



Nunavut Regional Office  
Operations Directorate  
Water Resources Division  
P.O. Box 100  
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November 7, 2008

*via Email*

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

**SUBJECT    Water License #1AR-NAN0208, CanZinco Ltd., Nanisivik  
Project, License Amendment and Renewal Application**

Dear Phyllis,

Please be advised Indian and Northern Affairs Canada (INAC) has completed a review of the above-referenced license amendment and renewal application (dated February 15, 2008) submitted by CanZinco Ltd. to the Nunavut Water Board for approval.

A Technical Memorandum with comments / recommendations is provided for the Board's consideration in the approval of this application.

Should you have any questions regarding this submission, feel free to contact me at 867-975-4555 or [AbernethyD@inac-ainc.gc.ca](mailto:AbernethyD@inac-ainc.gc.ca).

Regards,  
David W. Abernethy

Cc.    Kevin Buck, Manager of Water Resources  
        Bernie MacIsaac, Manager of Field Operations

## **Technical Review Memorandum**

Date: November 7, 2008

To: Phyllis Beaulieu, Nunavut Water Board

From: David Abernethy, Indian and Northern Affairs Canada

### **DESCRIPTION / HISTORY**

The Nunavut Water Board (NWB) has received two (2) amendment requests and a renewal application from CanZinco Ltd. for the Nanisivik Project's Type A water license, #1AR-NAN0208. These submissions are dated June 7, 2006; June 16, 2006; and, February 21, 2008 respectively.

On August 17, 2006, the two (2) license amendment requests were distributed to interested parties for review. Indian and Northern Affairs Canada (INAC), along with Environment Canada, and the Government of Nunavut's Department of Environment submitted technical review comments to the Board. The INAC submission is dated September 14, 2006.

On April 30, 2008, the license renewal application was distributed to interested parties for review. Written responses were received from INAC, the Government of Nunavut's Department of Environment and Department of Culture, Language, Elders, and Youth, the Hamlet of Arctic Bay's Senior Administration Officer, and a community liaison officer. The INAC submission is dated May 28, 2008.

To date, INAC is unaware of any determination made by the Board with respect to these license amendment requests and renewal application. On September 29, 2008, the license amendment requests and renewal applications were once again distributed to interested parties, along with additional information, for review and comment.

INAC conducted an inspection of the Nanisivik site on July 14, 2008 to determine the project's reclamation status. In attendance were Mr. Robert Carreau of CanZinco Ltd., Mr. Geoff Claypool of BGC Engineering Inc., INAC, and representatives of the Government of Nunavut's Department of Environment and Department of Community and Government Services.

On August 1, 2008 (attached), INAC submitted a Technical Review Memorandum (memo) to the Board identifying potential areas of concern and outstanding issues that were noted during the July 14, 2008 site inspection. CanZinco Ltd. was provided a copy of this memo and was requested in correspondence dated August 1, 2008 (attached) to provide a written plan of action to address the outstanding issues (by August 15, 2008). CanZinco Ltd. has recently provided a response which appears to address these reclamation

issues (can be classified as geotechnical related). This response, in conjunction with the July 14, 2008 inspection findings, will be taken into consideration in an assessment of current license security requirements. INAC will provide a revised security estimate to the Board for consideration by December 10, 2008.

It should be noted that CanZinco Ltd. has implemented the approved 2004 Final Closure and Reclamation Plan in a thorough manner. At the time of the site inspection, reclamation activities were nearly complete and CanZinco Ltd. was initiating the post-closure monitoring program.

