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NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYINGI

WATER LICENCE APPLICATION FORM

Application for: (check one)

___ **New** ___ **Amendment** __X__**Renewal** ___**Assignment**

LICENCE NO:
(for NWB use only)

1. NAME AND MAILING ADDRESS OF APPLICANT/LICENSEE

CanZinco Ltd., Nanisivik Mine
PO Box 225
Nanisivik Mine
X0A 0X0

Phone: 867-436-7401
Fax: 867-436-7435
e-mail: kledrew@nu.breakwater.ca

2. ADDRESS OF CORPORATE OFFICE IN CANADA (if applicable)

CanZinco Ltd
PO Box 56
Bathurst, NB
E2A 3Z1

Phone : 506-546-1999
Fax: 506-548-1100
e-mail: kwhalen@nb.breakwater.ca

3. LOCATION OF UNDERTAKING (describe and attach a topographical map, indicating the main components of the Undertaking)

See Attached; Description of Undertaking

Latitude: **73 03 N** Longitude: **84 35 W** NTS Map No. **C 48/1** Scale

4. DESCRIPTION OF UNDERTAKING (attach plans and drawings)

Continuation of;

Underground and Open Pit Mining activity in the Nanisivik Ore body as well as the Processing and Concentrate Production.

5. TYPE OF UNDERTAKING (A supplementary questionnaire must be submitted with the application for undertakings listed in **"bold"**)

___ **Industrial**	___ **Remote/Tourism Camps**
_X_ **Mine Development**	___ **Municipal**
___ **Advanced Exploration**	___ Power
___ **Exploratory Drilling**	_X_ Other (describe)_____

License renewal application for the continuation of mining activities at Nanisivik Mine.

6. WATER USE

_X_ To obtain water	___ To divert a watercourse
___ To modify the bed or bank of a watercourse	___ Flood control
___ To alter the flow of , or store, water	___ Other (describe):
___ To cross a watercourse	

7. QUANTITY OF WATER INVOLVED (litres per second, litres per day or cubic metres per year, including both quantity to be used and quality to be returned to source)

Water renewal for 180,000 cubic meters per year.

8. WASTE (for each type of waste describe: composition, quantity, methods of treatment and disposal, etc.)

See Attached;

_X_ Sewage	_X_ Waste oil
_X_ Solid Waste	_X_ Greywater
_X_ Hazardous	_X_ Sludges
_X_ Bulky Items/Scrap Metal	_X_ Other (describe) **Mill Process Tailings**

9. PERSONS OR PROPERTIES AFFECTED BY THIS UNDERTAKING (give name, mailing address and location; attach if necessary)

Land Use Permit See Table I Attached

DIAND	_X_ Yes	___ No	If no, date expected _____
Regional Inuit Association	___ Yes	_X_ No	If no, date expected _____
Commissioner	_X_ Yes	___ No	If no, date expected _____

10. PREDICTED ENVIRONMENTAL IMPACTS OF UNDERTAKING AND PROPOSED MITIGATION MEASURES (direct, indirect, cumulative impacts, etc.)

NIRB Screening ___ Yes ___ No If no, date expected _____

DIAND-INAC conducted an environment screening of Nanisivik's application under the Canadian Environmental Assessment Act and stated in a letter to the NWTWB on July 8th 1996 that the Nanisivik application "*is unlikely to cause significant adverse effects.***" And further noted, "***Although several environmental concerns and problems were noted, these issues are already known, and are being addressed by the applicant***" Please see attached.**

11. INUIT WATER RIGHTS

Will the project or activity substantially affect the quality, quantity, or flow of water flowing through Inuit Owned Lands and the rights of Inuit under Article 20 of the Nunavut Land Claims Agreement?

The project and application is made under Commissioner's and Crown Land Lease agreements.

If yes, has the applicant entered into an agreement with the Designated Inuit organization to pay compensation for any loss or damage that may be caused by the alteration. If no compensation agreement has been made, how will compensation be determined?

