m^3 annually
Liner	Soil treatment facilities	Approved on-site landfill or southern facility	25 m^3
Waste diesel fuel	Fuel transfer containment pans	Burn barrel (for ignition)	2 L annually
Scrap metal, cable, heavy equipment tires	Site wide debris gathered during inspections.	Approved on-site landfill	25 m^3
Concrete	Demolition debris	On-site rubble pit	10 m^3

3.2 Record Keeping

Canzinco maintains a logbook of:

- The quantity and type of waste deposited each day (in cubic metres),
- Where the waste is deposited,
- Records of any test results, waste analysis or other determinations made in evaluating whether wastes generated are non-hazardous, and
- The measures that were taken to avoid or mitigate any adverse impacts from the deposition of waste.

Photographs to document activities are taken throughout the field season. The logbook is transported to the site at the start of each field season and stored off-site during the off season for safe keeping. An electronic copy is made at the end of each field season and retained by Canzinco.

4 Hazardous Waste Management

Hazardous waste is managed in accordance with the Government of Nunavut *Environmental Guideline for the General Management of Hazardous Waste* (2010), the Transport Canada's *Transportation of Dangerous Goods Regulations* and the Canadian Environmental Protection Act's *Inter-provincial Movement of Hazardous Waste Regulations*.

Material Safety Data Sheets (MSDS) for the materials are provided in Appendix A of this Waste Management Plan and in the Spill Contingency Plan. Copies are stored in the office trailer at the dock site during operations between June and September.

4.1 Hazardous Materials on Site

Table 2 lists the hazardous materials that are stored on site. The UREA and DAP is used to treat the petroleum hydrocarbon contaminated soil. The hexane gas is used to calibrate gas monitors. The construction contractor will be providing a mobile fuel truck to refuel the heavy equipment; however a need may arise to keep small quantities of fuel as listed in Table 3 on site between June and September.

Table 2: Hazardous materials routinely stored on site

Material	Maximum Amount	Storage Container and Capacity	No. of Containers	Storage Location
Hexane Gas	34 L	17 L cylinder	2	Shed (locked)
Nutrient UREA	4200 kg	11 kg impermeable plastic bags	167 bags	Shed (covered and locked)
Nutrient DAP	700 kg	11 kg impermeable plastic bags	167 bags	Shed (covered and locked)
Lead and zinc concentrate contaminated soil	0.5 m^3	0.5 m^3 Lined wooden box	1	Former concentrate shed pad

Table 3: Hazardous materials that may be stored on site

Material	Maximum Amount	Storage Container and Capacity	No. of Containers	Storage Location
Gasoline	200 L	Drum	1	Laydown pad
Diesel	200 L	Drum	1	Laydown pad

Other substances such as lubricating oils, hydraulic fluids, antifreeze, engine coolants and fuel additives will be used on site. The construction contractor will transport these substances to site in a service truck and small quantities (10 L or less) may be stored in a trailer or shed on site between June and September. All waste generated from heavy equipment maintenance is managed by the contractor at his facilities in Arctic Bay.

All used batteries: including general purpose batteries; lithium, and nickel cadmium shall be collected and stored in a designated container in the office trailer in order to prevent the release of any hazardous constituents to the environment. The batteries are to be transported off-site for disposal at an approved facility.

4.2 Transportation and Documentation

Transportation of dangerous goods within the Site and shipping to and from Nanisivik requires conformance with transportation regulatory requirements, including Dangerous Goods Regulations and International Air Transport Association.

Emergency Response Information for hazardous materials, shipped from site, shall be maintained on site. Workers involved in transportation of hazardous materials shall receive proper training prior to starting any work.

Labelling
Appropriate labelling of all hazardous waste shall be conducted as the waste is generated.

Storage and Packing of Hazardous Waste Prior to Shipment
Canzinco shall ensure that hazardous waste is contained to inhibit off-site migration. Canzinco shall ensure this waste is entered into the Hazardous Waste Log. Appropriate placards, as required under the transport of hazardous materials, must be supplied by the transporter. Only licensed waste handlers shall be used. A copy of the license shall be kept in the files.

Manifests
Canzinco has a Waste Generator Number, and proper manifesting will accompany all waste shipments. The manifest form must be signed by one of the following:

- Soil Remediation Project Manager, or
- Their designate.

The transporter must sign and date the manifest upon accepting the waste for shipment. A copy of the signed manifest shall be retained for at least three years. The returned copy of the manifest with the handwritten signature of the owner or operator of the recycling or disposal facility shall be retained on site for at least three years.

4.3 Record Keeping and Reporting

Copies of each manifest form shall be available on site during the field season for at least three years.

Canzinco shall retain all records of any test results, waste analysis or other determinations made in evaluating whether wastes generated at the Nanisivik site are hazardous wastes for at least three years after the waste(s) were last sent off-site for treatment or disposal.

5 Sewage Management

Sewage is currently deposited in a pail lined with a heavy duty biodegradable waste bag inside the portable outhouse. Sewage is disposed of whenever the pail gets full or daily when concerns of attracting wildlife warrant. The sewage pail is transported to the Arctic Bay solid waste disposal facility where the waste bag is deposited in the area of the facility reserved for the disposal of dead animals. A second lined sewage pail is used while the sewage is being transported. In the event that sewage cannot be disposed of in the Arctic Bay solid waste disposal facility, latrine pits will be established on-site for disposal.

Wash water and sterile wipes are provided for the site workers. The wash water is deposited directly onto the ground and the sterile wipes are disposed of with food waste.

In the event that the Arctic Bay solid waste disposal facility is unable to accept the bags of sewage, the following procedures must be followed for disposal of sewage in latrine pits on site.

- Latrine pits are to be located at least thirty on (31) metres above the ordinary high water mark of any water body, treated with lime and covered with native material to achieve the pre-existing natural contours of the land prior to abandonment.
- The location of latrine pits will be at a suitable distance from active areas of the site so as to not attract wildlife to work areas.
- Latrine pits will be closed out annually.
- Coordinates will be provided with the Annual Report.

APPENDIX A – MATERIAL SAFETY DATA SHEETS

The following list of Material Safety Data Sheets (MSDS) will be inserted into the plan upon implementation at site:

- Hexane Gas
- Diesel Fuel
- Gasoline
- Nutrient UREA
- Nutrient DAP
- Diesel Engine Oil 10W30
- Diesel Engine Oil 15W40
- Ethylene Glycol
- Crankcase Oil Heavy Duty 10W
- Transmission Oil
- Gear Lubricant 75W90
- Lubricating Grease
- Hydraulic Oil

Attachment 4

Spill contingency plan (updated in March 2014)

Former Nanisivik Mine Site

Spill Contingency Plan

April, 2014

Document Control

	Description	Date
(1)	Original version	8 May 2012
(2)	Opening paragraph updated to acknowledge revision made. Nyrstar contact information updated. Nyrstar Environmental Policy Statement updated. Section 1.4.1, period during which the road is open is revised to reflect recent experience, fuel tank farm now referred to as former fuel tank farm. Section 1.4.2 updated as NWTel infrastructure has been removed. Section 1.4.2, reference to construction of treatment facilities removed. Table 3, distribution list updated. Table 4 updated to be more generic. Section 5, Backhoe added to list of additional on-site equipment. Table 6, Additional Resource Contacts list updated. Section 6, personnel responsible for training on-site workers revised to be more generic. Page breaks revised.	9 April 2014
(3)		
(4)		
(5)		
(6)		
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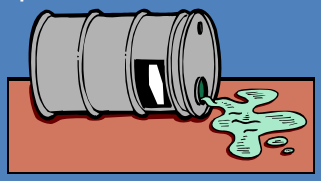
(8)		
(9)		
(10)		