### **Documents Related To This Review:**

- Water License #1AR-NAN0208;
- Reclamation Activities Quarterly Report 1st Quarter 2005;
- Reclamation Activities Quarterly Report 2nd Quarter 2005;
- Reclamation Activities Quarterly Report 3rd Quarter 2005;
- Reclamation Activities Quarterly Report 4th Quarter 2005;
- Cover letter dated June 7, 2006 – request for amendment;
- Water License Amendment Application Form dated August 17, 2006;
- Letter dated June 16, 2006 – request for amendment;
- 2006 Annual Report;
- Letter dated September 14, 2006 – INAC Review of Requests for Amendments;
- Reclamation Activities Quarterly Report 1st Quarter 2007;
- Reclamation Activities Quarterly Report 2nd Quarter 2007;
- Reclamation Activities Quarterly Report 3rd Quarter 2007;
- Reclamation Activities Quarterly Report 4th Quarter 2007;
- BGC 2007 Annual Geotechnical Inspection Report;
- Letter dated February 20, 2007 – Environment Canada's Nanisivik Mine Environmental Effects Monitoring (EEM) Report Review;
- October 15, 2007 – Nanisivik Reclamation Update;
- Letter dated May 30, 2008, Nanisivik Mine – License Renewal;
- Water License Application Form dated February 15, 2008
- BGC Memo dated May 31, 2008 – Proposed 200-2012 Geotechnical Monitoring Schedule;
- April 9, 2008 – Gartner Lee Ltd. – Issuance of the Nanisivik Mine Summary of Contaminated Soil Remediation, Interim Close Out Report – Dock Area;
- April 14, 2008 – BGC Surface Reclamation Covers As-Built Report;
- Letter dated May 28, 2008 – INAC Review of License Amendment and Renewal Application;
- April 30, 2008 – BGC – Reclamation of Mine Openings As-Built Report;
- May 30, 2008 – BGC Nanisivik Mine Hydraulic Structures As-Built Report;

- May 30, 2008 – Jacques Whitford to BWR – Recommended Water Quality Monitoring for Closure Period – Nanisivik Mine;
- August 1, 2008 – INAC Technical Review Memorandum – July 14, 2008 Site Inspection;
- August 1, 2008 – INAC correspondence with CanZinco Ltd. regarding July 14, 2008 Site Inspection Findings; and,
- Letter dated November 4, 2008 – Breakwater Resources Ltd. Response to INAC's August 1, 2008 Technical Review Memorandum (re: July 14, 2008 site inspection).

## COMMENTS / RECOMMENDATIONS

The following comments / recommendations are provided to the Board for consideration in the approval of the water license amendment and renewal application.

### 1. License Classification and Public Hearing Requirements

In INAC's May 28, 2008 submission to the Board it was recommended that consideration be given to providing an extension to the present license, retaining the current terms and conditions, for one year (through the use of a written hearing format). This extension would allow for CanZinco Ltd. to update or revise its amendment application and provide an opportunity for interveners to perform comprehensive reviews of the project's reclamation status.

It should be noted that the February 15, 2008 Water License Renewal Application states that less than 100 cubic metres of water will be consumed per day for project activities. This may trigger a reclassification of the project's license from a Type A to a Type B as per the *Northwest Territories Waters Regulations*. This issue is addressed in the Board's April 30, 2008 notice of CanZinco Ltd.'s license renewal application where it is stated that "... the options (or licensing decisions) facing the Board are to proceed with review of the Type A application and depending upon whether the License becomes a Type B and public concerns related to that, a determination on whether or not a public hearing is warranted." INAC recommends that following the Board's review of submissions received from interested parties, a decision be made to either proceed with a Type A licence amendment and renewal application review, or change the license classification to a Type B. If the License will remain to be a Type A, a public hearing must be held pursuant to Section 52 of the *Nunavut Waters and Nunavut Surface Rights Tribunal Act*.

Should the Board decide to hold a public hearing, INAC recommends that the written hearing format be followed.

## 2. Reclamation and Closure Monitoring Plan

The approved 2004 Nanisivik Mine Reclamation and Closure Monitoring Plan was prepared by Gartner Lee Ltd. on behalf of CanZinco Ltd. and was submitted to the Board in response to the requirements of Part G, Item #9 of the License. This plan provides for water quality monitoring, geothermal monitoring, confirmatory sampling of soils, the physical stability of earth structures, and the reporting and interpretation of results. In the current license renewal application, CanZinco Inc. is requesting revisions to monitoring parameters, frequencies, and locations for water quality and geotechnical monitoring (Jacques Whitford Ltd. *Recommended Water Quality Monitoring for Closure Period – Nanisivik Mine*. Fredericton: May 30, 2008 and BGC Engineering Inc. *Proposed 2008 – 2012 Geotechnical Monitoring Schedule*. Calgary: May 31, 2008).