N/A

12. CONTRACTORS AND SUB-CONTRACTORS (name, address and functions)

N/A

13. STUDIES UNDERTAKEN TO DATE (list and attach copies of studies, reports, research, etc.)

See Attached; Table II

14. THE FOLLOWING DOCUMENTS MUST BE INCLUDED WITH THE APPLICATION FOR THE REGULATORY PROCESS TO BEGIN

Supplementary Questionnaire (where applicable: see section 5) X Yes ___ No
If no, date expected_____

Inuktitut/English Summary of Project X Yes ___ No
If no, date expected _____

Application fee $30.00 (c/o of Receiver General for Canada X Yes ___No
If no, date expected _____

15. PROPOSED TIME SCHEDULE

___ Annual (or) **X** Multi Year

Start Date: **July 31, 2002** Completion Date: **July 31, 2007** .

Kevin G LeDrew **Manager of Environmental**

Name (Print) Title (Print) Signature

Date: January 31, 2001

For Nunavut Water Board use only

APPLICATION FEE **Amount: $_____** **Receipt No.:**

WATER USE DEPOSIT **Amount:** **Receipt No.:**

Item #3 - Water License Application

Description of Undertaking

History

The Nanisivik Mine began operation in October 1976 as the world's most northerly metal mine and the first permanent industrial project in the Canadian Arctic. Located 700 kilometers north of the Arctic Circle on Baffin Island's Strathcona Sound, exploration by Texasgulf Inc., between 1957 and 1970 outlined the ore deposit. *(See Figure 1)*

In 1974 Nanisivik Mines Ltd., was formed with, Mineral Resources International, the Government of Canada, Metallgesellschaft and Billiton being shareholders and Strathcona Mineral Services Ltd., providing project management. In 1996 Breakwater Resources Limited purchased the mine from Alberta Energy Corporation Limited, which had recently acquired the assets of then owners Conwest Exploration Ltd.

Ore Deposit

The main ore deposit is very flat, approximately 80 meters in width and varying thickness of 3 to 16 meters. The length of the deposit is approximately 3000 meters with satellite zones located on the perimeter of the main zone. The economic mineralization is sphalerite with minor galena and silver with the sulphides being coarse grained and associated with pyrite as the main gangue component with minor inclusions of dolomite and calcite. However, a substantial volume of the zinc resource exists in high-grade narrow lenses that, due to mining widths, dilution from the host rock dolomite with minor pyrite reduces the economics of this resource.

Ore Development and Mining

As of this writing approximately 16.6 million tonnes of Zn-Pb ore has been mined and milled at the Nanisivik Mine, having an average head grade of approximately 9%. Production from milling resulted in a yield of approximately 1.4 million tonnes of zinc metal in a concentrate tonnage of 2.5 million tonnes. Feed grades remained fairly steady in the early years of production averaging over 13% zinc in the first 7 years of operation. Since that time the mill head grade has generally fallen annually and presently averages approximately 7.5% zinc at a production rate of 2300 mt/d. The approximate overall grade of the remaining reserve (2001) is 6.2% zinc contained in 4.5 million tonnes. Of this 1.7 million tonnes are considered low grade having an average zinc grade of 4.5%. The low grade ore is typically blended underground with run of mine muck to maximize resource exploitation and it is this material which has been earmarked for upgrading in the dense media separation (DMS) plant.

Mineral Processing

The Nanisivik Mill presently processes approximately 800,000 tonnes of ore annually at a feed grade of 7.5% Zn with minor amounts of galena. Production typically yields approximately 58,000 tonnes of zinc metal in 100,000 tonnes of concentrate along with +400 tonnes of lead metal in 1000 tonnes of concentrate. (Relatively low lead metal production is a function of head grade, which is typically ~0.2%.)

Grinding is completed in a conventional grinding circuit with primary grinding provided by a 2.9m by 3.7m rod mill and secondary grinding provided by a 3.2m by 3.7m ball mill run in closed circuit with the cyclone classification system. Classification is provided by three 38cm cyclones yielding a flotation circuit feed sizing at 60% minus 200 mesh. The grind index of the ore is 9 kWh per tonne with media consumption of 900g/t split between rods and balls.