Nanisivik First Responder Flowchart

First Responder **IDENTIFIES** the Spill



If there is danger to human health

1. **EVACUATE** the area

2. **SECURE** the area

3. **NOTIFY** the On-Scene Coordinator

If the spill is not controllable or not safe

1. **SECURE** the area

2. **RETREAT** a safe distance

3. **NOTIFY** the On-Scene Coordinator

If the spill is controllable and safe

1. **NOTIFY** the On-Scene Coordinator

2. **CONTROL / CLEAN-UP** the spill

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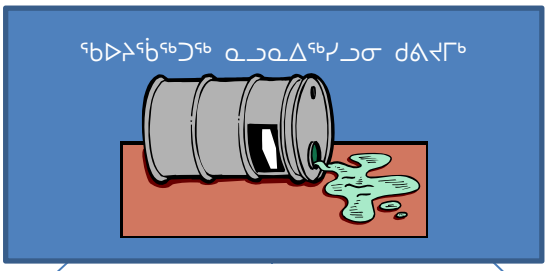

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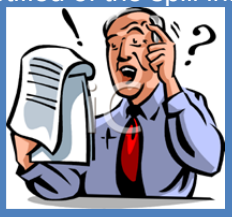
Nanisivik On-Scene Coordinator Flowchart

On-Scene Coordinator is notified of the spill information and takes control



On-Scene Coordinator notifies Contractor to mobilize equipment needed

If the spill can be

If the spill cannot be controlled

Continue containment and clean-up

Compile information

If the spill is in the marine environment

If the spill is on land or surface water

Compile information

Contact Canadian Coast Guard 1-800-265-0237

Contact AANDC 867-975-4295

Report incident to 24 Hour Spill Line at **867-920-8130**

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Contents

TABLES

FIGURES

APPENDICES

1 Introduction

1.1 Purpose

In 2012, Nyrstar developed this Spill Contingency Plan (SCP) for activities associated with the abandonment and reclamation of the fuel tank farm at the former Nanisivik Mine site. The SCP has been prepared to complement the 2010 *Abandonment and Reclamation Plan, Fuel Tank Farm, Former Nanisivik Mine Site, Nunavut*, prepared by Jacques Whitford Stantec Limited (JWSL) and to satisfy the requirements of Part J, Item 2 (k) of water licence 1AR-NAN0914. The SCP is reviewed annually and updates are submitted as required by changes in operation, site conditions, monitoring and/or technology. A list of revisions to the plan is included in the Document Control section.

The SCP follows the Government of Nunavut's (GN), *Consolidation of Spill Contingency Planning and Reporting Regulations*, 1999, as well as Aboriginal Affairs and Northern Development Canada's (AANDC) *Guidelines for Spill Contingency Planning*, 2007.

1.2 Nyrstar Contact Information

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Switzerland

1.3 Nyrstar Environmental Policy

nyrstar

Nyrstar Environment Policy Statement

We are a global leader in mining, metals processing and recycling with operations across multiple cultures and continents. Our metal products meet society's needs worldwide and are inherently recyclable. We are located within communities who have expectations of us, which we must meet.

We operate our business in an environmentally responsible way. Our aim is to prevent harm to the environment and the community. We will build trust with our key stakeholders by meeting our commitments and maintaining open and honest communications.

To achieve this, we will:

- Minimise the environmental impact of our operations by applying leading practice, innovation and sound science
- Continually improve our performance through the identification and management of environmental risks and establishment of measurable objectives and targets
- Comply with legal obligations as a minimum and meet the requirements of our voluntary agreements
- Provide material stewardship through efficient and responsible use of resources, minimizing waste and expanding recycling options
- Recognize the environmental impact from past operations and address legacy issues
- Develop a culture of environmental ownership through integration of business goals and by increased awareness, skills and competency of our people.
- Engage with our stakeholders, understand and respond to their expectations and effectively communicate our environmental performance

We believe that these commitments provide the foundation for a sustainable business.

Roland Junck – Chief Executive Officer
November 2013

1.4 Project Description

1.4.1 Site Description

The former Nanisivik Mine site is located in the Canadian Arctic on northern Baffin Island, on the south shore of Strathcona Sound, on the Borden Peninsula, at latitude 73°02'N and longitude 84°31'W. The environment around the mine site is typical of the High Arctic region, characterized by extremely cold temperatures, low precipitation, continuous permafrost and largely barren surface soils, which results in the mine area having minimal vegetation coverage and wildlife usage.

The former mine site is located approximately 33 kilometres by road from the Hamlet of Arctic Bay, which is located on the shore of Arctic Bay on the Adams Sound. This community has a population of about 825 people, composed of a majority of Inuit.

Access to the mine site is via scheduled air service from Iqaluit and Resolute Bay to Arctic Bay. The road from Arctic Bay to Nanisivik is open during snow free periods from mid-June to mid-September. Freight is delivered to Nanisivik via ship during the 14-week open water season.

Climatic data was collected at the Nanisivik Airport by Environment Canada from 1976 to 2010, which is located approximately 10 km south of the West Twin Disposal Area (WTDA). The Nanisivik Airport is at an elevation of 642 m, which is approximately 250 m higher in elevation than the WTDA. The recorded climate data were analyzed in Golder (1998). The following list is a summary of the main climatic parameters based on the data available in 1998:

- The mean annual air temperature (MAAT) was estimated to be -15.2°C.
- The mean annual precipitation total was estimated to be 240 mm.
- The 24 hour Probable Maximum Precipitation (PMP) value was estimated to range from 140 to 210 mm.
- The mean annual lake evaporation value, as measured at the Nanisivik site, was approximately 200 mm.

Climate monitoring was discontinued at the Nanisivik Airport in January 2011. The nearest available climate monitoring station is located at Arctic Bay. The Arctic Bay weather station is located approximately 14.3 km west of the former fuel tank farm and at an elevation of 31 m. A statistical assessment of the comparable data sets collected at the Nanisivik Airport and Arctic Bay between 2008 and 2010 was undertaken and it was found that the average difference in air temperature was approximately 1.6˚C, with a standard deviation of approximately 4˚C. Arctic Bay generally experienced warmer air temperatures than the Nanisivik Airport, as expected. This difference was more pronounced in the months between May and September where it was found that the average difference increased to in excess of 3˚C (BGC, 2012).

Due to the proximity of the Arctic Bay weather station to the ocean and the fact that this weather station is located at a similar elevation to the former fuel tank farm, the climate data recorded at Arctic Bay is expected to be accurate for the former fuel tank farm site.