### a. Water Quality Monitoring

#### June 7, 2006 and June 16, 2006 Requests for Amendment

In the June 7, 2006 application for license amendment, CanZinco Ltd. informed the Board that the construction of thermal covers on the surface cell and test cell at the West Twin Tailings Area, as well as relevant spillways, had been completed (during the 2005 construction season). As a result of this reclamation work, CanZinco Ltd. requested that the required water sampling frequency requirements be reduced from daily to weekly, as the West Twin Disposal Area would be considered to be in year one of its “closure.”

In the June 16, 2006 application for license amendment, CanZinco Ltd. requested a reduction in sampling frequency for certain water quality parameters, namely cadmium, nickel, lead, and arsenic. Part D, Item #6 of the license requires that these parameters be sampled from all Final Discharge Points and that released effluent must not exceed their maximum effluent concentrations. It was proposed that these parameters be analyzed on a quarterly basis rather than at the frequencies specified in the License and the 2004 Nanisivik Mine Reclamation and Closure Monitoring Plan. CanZinco Ltd. notes that this proposal is consistent with Section 13 of the Metal Mining Effluent Regulations which allows for a sampling frequency of not less than once in each calendar quarter if the deleterious substance's monthly mean concentration is less than 10% of the maximum monthly mean concentration set out in Column 2 of Schedule 4 for the 12 months immediately preceding the most recent test.

Although INAC is not opposed to the submitted amendment requests, it is unclear whether they should be considered as CanZinco Ltd. has proposed

further revisions to the water quality monitoring program (in the May 30, 2008 license renewal application - see below).

**Jacques Whitford Ltd. *Recommended Water Quality Monitoring for Closure Period – Nanisivik Mine. May 30, 2008.***

Jacques Whitford Ltd., on behalf of CanZinco Ltd, proposes a revised water quality monitoring program for years 3 to 5 of the approved 2004 Reclamation and Closure Monitoring Plan's (2004 Plan) closure period (refer to Table 5: Water Quality Monitoring Schedule – Closure Period Years 3-5)

Revisions to the 2004 plan include:

- i. The following twenty-five (25) Monitoring Stations are proposed to be removed from the program:
  - o Twin Lakes Creek Watershed
    - ... 200-7 Twin Lakes Creek upstream of waste rock piles (Waste rock recovery monitoring);
    - ... 159-11 Twin Lakes Creek downstream of waste rock piles (Waste rock recovery monitoring); and,
    - ... 200-3 Twin Lakes Creek downstream of natural sulphide outcrop (Metal loading station).
  - o Chris Creek Watershed
    - ... 159-13 Chris Creek downstream of East Adit (East Adit Monitoring); and,
    - ... 159-16 Chris Creek downstream of Area 14 (Area 14 Monitoring).
  - o East Adit Treatment Facility
    - ... 159-12 Discharge from East Adit Retention Pond (Effluent discharge);
    - ... 159-12A East Portal Creek flow into East Adit Catchment Pond (East Adit Area 14 Monitoring); and,
    - ... 159-12 B Upstream flow into East Adit Retention Pond (Upstream East Adit Area Monitoring).
  - o Oceanview Watershed
    - ... 159-18 Run off from Oceanview Open Pit area (Oceanview Monitoring); and,
    - ... 159-19 Discharge from Oceanview sump (Oceanview Monitoring).

- Landfill Watershed

- ... NML-26 Surface flow at toe of landfill (Landfill monitoring);
- ... NML-30 Downstream of landfill – west drainage system (Landfill monitoring);
- ... TP02-95 Groundwater well downgradient of the landfill (Landfill monitoring);
- ... TP02-97 Groundwater well downgradient of the landfill (Landfill monitoring);
- ... TP02-102 Groundwater well downgradient of the landfill (Landfill monitoring); and,
- ... TP03-387 Groundwater well downgradient of the landfill (Landfill monitoring).

- ii. The following stations are proposed to be maintained:

- Twin Lakes Creek Watershed

- ... NML-23 Outflow from East Twin Lake (Upstream control station);
- ... 159-4 Outflow from West Twin Disposal Area (Final discharge point);
- ... 159-6 Outlet of Twin Lakes Creek into Strathcona Sound (General monitoring).
- ... 159-9 Twin Lakes stream crossing (mixing of East Twin Lake and West Twin Disposal Area complete); and,
- ... 159-10 Twin Lakes Creek upstream of west town site tributary (General monitoring).