The flotation section consists of a lead circuit with two rougher and one cleaning stage while the zinc circuit consists of two rougher, one scavenger and three cleaning stages. All the flotation cells are Denver 30's with the exception of the lead cleaners, which are Denver 18's. Since mid-1997 rougher concentrates have been reground in a 1.8 by 2.7 m ball (regrind) mill to a fineness of 80% minus 75 microns. The introduction of the regrind circuit resulted in significant improvements in metal recovery and concentrate grades. The flotation circuits are operated at a pH of 11.9, which results in a lime addition of 2,300 grams per tonne stage added to the grinding circuit and the lead rougher tails. The main collector used is potassium amyl xanthate with a total consumption of 115 grams per tonne. Copper sulfate is added to the conditioning stage of the zinc circuit at a rate of 535 grams per tonne.

The de-watering section consists of a lead and zinc circuit with conventional thickeners, vacuum disc filters and rotary dryers. The heat for the dryers is supplied from the power plant diesel exhaust gas. Concentrates are dried for haulage to the main storage facility, which has a capacity for 125,000 tonnes of concentrates.

Tailings Disposal

Final flotation tailings material is pumped 5 kilometers to the tailing disposal area by a positive displacement pump through a 20 cm diameter insulated pipeline.
(See Figure 1)

Original tailings disposal was conducted subaqueously in the existing West Twin Disposal Area, however successful replacement of the ore reserves has necessitated a change in this disposal method to accommodate additional storage of tailings. Construction began on a frozen core dike in the early 90's and has since been raised annually on frozen tailing solids deposited in two-meter increments on the upstream side of the existing dyke and covered with locally quarried shale. This construction permitted the disposal of tailings 'On Land' or dry. Present volume curves indicate a future storage capacity of 4 years with the possibility of more through additional dyke construction. To date the dyke has been raised 18 meters above the original lake elevation while internal

dike core temperatures remain below freezing. Dike core temperatures are monitored monthly, and bimonthly through a network of thermocouple strings installed into the historic lakebed sediments and bedrock.

DMS Overview

The Dense Media Separation (DMS) process is a known and accepted technology in the mining industry that employs materials of relatively high density, such as magnetite or ferrosilicon, to separate waste from desired products.

In the coal industry it is used in wash plants to clean coal, into separate grades ie metallurgical and thermal coal, that contain waste materials of ash and sulphides. In the diamond industry it is used to separate diamond enriched product from the host rock, kimberlite.

At the Nanisivik Mine it is expected this technology will be utilized to remove lightweight gangue rock; shale and dolomite, from the run of mine ore to decrease the amount of waste entering the process plant. The removal of this waste material is expected to decrease the cost per pound of zinc metal recovered as higher-grade feed is delivered to the mill. The operating philosophy is to reduce the amount of grinding required per tonne of metal as well as to decrease the amount of tailings storage required to recover the remaining metal. The waste rock once separated in the DMS plant will be trucked underground as backfill.

Pilot testing results using dense media specific gravities (S.G.) of 2.7 and 2.9 indicate that, sulphide recovery will be in the order of 98% with an optimum media specific gravity of 2.85. All sulphides recovered in the DMS Plant having an S.G. greater than 2.85 will report to the Mineral Processing Plant for benefication. The waste rock (reject), dolomite with minor sulphides, will be screened for water removal and the solids with residual moisture will be transferred to a 100 tonne hopper in the reject building then trucked and used as backfill underground. The retained sulphides will be added to the process stream while the waste will be screened and disposed of underground.

Water required in the DMS plant will be diverted from water presently destined to the Mineral Processing Plant where it will be used in the circuit to wash, screen and 'float' the lightweight gangue from the valuable sulphides. All water used within the DMS plant will ultimately be recycled and used in the existing Processing Plant. Any sump water not recycled will be diverted to the existing tailings circuit for disposal at the West Twin Disposal Area.

Item #8 - Water License Application

Waste (for each type of waste describe: composition, quantity, methods of treatment and disposal, etc.)