1.4.2 Site Infrastructure and Activities

Infrastructure remaining at the former Nanisivik mine site includes:

- Water conveyance structures including the West Twin dike spillway, West Twin outlet channel and the East Twin Creek diversion berm and channel;
- Thermal covers over the tailings surface cell, test cell, toe of West Twin dike, landfill, West Open Pit waste rock, East Open Pit waste rock, East Trench waste rock, Oceanview Open Pit waste rock, Area 14 waste rock, Upper Dump Pond, and the Industrial Complex foundation;
- Embankments including remnant dikes at East Adit Treatment Facility and remnant berms of the fuel tank farm. The West Twin dike and Test Cell dike have been incorporated into the Surface Cell and Test Cell tailings covers;
- Shale and armour borrow areas;
- Covers over mine openings 00/01 Portals and Crown Pillar, 17 North Portal, Oceanview Portal, K-Baseline Portal, Area 14 Portal, 09 South Portal, Lower Adit, Portal to Mill Foundation, Shale Hill raise, Oceanview East raise, Oceanview West raise, Area 14 Raise;
- Service roads around the former mine site as required for post-closure monitoring;
- Nanisivik wharf structure;
- General laydown pad at the Nanisivik wharf;
- The concrete floor slab of the former concentrate storage shed (a portion of the surficial cover of the remnant concrete pad was removed by the Canadian Coast Guard);
- The Department of National Defence Canada has erected a building on the surface of the cleared concrete pad;
- A garage in the former townsite owned by the Government of Nunavut;
- The road from Arctic Bay to future site of the Nanisivik Port and the spur road to the East Twin Lake are owned by the Government of Nunavut; and
- The Canadian Coast Guard and residents of Arctic Bay maintain trailers and sheds at the port.

Infrastructure required for post-closure monitoring and for carrying out the remediation of the remaining petroleum hydrocarbon (PHC) contaminated soil at the former tank farm includes:

- Lined treatment facilities for petroleum hydrocarbon contaminated soil. For more information about the treatment facilities refer to the *Abandonment and Reclamation Plan, Fuel Tank Farm, Former Nanisivik Mine Site, Nunavut* (JWSL, 2010) and the 2011 *Water Licence 1AR-NAN0914 – Annual Report* (Nyrstar, 2012); and
- Trailers, sheds and a portable outhouse owned by local residents and rented for the monitoring and remediation activities.

Ongoing reclamation and closure activities include:

- Surface water quality monitoring during periods of flow as per Schedule I, Table 2 of water licence 1AR-NAN0914;
- Geotechnical monitoring all year as per Schedule I, Table 3 of water licence 1AR-NAN0914;
- Excavation of PHC contaminated soils in the former fuel tank farm area;
- Operation of PHC contaminated soil treatment facilities including mechanical soil aeration, nutrient application and soil testing;
- Stockpiling of clean soil for future use; and
- General site maintenance as needed.

1.4.3 Hazardous Materials on Site

Table 1 lists the hazardous materials that will be stored on site. The UREA and DAP will be used to treat the PHC contaminated soil. The hexane gas will be used to calibrate gas monitors. The construction contractor will be providing a mobile fuel truck to refuel the heavy equipment; however a need may arise to keep small quantities of fuel as listed in Table 2 on site between June and September.

Table 1: Hazardous materials to be stored on site

Material and Use	Maximum Amount	Storage Container and Capacity	No. of Containers	Storage Location
Hexane Gas	34 L	17 L cylinder	2	Shed (locked)
Nutrient UREA	4200 kg	11 kg impermeable plastic bags	167 bags	Shed (covered)
Nutrient DAP	700 kg	11 kg impermeable plastic bags	167 bags	Shed (covered)

Table 2: Hazardous materials that may be stored on site

Material and Use	Maximum Amount	Storage Container and Capacity	No. of Containers	Storage Location
Gasoline	200 L	Drum	1	Laydown pad
Diesel	200 L	Drum	1	Laydown pad

Other substances such as lubricating oils, hydraulic fluids, antifreeze, engine coolants and fuel additives will be used on site. The construction contractor will transport these substances to site in a service truck and small quantities (10 L or less) may be stored in a trailer or shed on site between June and September.

Material Safety Data Sheets (MSDS) for the materials listed in the tables above are provided in Appendix A.

1.4.4 Spill Prevention Measures

Spill prevention measures to be employed at site include:

- Operators responsible for the handling of hazardous materials will be trained in spill prevention and control;
- Storage areas for hazardous materials will be clearly signposted ;
- Inventory tracking of hazardous materials will be performed;
- Hazardous materials will be stored on level ground at least thirty (30) meters from the ordinary high water mark of any water body;
- Hazardous material storage areas will be inspected weekly to for evidence of leaks and staining on the ground;

- Equipment maintenance and servicing will be undertaken in designated areas using portable drip pans;
- Transfer or fuels and fuelling of vehicles will be undertaken with appropriately sized hoses and pumps;
- Fuel drums will be stored on the Nanisivik wharf laydown pad and will be provided with secondary containment; and
- Nutrients will be mechanically blended into the PHC contaminated soil within 24 hours of placement to reduce wind dispersion.

1.5 Plan Review

This SCP is a working document. It will be reviewed annually or as required to accommodate any changes to site conditions or work practices. A copy of the SCP will be posted and reviewed for all staff, contractors, and visitors to the project site as part of the site orientation program.

The distribution list for the SCP and future revisions are detailed in Table 3.

Table 3: Spill Contingency Plan Distribution List

Organization	Version	Date
Nunavut Water Board	2	April 2014
Department of Fisheries and Oceans, Real Property	2	April 2014
Aboriginal Affairs and Northern Development Canada	2	April 2014
Government of Nunavut, Department of Environment	2	April 2014
Environmental Contractor - Claude Lavallee	2	April 2014
Construction Contractor -Arqvartuuq Services Ltd	2	April 2014
BGC Engineering Inc.	2	April 2014
WESA Inc.	2	April 2014
Stantec Consulting Ltd.	2	April 2014
SRK Consulting (Canada) Inc.	2	April 2014

Copies of the most recent SCP can be obtained from Nyrstar's Environment Manager, Johan Skoglund, at Johan.skoglund@nyrstar.com.

2 Response Organization

The response team will be comprised of the First Responder and the On-scene Coordinator. See the Flowcharts in Appendix B depicting communication lines and response duties.

The First Responder is the person who first identifies the spill and carries out the initial actions outlined in the First Responder Flowchart included in Appendix B.
The On-scene Coordinator is responsible for ensuring that spill prevention measures are implemented and for reporting of spills as outlined in the On-Scene Coordinator Flowchart in Appendix B. The On-scene Coordinator will be available locally at the time of the spill. Team members designated to fulfil the On-scene Co-ordinator role are listed in Table 4. The On-scene Coordinator will be responsible for notifying the Project Manager and Nyrstar's Environmental Manager.

Table 4: On-Scene Coordinator Options

Team Member	Position	Local Contact #
Claude Lavallee	Environmental Contractor	867-439-8477
Moses Oyukuluk	Construction Contractor, Arqvartuuq Services	867-439-8227
Arlene Laudrum	Project Manager, SRK	867-439-8005 –c/o Tangmaarvik Inn
Various	Site Supervisor	Satellite Phone # TBD

The Project Manager, Arlene Laudrum, is responsible for keeping track of all spills, conducting follow-up investigations and recommending revisions of the SCP to Nyrstar as necessary. The On-scene Coordinator and Project Manager will be supported by Nyrstar's Environmental Manager, Johan Skoglund.

Means of communication will be provided via satellite telephone located in the crew truck or hand held two way radios.