- Chris Creek Watershed

- ... 159-14 Chris Creek downstream of K-Baseline (K-Baseline monitoring);
- ... 159-15 Chris Creek upstream of Area 14 (Upstream control station); and,
- ... 159-17 Chris Creek outlet into Strathcona Sound (Final discharge point);

- Landfill Watershed

- ... NML-29 Downgradient of Landfill – East drainage system (Landfill monitoring).

- iii. Proposed changes to sampling frequency and laboratory parameters:

- The frequency of sampling for “laboratory parameters” (referenced in the 2004 Plan) has increased from monthly to every two (2) weeks for monitoring stations:

- 159-14 (Chris Creek Downstream of K-Baseline);
- 159-15 (Chris Creek Upstream of Area 14);
- 159-17 (Outlet of Chris Creek into Strathcona Sound); and,
- NML-29 (Downgradient of Landfill – East drainage system).

The proposed laboratory parameters are total metals, sulphate, and total suspended solids, with “all metals analyses to comprise hardness, cadmium, lead, and zinc.” Laboratory parameters specified in 2004 Mine Closure and Reclamation Plan are “total metals, dissolved metals, sulphate, total suspended solids, and total dissolved solids, with all metals analyses to include hardness.”

- Flow measurements will no longer be collected at monitoring stations:
  - NML-23 (Outflow – East Twin Lake);
  - 159-4 (Outflow – West Twin Disposal Area);
  - 159-6 (Outlet of Twin Lakes Creek into Strathcona Sound); and,
  - NML-29 (Downgradient of Landfill – East drainage system).

After a review of the previously referenced documents, including sample monitoring results and trends, INAC recommends that the water quality monitoring program for years 1 to 5 of the closure period be revised such that the sampling and flow monitoring program is in accordance with Table 4: Water Quality Monitoring Schedule – Closure Period Years 1-2 of the 2004 Plan be carried out on an annual basis during low flow conditions, i.e., fall. This would ensure the integrity of the water sampling database and provide the required information to ensure that the reclamation objectives are being met. Furthermore, INAC recommends that CanZinco Ltd. implement the proposed Jacques Whitford Ltd. monitoring program (again through years 1-5 of the closure period), and no changes be made to Part D, Items #6 and #7 of the present license that relate to effluent quality criteria at all “Final Discharge Points.”

In making this recommendation, INAC has considered that, according to the approved 2004 Plan, the closure period would last five (5) years. The Jacques Whitford Ltd. submission assumes that the Nanisivik Project is in year 3 of its water quality monitoring schedule’s closure period. This is inconsistent with BGC Engineering Inc.’s proposal for geotechnical monitoring which indicates that the project’s closure period began in 2008 (refer to Item #2b). Also, CanZinco Ltd.’s May 30, 2008 letter to the Board states that “the project is now entering its final stage – post closure monitoring.” In order to assess performance reclamation measures, CanZinco Ltd. should definitively advise the Board and interested parties which year / stage of the reclamation



and closure monitoring program is applicable to this project. INAC has made the assumption that this period has begun in 2008 and that major reclamation activities have been completed.

## **b. Geotechnical Monitoring**

### **BGC Engineering Inc. *Proposed 2008 – 2012 Geotechnical Monitoring Schedule.* May 31, 2008**

BGC Engineering Inc.'s submission proposes a geotechnical monitoring program for the project's closure period that is subdivided into two (2) smaller periods: 2008 through 2010 and 2011 through 2012. Different monitoring frequencies are proposed for each of these periods. Monitoring data will be collected from the West Twin Disposal Area, Oceanview Pit, East Open Pit, Landfill, Area 14, and Upper Dump Pond by using the following instruments:

- Thermistors;
- Vibrating wire piezometers;
- Frost gauges;
- Thermocouples; and,
- Monitoring wells.

Table #1, Geotechnical Monitoring Requirements 2008-2012, provides a summary of the proposed instrument reading requirements that appears sufficient to monitor site reclamation measures.