Sewage	This is a government installation and responsibility falls under the Public Services Section of the Nunavut Government.
Solid Waste	Engineered Landfill for burning and burial. (See Phase I and II Environmental Site Assessments of the Nanisivik Landfill Site.)
Hazardous Waste	Battery removal is completed offsite by returning old batteries to the supplier for credit.
Bulk and Scrap Metals	Derelict vehicles are disposed of underground as backfill after removal of remaining fuels and oils to the waste oil burner. Minor scrap metal reports to the land fill site, ~10% of metal discarded.
Waste Oil	Waste oil burner installation at the town carpenter shop, generating approximately 200 barrels per year.
Greywater	Most reports to sewage but approximately 20% reports to the West Twin Disposal Area (WTDA).
Sludges	Metal Precipitates from polishing and retention ponds will be removed for disposal underground at East Adit and at depth in the WTDA. When reclamation is complete burial with cover materials and entombment in permafrost will prevent metal leaching from this material.
Other Mill Tailings	Mill flotation tailings, approximately 687,000 tonnes per year, are disposed of in the WTDA, which is comprised of a Surface Cell, Reservoir, Test Cell and Polishing Pond areas.

***Item # 10* - Water License Application**

Predicted Environmental Impacts of Undertaking and Proposed Mitigation Measures.

Direct Environmental Impact

Mining activity will render the land unusable, in the short-term, as traditional hunting grounds due to the fact that personnel work on the industrial site 24 hours/day. Because the mine is an industrial area, hunting and firearm discharge is prohibited. The Nanisivik area is not recognized as a source of traditional food as the local Inuit generally travel to the flow edge during the annual breakup approximately 40-70 kilometers away. Local caribou migration patterns generally run on a 60-year cycle and sightings in the Nanisivik area are rare.

In some locations within the mine's impact area, open pit mining of insitu sulphides from outcropping and sub-cropping zones of mineralization helps to reduce the amount of metal naturally reporting to Strathcona Sound from surface runoff waters. Once the area is reclaimed as approved in the Final Closure and Restoration Plan, mined areas will be covered with local soils and materials minimizing the exposed sulphide zones, effectively reducing the amount of metal available for transport.

Areas such as open pits and the tailings disposal areas will contribute to the loading of metals into the environment. Retention times and metal precipitation from contained waters have been proven to be effective mitigative measures to lower metal discharge from the West Twin Disposal Area. Runoff waters from the East Adit and Open Pit areas will continue to be collected for lime addition (pH modification) and retention for metal precipitation.

It should be mentioned here that water quality determinations in these areas as well as the Ocean View Open Pit Area have shown that significant metal leaching occurs in as runoff waters contact natural outcropping and sub-cropping sulphides. However, as mining activities also occur at both areas and waste rock dumps exist in the area of the East Adit runoff as well as Pit sump water is receiving ongoing treatment.

As indicated in the Interim Abandonment and Reclamation Plan, at the cessation of mining these areas will be reclaimed with cover materials and all infrastructures removed as salvage.

Indirect Environmental Impact

Indirectly the mine will make some lands unusable during the remaining operating life until the area is reclaimed as approved in the Final Closure and Restoration Plan.

The village of Nanisivik rests at the foot of Mt Fuji, a platform of landing reaching an altitude of approximately 650 meters above sea level. The town-site is located in a relatively flat lying area at an elevation of 335 meters above sea level and has been graded with shale material to reflect natural topography and relief to prevent the accumulation of standing water for foundation stability. The use of domestic water from East Twin Lake and the discharge of sewage is conducted through infrastructure owned by the Government of the Northwest Territories and it is believed to have been transferred to the Nunavut Government upon the separation of the territory into two entities. A study on the discharge of this water had been commissioned by the GNWT, completed by Vista Engineering of Yellowknife and at that time was considered to be of minor or little environmental significance.

The village of Nanisivik has a domestic landfill site that receives domestic household garbage as well as minor industrial scrap from the mine; refer to Phase I Assessment of the Nanisivik landfill site. Burning combustibles in a concrete burn box and then subsequently burying the residual ash and noncombustible materials with a shale cap are daily activities performed at landfill site. The area is located on a natural high relief area so that water accumulation is not an issue, capping is then completed to ensure a positive drainage away from the landfill site to prevent pooling of runoff water. Permafrost then naturally advances into the site proper, entombing and isolating the buried contents.