3 Spill Scenarios

Table 5: Spill Scenarios

Material	Potential Spill Scenario	Worst Case Spill Volume	Potential Environmental Impact
Fuel and lubricants	1) Over pumping of fuel from drum or fuel truck to equipment/vehicles. 2) Leaking from drums. 3) Leaking from equipment/vehicles. 4) Hydraulic hose break 5) Overflow of leachate from treatment facility	400 L	Direct negative impact to soil quality. If spill is not cleaned up, potential for negative impact to water quality from runoff. Poor soil and water quality may indirectly affect aquatic life and wildlife feeding from the land and water.
Nutrients	1) Bag breakage. 2) Wind-blown dispersion during treatment facility application.	4200 kg	Nutrients contain phosphorous and nitrogen which can negatively impact soil quality if spilled on land as well as water quality through wind dispersion. If not cleaned up, potential negative impact to water quality may also occur from runoff. Poor soil and water quality may indirectly affect aquatic life and wildlife feeding from the land and water.

4 Action Plan

4.1 Initial Actions

Initial spill response actions are taken by the First Responder. As per the First Responder Flowchart (Appendix B), these actions include:

- Stop work;
- Ensure the safety of yourself and others;
- Assess the potential danger to human health, safety, and controllability of the spill;
- Take appropriate actions to either evacuate, secure, or retreat if necessary;
- Immediately notify the on-scene coordinator at the number listed in Table 4;
- If safe, control the spill (Remove all sources of ignition from fuel spills and use appropriate personal protective equipment); and
- If safe, contain, recover, clean up and dispose of the spilled contaminant.

4.2 Spill Reporting

The following spill events are reportable for regulatory purposes:

- Fuel and lubricant spills over 100 litres as well as any spills of an undetermined amount;
- Spills of nutrients over 1 litre or 1 kg as well as any spills of an undetermined amount; and
- All spills into a water body regardless of the amount.

The spill events described above should be immediately notified to the following agencies:

- Government of Nunavut via the NWT/NU 24 hour Spill Reporting Line **867-920-8130**;
- Aboriginal Affairs and Northern Development Canada (AANDC) Inspector at **867-975-4295**;

The initial notification will include the type and volume of contaminant, the location and approximate size of the spill, the actions already taken to stop and contain the spill and other observations including the presence of wildlife and weather conditions.

Following initial notification, the following reporting must be completed:

- Complete the NWT/NU Spill Report Form contained in Appendix C of this SCP and fax or email the completed form to the NWT/NU 24 hour Spill Reporting Line at 867-873-6924 or spills@gov.nt.ca within 24 hours;
- Submit a detailed report to the AANDC Inspector within thirty (30) days after reporting the spill including the following:
    - Reference spill report number;
    - Summary of information provided during initial reporting;
    - The final estimated amount and type of spilled product;
    - GPS location of the spill; and
    - Measures taken to contain, clean-up and restore the spill site.

For spills that do not meet the criteria for regulatory reporting, the NWT/NU Spill Report Form contained in Appendix C of this SCP should be completed and kept on file.

4.3 Containing, Controlling and Cleaning-up a Spill

A photographic record of any spills and all associated clean up measures will be maintained.

4.3.1 Fuel Spill on Land

Fuel spills on land (gravel, rock, soil, vegetation) shall be handled using the following measures:

- Construct temporary berms or trenches to prevent spill migration;
- Block entry to water bodies;
- Recover the spill as soon as possible using absorbents, shovels, buckets, excavator, and pumps;
- Dispose and treat contaminated soil in the treatment facility;
- Dispose of used absorbents in a drum for temporary storage and final disposal off site at an approved facility;
- Recovered fluids will be temporarily stored in tanks and applied to the treatment facilities;
- If the spill is due to a punctured drum, recover and properly contain any un-spilled fuel for future use, and dispose of used drums off site at an approved facility;
- Wash equipment used to clean up the spill and dispose of washwater in the treatment facility; and
- Once clean-up of the spill has been achieved, re-grade temporary berms and trenches.

In addition, if the spill occurs near water:

- Contain the spill as close as possible to the release point;
- Construct temporary berms or trenches downslope of the spill;

4.3.2 Fuel Spill on Water

Fuel spills on water shall be handled used the following measures:

- Contain the spill immediately and as close as possible to the release point;
- Concentrate floating product using containment booms by encircling the spill with the booms taking into account the effect of wind and waves;
- Once booms are secured, use absorbent mats, pumps, and similar materials to capture spilled material;
- If diesel enters a stream, intercept in calm areas using absorbent booms. Avoid use of absorbent booms or pads in fast currents or turbulent water; and
- Use absorbent mats and similar materials to capture small spills and oily residue on water.

4.3.3 Fuel Spill on Snow or Ice

Fuel spills on snow or ice shall be handled using the following measures:

- Construct berms and ditches from compacted snow and ice to contain the spill;
- Block entry to water;
- Recover the spill as soon as possible. Locate the low point of the spill area and create channels in the snow/ice to allow free product to flow towards the low point, directing channels away from water bodies. Collect spilled material in barrels or tanks;
- Dispose and treat contaminated snow and ice in the treatment facility;
- If the spill is due to a punctured drum, recover and properly contain any un-spilled fuel for future use, and dispose of damaged drums off site at an approved facility; and
- Wash equipment used to clean up the spill and dispose of washwater in the treatment facility;

4.3.4 Nutrient Spill

General procedures for handling a nutrient spill are as follows:

- Prevent contact of spilled nutrient with water;
- If the spill is due to a punctured bag, recover and properly contain any un-spilled nutrient for future use, and dispose of used bags in an approved landfill;
- Plastic sheeting can be used to prevent nutrient wind dispersal;
- Dispose of any contaminated soil in the treatment facility;
- Spread any contaminated snow and ice evenly across the treatment facility; and
- Wash equipment used to clean up the spill and dispose of washwater in the treatment facility.

5 Resources

Three (3) spill kits will be located at the project site with a sorbent capacity of 74 gallons. The locations of the spill kits are shown on Figure 1. Each spill kit contains:

- 10 pairs of nitrile gloves
- 2 Splash protection goggles
- 2 half mask dust respirators and cartridges
- 2 disposable coveralls
- 1 Petroleum Sorbent Roll, High Capacity
- 2 mini-booms (each 3" x 8') - sorb 2 gallons each
- 1 small shovel
- 3 Polyethylene disposable bags
- One Spill Contingency Plan
- One laminated list of contents

Additional on-site equipment that may be utilised in case of spills includes:

- Excavator
- Backhoe
- Loaders
- Haul Trucks
- Dozer
- Crew trucks
- First aid station
- Shovels, water pump, barrels
- Three (3) 1130 L (250 gallon) plastic water tanks

Figure 1: Location of Spill Response Equipment and infrastructure

Table 6 provides a list of contractors and government agencies can be contacted in the event of a spill if additional off-site resources are required.

Table 6: Additional Resource Contacts

Contact	Phone Number
AANDC Manager Field Operations, Iqaluit, NU	867-975-4295
AANDC Manager Water Resources, Iqaluit, NU	867-975-4550
AANDC Manager Land Administration, Iqaluit, NU	867-975-4280
AANDC Manager Environment, Iqaluit, NU	867-975-4549
Environment Canada, Environmental Protection Branch, Environment Officer, Iqaluit, NU	867-975-4644
Fisheries and Oceans Canada, Canadian Coast Guard, Environmental Response	1-800-265-0237
Fisheries and Oceans Canada, Real Property, Safety and Security, Ottawa, ON (Andrew Anderson)	613-990-8886
Workers' Safety and Compensation Commission, Iqaluit, NU	877-404-4407
RCMP, Arctic Bay, NU	867-439-1111
Health Centre, Arctic Bay, NU	867-439-8816
First Air, Arctic Bay, NU	867-439-3000
SRK Consulting, Yellowknife, NT (Arlene Laudrum)	867-766-6332 867-445-3656

6 Training

All on-site workers will receive training from the site supervisor and/or project manager in the implementation of the spill prevention measures and spill response procedures contained in this SCP. On-site workers will be briefed on the location of the spill kits and their proper use. The flowcharts in Appendix B will be posted in prominent locations for ease of reference and instructions will be provided for the use of the satellite phone for First Responders to notify the On-Scene Coordinator in the event of a spill.