INAC concurs with the proposed Geotechnical Monitoring Program. This program is more comprehensive than that which is provided in the 2004 Plan as additional monitoring locations and an increased frequency of monitoring data is proposed. If approved by the Board, CanZinco Ltd. must provide a diagram or map that identifies monitoring locations.

## **3. Comprehensive Assessment of Mine Site Reclamation**

CanZinco Inc. is required by Part G, Item #22 of license #1AR-NAN0208 to provide the Board by May 1, 2007, for approval, "the Terms of Reference for completion of a Comprehensive Assessment of Mine Site Remediation that considers remediation objectives, the need for ongoing and long term monitoring, as well as follow-up remediation requirements." A copy of this "Terms of Reference" document cannot be found on the Board's public registry. If not already submitted and approved, CanZinco Inc. must satisfy this license requirement by providing this document within a reasonable time period. A January 15, 2009 deadline is recommended.

#### 4. Security Provisions

Part B, Item #2 of the license requires CanZinco Ltd. to “furnish and maintain a security in the amount of \$17.6 million dollars in the form and nature in accordance with the Regulations or that is satisfactory to the Minister.” INAC is currently assessing site security requirements in light of the project’s reclamation status. INAC anticipates submitting a revised security estimate to the Board for consideration by December 10, 2008.

#### 5. As-Built Reports

Three (3) As-Built Reports were provided in the 2008 license renewal application. These reports were prepared by BGC Engineering Inc. on behalf of CanZinco Ltd. and are as follows:

- April 14, 2008 Surface Reclamation Covers As-Built Report;
- April 30, 2008 Reclamation of Mine Openings As-Built Report; and,
- May 30, 2008 Hydraulic Structures As-Built Report.

These reports detail, in an acceptable manner, the project’s reclamation status. Revised versions and additional As-Built reports that address 2008 construction activities should be provided to the Board.

#### Summary

- *License Classification and Public Hearing Requirements*
  - INAC recommends that following the Board’s review of submissions received from interested parties, a decision be made to either proceed with a Type A license amendment, or change the license classification to a Type B. Should the Board decide to hold a public hearing, INAC recommends that the written hearing format be followed.
- *Reclamation and Closure Monitoring Plan*
  - INAC recommends that the water quality monitoring program for years 1 to 5 of the closure period be revised to ensure that the sampling and flow monitoring program is in accordance with Table 4: Water Quality Monitoring Schedule – Closure Period Years 1-2 of the 2004 Plan, being carried out on an annual basis during low flow conditions, i.e., fall. Furthermore, INAC recommends that CanZinco Ltd. implement the proposed Jacques Whiford Ltd. monitoring program (again through years 1-5 of the closure period),

and no changes be made to Part D, Items #6 and #7 of the present license that relate to effluent quality criteria at all “final discharge points.”

- In order to assess performance reclamation measures, CanZinco Ltd. should definitively advise the Board and interested parties which year / stage of the reclamation and closure monitoring program is applicable to this project. INAC has made the assumption that this period has begun in 2008 and that major reclamation activities have been completed.
- INAC concurs with the Geotechnical Monitoring Program proposed by BGC Engineering Inc. on behalf of CanZinco Ltd.
- *Comprehensive Assessment of Mine Site Reclamation*
  - If not already submitted and approved, CanZinco Ltd. must comply with Part G, Item #22 of the License by providing the Board for approval, “the Terms and Reference for completion of a Comprehensive Assessment of Mine Site Remediation that considers remediation objectives, the need for ongoing and long term monitoring, as well as follow-up remediation requirements.” These terms should be submitted to the Board by January 15, 2009.
- *Security Provisions*
  - INAC anticipates providing a revised license security estimate to the Board by December 10, 2008. This estimate will be based on a review of CanZinco Ltd.’s implementation of the approved 2004 Final Reclamation and Closure Plan, observations from the July 14, 2008 site inspection, and CanZinco Ltd.’s response to INAC’s August 1, 2008 Technical Review Memorandum on site inspection findings.
- *As-Built Reports*
  - The submitted As-Built Reports are informative and an excellent resource in terms of monitoring the project’s reclamation status. INAC anticipates that revised versions and additional reports that address 2008 construction activities will be provided to the Board.