7 References

BGC Engineering Inc. 2011. *2011 Annual Geotechnical Inspection, Nanisivik Mine, Nunavut*. Report No. 0255-021-03. Submitted to Nyrstar, March 1, 2012.

Golder Associates 1998. *1998 Geotechnical Inspection of Waste Containment Dykes*, *Nanisivik Mine, Baffin Island, N.W.T*. Report No. 982-2432.5100. Submitted to Nanisivik Mine, a division of CanZinco Ltd, October 1998, 27 pages plus Drawings.

Jacques Whitford Stantec Limited for Breakwater Resources Ltd., *Abandonment and Reclamation Plan, Fuel Tank Farm, Former Nanisivik Mine Site, Nunavut*, January 8, 2010.

Nunavut Water Board, 2010. *Approval - Abandonment and Reclamation Plan, Fuel Tank Farm, Former Nanisivik Mine Site, Nunavut, Type "A" Water Licence 1AR-NAN0914, Part J, Item 2*. April 26, 2010.

Nunavut Water Board, *Reasons for Decision Including Record of Proceedings for 1AR-NAN0914*, March 31, 2009.

Nunavut Water Board, *Water Licence No. 1AR-NAN0914*, Date of Issuance: April 1, 2009.

Nyrstar, 2012. Letter report including appendices from J. Skoglund, Nyrstar, to P. Beaulieu, Nunavut Water Board, *Re: Water Licence 1AR-NAN0914 – Annual Report*, dated March 24, 2014.

Spill Contingency Planning and Reporting Regulations, N.W.T. Reg. (Nu.) 068-93. Source: http://www.canlii.org/en/nu/laws/regu/nwt-reg-nu-068-93/latest/nwt-reg-nu-068-93.html

Water Resources Division, Indian and Northern Affairs Canada, Yellowknife, *Guidelines for Spill Contingency Planning*, 2007. Source: http://env.gov.nu.ca/sites/default/files/NT%20NU%20Spill%20Report%20Form.pdf

APPENDIX A – MATERIAL SAFETY DATA SHEETS

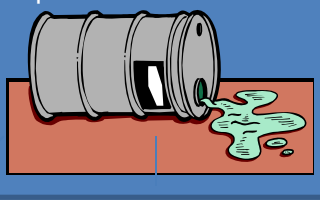
The following list of Material Safety Data Sheets (MSDS) will be inserted into the plan upon implementation at site:

- Hexane Gas
- Diesel Fuel
- Gasoline
- Nutrient UREA
- Nutrient DAP
- Diesel Engine Oil 10W30
- Diesel Engine Oil 15W40
- Ethylene Glycol
- Crankcase Oil Heavy Duty 10W
- Transmission Oil
- Gear Lubricant 75W90
- Lubricating Grease
- Hydraulic Oil

APPENDIX B – RESPONSE FLOW CHARTS

First Responder Flowchart

First Responder **IDENTIFIES** the Spill



If there is danger to human health

1. **EVACUATE** the area

2. **SECURE** the area

3. **NOTIFY** the On-Scene Coordinator

If the spill is not controllable or not safe

3. **SECURE** the area

2. **RETREAT** a safe distance

3. **NOTIFY** the On-Scene Coordinator

If the spill is controllable and safe

1. **NOTIFY** the On-Scene Coordinator

2. **CONTROL / CLEAN-UP** the spill

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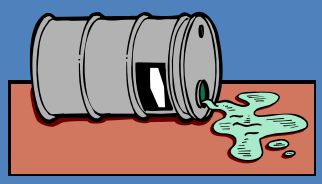

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On-Scene Coordinator Flowchart

On-Scene Coordinator is notified of the spill information and takes control

On-Scene Coordinator notifies Contractor to mobilize equipment needed

If the spill can be

If the spill cannot be controlled

Continue containment and clean-up

Compile information

Compile information

If the spill is in the marine environment

If the spill is on land or surface water

Contact Canadian Coast Guard 1-800-265-0237

Contact AANDC 867-975-4295

Report incident to 24 Hour Spill Line at **867-920-8130**

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APPENDIX C – SPILL REPORT FORM

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR	REPORT TIME	☐ ORIGINAL SPILL REPORT, OR ☐ UPDATE # _____ TO THE ORIGINAL SPILL REPORT	REPORT NUMBER ____-_____
B	OCCURRENCE DATE: MONTH – DAY – YEAR	OCCURRENCE TIME		

C	LAND USE PERMIT NUMBER (IF APPLICABLE)	WATER LICENCE NUMBER (IF APPLICABLE)
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION	REGION ☐ NWT ☐ NUNAVUT ☐ ADJACENT JURISDICTION OR OCEAN
E	LATITUDE DEGREES MINUTES SECONDS	LONGITUDE DEGREES MINUTES SECONDS

F	RESPONSIBLE PARTY OR VESSEL NAME	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION	
G	ANY CONTRACTOR INVOLVED	CONTRACTOR ADDRESS OR OFFICE LOCATION	
H	PRODUCT SPILLED	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER
	SECOND PRODUCT SPILLED (IF APPLICABLE)	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER
I	SPILL SOURCE	SPILL CAUSE	AREA OF CONTAMINATION IN SQUARE METRES
J	FACTORS AFFECTING SPILL OR RECOVERY	DESCRIBE ANY ASSISTANCE REQUIRED	HAZARDS TO PERSONS, PROPERTY OR ENVIRONMENT
K	ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS		

L	REPORTED TO SPILL LINE BY	POSITION	EMPLOYER	LOCATION CALLING FROM	TELEPHONE
M	ANY ALTERNATE CONTACT	POSITION	EMPLOYER	ALTERNATE CONTACT LOCATION	ALTERNATE TELEPHONE

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION STATION OPERATOR	EMPLOYER	LOCATION CALLED YELLOWKNIFE, NT	REPORT LINE NUMBER (867) 920-8130

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC

SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN

FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

Attachment 5

Reclamation cost estimate

OUTSTANDING FINANCIAL OBLIGATIONS - 9 April 2014

COMPONENT TYPE	COMPONENT NAME	TOTAL COST
TANK FARM		$417,264
LANDFILL (INITIAL ESTIMATE)		$50,000
POST-CLOSURE MONITORING AND MAINTENANCE		$800,000
	SUBTOTAL	**$1,267,264**
MOBILIZATION/DEMOBILIZATION		$135,722
PROJECT MANAGEMENT	20%	$253,453
CONTINGENCY	15%	$190,090
GRAND TOTAL		**$1,846,528**

1 Tank Farm

	ACTIVITY/MATERIAL	Units	Quantity	Cost Code	Unit Cost	Cost
	CONTAMINATED SOILS	m3		#N/A		$0
	Soil aeration/empty/reload	m3	10300	csrl	33.48	$344,844
	Excavation of contaminated soil	m3	500	scsh	64.84	$32,420
.	Soil analyses	ls	1	N/A	40000	$40,000
				Subtotal		$417,264

1 **Mobilization (Tank Farm Activities)**

	ACTIVITY/MATERIAL	Units	Quantity	Cost Code	Unit Cost	Cost
A	MOBILIZE HEAVY EQUIPMENT					
	Equipment, regional centre to site			#N/A		
.	Excavators	km	200	mherh	38.33	$7,666
.	Dump trucks	km	400	mherl	24.55	$9,820
	Dozers	km	200	mherh	38.33	$7,666
	Demolition shears	km		#N/A	0	$0
	Crane	km		#N/A	0	$0
	Light duty vehicles	km		#N/A	0	$0
.	loader	km	200	mherl	24.55	$4,910
.	Backhoe	km	200	mherl	24.55	$4,910
C	MOBILIZE WORKERS			#N/A		
	crew travel time	andays	50	#N/A	800	$40,000
.	crew transportation (flights)	each	6	#N/A	6000	$36,000
E	WORKER ACCOMODATIONS			#N/A		
.		manmths	75	#N/A	330	$24,750
					Subtotal	$135,722

1 Post-Closure Monitoring & Maintenance:

	ACTIVITY/MATERIAL	Units	Quantity	Cost Code	Unit Cost	Cost
A	OBJECTIVE: MONITORING & INSPECTIONS					
	Annual geotechnical insp.	each	1	#N/A	$50,000	$50,000
.	Annual water monitoring (incl analyses)	each	1	#N/A	$25,000	$25,000
C	SPILLWAY MAINTENANCE			#N/A		
	Repair erosion	allow	1	#N/A	$5,000	$5,000
	Subtotal, Annual post-closure costs					$80,000
	Discount rate for calculation of net present value of post-closu			0.00%		
	Number of years of post-closure activity			10 years		
	Present Value of payment stream					$800,000

Attachment 6

Schedule of soil remediation activities

Response to Information Requests Attachment 6:

Outline of Project Schedule, updated from *Water LIcence 1AR-NAN0914 - 2012 Annual Report* , Table 1 (Nyrstar, 2013)

Activity	2014				2015				2016			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Excavation of Contaminated Soil												
Soil Treatment												
Remediation Confirmation Sampling												
Tier 3 CCME Studies and Reporting												
Backfilling and Regrading												
Tank Farm Reclamation Confirmation Reporting												
Soil Remediation Performance Monitoring												
Treatment Facility Closure												

Note: Assumes use of the concrete pad to July 31, 2015

Attachment 7

Response to Environment Canada Information Requests #1 to #4

Stantec

Memo

To:	Mr. Johan Skoglund Canzinco Ltd. c/o Nyrstar Canada Holdings Ltd. Tessinerplatz 7, 8002 Zurich Switzerland	From:	Dr. Malcolm Stephenson Stantec Consulting Ltd. 845 Prospect Street Fredericton, NB
File:	Stantec: 121810953 Nyrstar:	Date:	April 9, 2014

Reference: Response to Comments: Environment Canada Completeness Review Water Licence Renewal

IR#1: Station NML-23 Sulphate Levels

Reference: Appendix H: Water Quality Monitoring Schedule, Twin Lakes Creek Watershed, Station NML-23 pp. 3.

Issue/Concern: The proponent states that at Station NML-23 "results for most parameters have been within the non-regulatory station-specific action levels ... with the exception of sulphate concentrations, which have been variable". The Proponent believes erratic sulphate levels at this monitoring station are the result of natural weathering, and follow-up investigation was conducted as per the Contingency Plan for Water Quality Exceedances (Water Quality Monitoring Report, 2012). The proponent indicates that the newly designated Station ELO (at the outlet of East Twin Lake) was monitored in 2012 and 2013 to confirm that the anomalous sulphate readings came from places other than the mine tailings disposal area. The proponent found neutral pH, despite the elevated sulphate concentrations, therefore suggesting any acidity produced is neutralized by carbonate minerals. EC has concerns about high levels of sulphates and requests further information/justification for the proponent's conclusions.

Information Request: EC asks the proponent to provide information on the geochemistry of the area and justification for their conclusions regarding the neutralization potential of the surrounding environment. In addition, please provide 2013 sampling data from Station ELO and Station NML-23 for comparison.

Response: The Nanisivik ore deposit resides within dolostone from the Society Cliffs Formation, covered with dolomite shale from the Victor Bay Formation, which together form the Uluksan Group and reside on top of silty shale. Dolostone or dolomite rock is a sedimentary carbonate rock that contains a high percentage of the mineral dolomite (*i.e.,* a magnesium-rich form of limestone). It is resistant to erosion and less soluble than limestone in weakly acidic groundwater, but is a rich source of calcium, magnesium, and carbonate minerals, which provide acid neutralizing capacity.

Mineralization (*i.e.,* the occurrence of pyrite) is common in the contact zone between the dolostone and the shale. When exposed, such pyrite will undergo oxidation to release iron, possibly other metals, and acidity. However, analysis of water collected in July 2013 from Stream N, Quarry Stream and Quarry Pond (see Table 2.2 in the Final 2013 Annual Water Quality Monitoring Report) shows that despite having the highest sulphate concentration (484 mg/L) and conductivity reading (1,045 µS/cm), the water collected from Quarry Pond was not acidic (the pH was 7.92), there was

abundant hardness (581 mg/L) and bicarbonate alkalinity (62 mg/L) present, and the metals cadmium, lead and zinc were not detectable. Results from Stream N and Quarry Stream were similar, although more dilute. As the water in Quarry Pond was pooled in the suspected source area (i.e., the interface between the shale and dolostone), it remains our contention that the pyrite oxidation process (which produced the sulphate) was neutralized at source (*i.e.,* by the dolostone or other carbonate minerals) and did not have an associated source of the metals cadmium, lead or zinc.

The 2013 data for sampling stations ELO and NML-23 can be found combined in Table D2-3 of the Final 2013 Annual Water Quality Monitoring Report.

IR#2: Station 159-4 Trace Metal Sampling

Reference: Appendix H: Water Quality Monitoring Schedule, Twin Lakes Creek Watershed, Station 159-4.

Issue/Concern: The proponent has concluded that no further monitoring for trace metals needs to be conducted at Station 159-4, stating that the twice-annual trace metal scan has "not revealed any untoward results". As the final outfall point from the West Twin (Tailings) Disposal Area, this site is of particular concern to EC. As the proponent notes "Station 159-4 was the only station where specific regulatory requirements for water quality remained in place under the Water Licence". EC believes the proponent should continue to monitor Trace Metals at this site on at least an annual basis.

Information Request: EC requests the trace metal (NAN-4) monitoring data from Station 159-4, and further justification from the proponent for their recommendation to discontinue trace metal sampling.

Response: Trace metal data (total metal) collected at Station 159-4 during 2013 are below in Table IR2-1. Corresponding general chemistry data (including the metals arsenic, cadmium, copper, lead, nickel and zinc) can be found in Table D1 of the Final 2013 Annual Water Quality Monitoring Report ("the 2013 Annual Water Quality Report"). As can be seen from Table D1 (which includes the regulated limits for the trace elements reported therein), the measured concentrations of arsenic, cadmium, copper, lead, nickel and zinc are consistently a small fraction of the Authorized License Limits, as they have been throughout the period of the current Water License, which was issued on April 1, 2009. Values for cadmium, lead and zinc at Station 159-4 are plotted for visual inspection in Figure E1 of the 2013 Annual Water Quality Report.

As indicated in the Addendum to the Final 2012 Annual Water Quality Monitoring Report ("the Addendum", dated September 30, 2013), and elsewhere, the analytical group NAN-1 includes total cadmium, lead and zinc; major cations (calcium, magnesium, sodium, potassium, ammonia and hardness); major anions (chloride, sulphate, bicarbonate, carbonate, nitrate+nitrite, and alkalinity); total suspended solids, specific conductance, and pH; with field observations for specific conductance, pH and temperature, and visual observations for hydrocarbon sheen.

It was suggested in the Addendum that monitoring at Station 159-4 could be reduced to monthly sampling for the analytical group NAN-1. A monthly schedule would generally support three sample

collection dates per year (corresponding to the ice-free months of June, July and August). As indicated above, the NAN-1 analytical group includes the trace elements cadmium, lead and zinc, in addition to general water chemistry parameters. Therefore, the proposed ongoing sampling regime does not seek to discontinue trace metal sampling (although it focuses on the metals of greatest historical concern), and is at a frequency that exceeds the minimum one sample per year that appears to be supported by Environment Canada.

Table IR2-1 Trace Metals Data for Station 159-4 for 2013

Group Reference	**Twin Lakes**	**Twin Lakes**	**Twin Lakes**	**Twin Lakes**
Station	**159-4**	**159-4**	**159-4**	**159-4 P**
Date	***17-Jun-13***	***24-Jun-13***	***7-Jul-13***	***27-Aug-13***
TSS (mg/L)	<3.0	7.1	<2	<2
Aluminum Total (mg/L)	0.0568	0.126	0.01	0.05
Antimony Total (mg/L)	<0.00020	<0.00010	<0.0005	<0.0005
Arsenic Total (mg/L)	<0.00020	0.00027	<0.001	<0.001
Barium Total (mg/L)	0.0166	0.022	0.02	0.03
Beryllium Total (mg/L)	<0.0010	<0.00010	<0.0005	<0.0005
Boron Total (mg/L)	0.257	0.367	0.32	0.56
Cadmium Total (mg/L)	<0.00020	0.000108	<0.0001	0.0002
Chromium Total (mg/L)	<0.0010	0.00034	<0.001	<0.001
Cobalt Total (mg/L)	<0.0010	0.00027	<0.0002	0.0002
Copper Total (mg/L)	0.0011	0.00107	0.002	0.001
Iron Total (mg/L)		0.215	<0.03	0.07
Lead Total (mg/L)	0.0012	0.00183	0.001	0.002
Manganese Total (mg/L)	0.0154	0.021	<0.01	<0.01
Mercury (mg/L)		<0.000010		
Molybdenum Total (mg/L)	0.006	0.00642	0.008	0.007
Nickel Total (mg/L)	<0.0010	0.00124	<0.005	<0.005
Selenium Total (mg/L)	<0.0010	0.00019	<0.001	<0.001
Silicon Total (mg/L)		0.692	0.3	0.5
Silver Total (mg/L)	<0.00010	0.000016	<0.0001	<0.0001
Strontium Total (mg/L)	0.298	0.403	0.31	0.706
Thallium Total (mg/L)	<0.0010	0.000027	<0.0001	<0.0001
Titanium Total (mg/L)		<0.010	<0.01	<0.01
Uranium Total (mg/L)	0.00103	0.00169	0.001	0.002
Vanadium Total (mg/L)	<0.0050	<0.0010	<0.001	<0.001
Zinc Total (mg/L)	0.0362	0.0496	0.03	0.08

IR #3: Station 159-10

Reference: Appendix H: Water Quality Monitoring Schedule, Twin Lakes Creek Watershed, Station 159-10.

Issue/Concern: The proponent has recommended that water quality monitoring for this station not be continued, stating that "... monitoring since 2009 has not revealed any untoward results". The proponent concludes that occasional high values of "NAN-1" parameters are the result of erosion and weathering of the mineral outcrop due to natural events. Sulphate appears to be on a downward trend, but concentrations are still elevated. EC recommends that monitoring be continued for this station at a lower frequency (annual).

Reference: Response to Comments: Environment Canada Completeness Review Water Licence Renewal

Information Request: EC requests the Proponent provide further rationale for discontinuing monitoring at this station altogether, and recommends maintaining annual sampling and analysis.

Response: The Twin Lakes Creek watershed presently supports two water quality monitoring locations downstream of the natural mineral outcrop which periodically releases metals to the stream. These are 159-10 (the subject of this question), and 159-6 (the station located at the mouth of the creek, near Strathcona Sound). There are strong correlations in values reported between these two stations, showing that during periods of weathering (when conductivity, sulphate and zinc values rise at Station 159-10), corresponding rises are also observed at Station 159-6.

The natural mineral outcrop was not disturbed by mining activities, and represents a part of the original ore body that was exposed by the erosive processes of Twin Lakes Creek. The original baseline surveys that were conducted in the area in 1975 (B.C. Research 1975) refer to "high levels of zinc … recorded from creek 5 [Chris Creek] and creek 2 [Twin Lakes Creek]", and Table 12 of B.C. Research (1975) provides zinc concentrations of 0.7 mg/L and 0.15 mg/L for Chris Creek and Twin Lakes Creek, respectively, when sampled near their mouths on July 30, 1974. The value for Twin Lakes Creek is similar to the values reported during 2013 (mean 0.238 mg/L, range 0.08 to 0.72 mg/L). The same statement can be made with respect to arsenic (<0.005 mg/L), cadmium (0.0004 mg/L), and lead (0.0008 mg/L) concentrations, which were also measured in Twin Lakes Creek by B.C. Research (1975), and were reported at similar concentrations as were measured during the 2013 season (see Table D2-1 in the 2013 Annual Water Quality Report).

The natural mineral outcrop in Twin Lakes Creek was not disturbed by mining activities. Metal concentrations reported at Stations 159-10 and 159-6 are correlated, and metal concentrations at Station 159-6 are in a similar range as was reported prior to mining at Nanisivik. CanZinco is not responsible for metals released from the natural mineral outcrop, as it was never part of the mine infrastructure. Continued monitoring at Station 159-10 is redundant and could be allowed to lapse, given continued monitoring at Station 159-6.

IR#4: Station 159-6

Reference: Appendix H: Water Quality Monitoring Schedule, Twin Lakes Creek Watershed.

Issue/Concern: The proponent states that Station 159-6 is similar to Station 159-10, in that it is situated below a natural mineral outcrop, and subject to occasional irregularity of metal and sulphate concentrations. The proponent states that "Values of TSS and zinc exceeding the nonregulatory site-specific action levels were observed ... during the period from 2006 to 2008, corresponding to reclamation activities when large - scale excavation and earth moving was occurring within the Twin Lakes Creek watershed".

EC acknowledges the proponents commitment to continue NAN-1 and NAN-2 sampling on a monthly basis. Considering the proximity of the site to currently and previously contaminated soils, EC recommends NAN-4 sampling continue on at least an annual basis.

Information Request: 1) EC requests the proponent consider bi-weekly sampling at the site during planned future earth-moving reclamation activities of the stockpiled soils undergoing

bioremediation, or provide justification for not doing so. 2.) EC requests the proponent provide justification for discontinuing NAN-4 sampling at this site.

Response: As indicated in the response to IR#2, the analytical group NAN-1 includes analysis for cadmium, lead and zinc, which are the metals of primary concern at Nanisivik. Therefore, the proposed termination of sampling for the analytical group NAN-4 (trace metals) at Station 159-6 does not imply that the key trace metals (cadmium, lead and zinc) will no longer be the subject of monitoring. The proposed monthly schedule means that these metals will be sampled three times each year (during June, July and August), not just once as appears to be supported by Environment Canada.

The stockpiled soils that are located near the mouth of Twin Lakes Creek are undergoing bioremediation for hydrocarbon contamination. The request for bi-weekly sampling at Station 159-6 during periods of earth moving is reasonable, and could be accommodated by increasing the frequency of monitoring for NAN-2 (Total Petroleum Hydrocarbon analysis by Canada Wide Standard methodology for F2 to F4 fractions) to a bi-weekly schedule during such periods.

Closing

We trust the clarification provided meets your information needs. Should you have any further comments or questions, please do not hesitate to contact Nyrstar or the undersigned.

STANTEC CONSULTING LTD.

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Attachment 8

Response to Environment Canada Information Request #5

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April 11, 2014
Project No.: 0255-023

Johan Skoglund
Group Manager Environment
Nyrstar
Zurich, Switzerland

Dear Mr. Skoglund,

Re: Response to IR 5 Regarding Monitoring Wells in Surface Cell and Test Cell

Overview

Monitoring wells were installed in the Surface Cell and Test Cell taliks in 2005 in order to monitor the pore water quality in the taliks as the tailings area froze back. No samples have been collected since 2011 as each of the four monitoring wells has been rendered inoperative due to a variety of reasons. The following provides a summary of why the monitoring wells were installed, how they functioned and why they are currently inoperative, what information was collected from them and its significance and justification to discontinue water quality monitoring within the Surface Cell and Test Cell taliks.

Objectives and Well Design

Prior to reclamation, the Surface Cell and Test Cell tailings areas contained a mixture of frozen and thawed tailings. The location and distribution of the thawed tailings was related to the depositional and operational history of the tailings area. Following reclamation of the tailings areas (removal of surface water/construction of permafrost aggradation covers), it was anticipated that the thawed tailings would freeze-back over time. Additionally, the metals concentrations in the unfrozen pore water contained within the taliks were expected to increase due to cryo-concentration of these elements during freeze-back of the tailings deposit. It was also thought that the pore water within the taliks could impact the water quality within the Reservoir, if migration of pore water between the taliks and the Reservoir were to occur. As such, this potential metal loading from the Surface Cell and Test Cell taliks was incorporated within the water quality projections provided in CanZinco's 2004[1] closure plan. Due to its potential impact on the Reservoir water quality, the monitoring wells were installed.

[1] CanZinco Ltd. 2004. 2004 Reclamation and Closure Plan. Submitted to Nunavut Water Board March 2004.

The monitoring wells were installed through the upper frozen portion of the tailings (which had already froze at the surface) into the underlying thawed tailings within each talik. As such, the upper portion of the monitoring wells installed through the permafrost layer are frozen all year long. A heat trace was installed within each well to permit thawing of the frozen portion of the monitoring well and allow sampling of the unfrozen pore water from the talik. The reason that sampling only continued to 2011 was that either the heat trace malfunctioned, complete freezeback of the tailings in the area of the well occurred or deformation of the pvc well casing by the coarse fraction of the cover materials. Regardless of the cause of the inoperative state, it is unlikely that the instruments could be rehabilitated to permit continued monitoring. If additional monitoring is to be undertaken, a new monitoring wells would need to be installed.

Monitoring Results

Geothermal and piezometric monitoring undertaken since construction of the covers was complete in 2005 indicates that the Surface Cell talik is freezing back and is hydraulically confined (i.e. not hydraulically connected to the Reservoir). As such, it is unlikely that the pore water quality in the Surface Cell has any impact on the water quality of the Reservoir.

The geothermal and piezometric monitoring of the Test Cell indicates that the Test Cell talik is freezing back, and that a hydraulic connection between the Test Cell talik and the Reservoir remains. A comprehensive review of the geothermal and piezometric monitoring data collected to date is provide in BGC (2014)[2].

The monitoring wells in the Surface Cell and Test Cell were monitored annually, when possible, between 2005 and 2011. The data collected from each monitoring well are summarized in Table 1.

[2] BGC Engineering Inc. 2014. 2013 Annual Geotechnical Inspection, Nanisivik Mine, Nunavut. Submitted to Nyrstar February 26, 2014.

Table 1. Summary of water quality data from samples collected from Surface Cell and Test Cell taliks.

Monitoring Well	Sampling Date	Field Parameters		Total Metals Concentrations (mg/L)		
		pH	Conductivity (mS/cm)	Cadmium	Lead	Zinc
BGC05-11 (closer to edge of talik)	October 13, 2005	10.94	3.23	<0.001	0.004	0.01
	August 27, 2006	11.29	3.69		0.058	0.08
	September 5, 2007	10.5	3.18	0.0013	0.064	0.09
	August 16, 2008			0.018	0.44	0.30
	August 4, 2009	10.08	2.07	0.004	0.176	0.34
	August 15, 2011	9.62	3.40	<0.01	1.13	3.24
BGC05-12 (closer to centre of talik)	October 13, 2005	10.28	4.92	0.004	0.628	0.54
	August 27, 2006	10.33	3.69		0.208	0.29
	September 5, 2007	9.7	3.00	0.0037	0.127	0.17
	August 16, 2008			<0.001	0.02	<0.1
	August 4, 2009	10.21	2.99	0.0016	0.522	0.37
BGC05-21 (Centre of Test Cell)	August 27, 2006	9.43	4.92		0.501	0.950
	September 5, 2007	9.5	6.74	0.0272	0.34	1.31
	July 25, 2008			0.0221	0.106	0.38
BGC05-23 (Edge of Test Cell)	August 27, 2006		>5		0.150	1.010
	September 5, 2007	7.9	>20	0.06	0.30	2.00
	August 3, 2009	6.98	>20	0.03	0.20	2.00

As can be seen, the results in terms of the trend of metals concentrations in the pore water within the Surface Cell and Test Cell taliks is generally inconclusive. The exception was the results from monitoring well BGC05-11 which indicated increasing zinc concentrations closer to the edge of the Surface Cell talik.

BGC (2014) and Stantec (2014)[3] discuss the results of surface water quality monitoring undertaken at the outlet of the Surface Cell cover and the outlet of the West Twin Disposal Area (Station 159-4). In summary, the water quality observed at the Surface Cell outlet has

[3] Stantec 2014. Final 2013 Annual Water Quality Monitoring Report, Former Nanisivik Mine, Nunavut. Submitted to Nyrstar February 2014.

shown low and declining metals and sulphate concentrations over the past several years. Similarly, the samples collected at the outlet of the West Twin Disposal Area have demonstrated low (well below discharge criteria) and declining concentrations of metals and sulphate. Hence if migration of pore water from either the Test Cell or Surface Cell taliks is occurring into the Reservoir, the impacts appear to be negligible.

Monitoring Recommendations

As noted in BGC (2014), replacement of the monitoring wells is not currently recommended due to reasons noted above and the continued compliant and improving Reservoir water quality. Should the water quality observations in the Reservoir change in the future, the need for new monitoring wells may be revisited.

Yours sincerely,

BGC ENGINEERING INC.
per:

ISSUED AS DIGITAL DOCUMENT.
SIGNED HARDCOPY ON FILE WITH
BGC ENGINEERING INC.

Geoff Claypool, M.Eng., P.Eng.
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GC/gf/sr