As indicated in the Interim Abandonment and Reclamation Plan, at the cessation of mining these areas will be reclaimed with cover materials and all infrastructures removed as salvage.

The Nanisivik Airport is the responsibility of the federal government and no reclamation considerations have been made in this regard. Power currently supplied by the Nanisivik Mine will be required at the airport after the cessation of mining but the environmental aspects of this will be considered minor, as a portable unit operated onsite as required will limit the amount of diesel exhaust gas generated for this operation. However, waste management and water use issues will require the use of the Arctic Bay Landfill site as well as the use of water and wastewater transport requirements. Presently, domestic water requirements are met by water haulage to the airport by Nanisivik Mine, wastewater services are provided by the Community of Arctic Bay, which operates a lagoon system. Solid wastes generated at the airport will be disposed of at the Arctic Bay landfill site.

Cumulative Environmental Impacts;

There is no other Industrial Activity in the North Baffin Region and therefore the issue of cumulative environmental impact from the continued operation of the Nanisivik Mine is not a concern. The effects of the concentration of airborne pollutants originating from south of the 60th parallel are predicted to have a greater impact on the northern environment than the contributions made by the Nanisivik Mine. As described in the Interim Abandonment and Restoration Plan (Part H, Item 1 of the current License); metal leachate contributions from waste rock stockpiles and sulphide areas exposed by mining will be non-issues as the majority of the waste rock will be removed underground as backfill and residual materials remaining in these areas will be covered with neutral or acid consuming soils, to prevent water infiltration and migration. The remaining insitu, naturally occurring, sulphides will continue to leach metal long after mining has ceased.

Socio-Economic Benefits;

The Nanisivik Mine has been in operation for 25 years and during that time Inuit employment has averaged approximately 15-20% of the workforce. In this period the contribution to the Baffin Region and the north in general is estimated to have been in the order of approximately $40 million dollars, this does not include special events, rush equipment purchase, contracts or rentals.

The mine's economic benefit to the Inuit of Arctic Bay is in the order of $2.7 million dollars per year through direct and indirect employment. The Territory and the Inuit of Nunavut benefit directly from the mine's operation through the employee payroll taxation system which adds over $0.3 million dollars annually to the Nunavut Government's budget. Other social and economic benefits include training and skill development of the Inuit employed at Nanisivik Mine in trades and career selections that can be taken back to their community for further employment elsewhere in Nunavut.

Over 200 people enjoy the economic benefits from the operation of the Nanisivik Mine. By continuing mining operation it may be expected that additional training and skill development will continue to be provided and expanded, and the community of Arctic Bay, as well as the Territory of Nunavut as a whole, will realize additional economic benefit.

The prosperity of the Nanisivik Mine, Breakwater Resources Ltd, its employees and the people of the Nunavut Territory are expected to continue to share in the wealth of the land's natural resource. The responsible exploitation, recovery and utilization of the remaining reserves at Nanisivik will continue to procure the maximum benefit of the resource for all involved.

Table I

COMMISSIONERS' LAND

SURFACE LEASES

LEASE NUMBER	START	END	ANNUAL RENT	DUE	LEASE DESCRIPTION
DL-40041T	31-Dec-99	31-Jan-02	$ 4,081.00	1-Jan	Mill Area
DL-40042T	31-Dec-99	31-Jan-02	$ 3,872.00	1-Jan	Stolport
DL-40043T	31-Dec-99	31-Jan-02	$ 4,146.00	1-Jan	West Twin Shore

LICENCES

DLC-40044T	31-Dec-99	31-Jan-02	$ 3,769.00	1-Jan	Pipelines, Dump Ponds
DLC-40163T	31-Dec-99	31-Jan-02	$ 1,913.00	1-Jan	Roads

CROWN LAND

SURFACE LEASES — GST required

LEASE NUMBER	START	END	ANNUAL RENT	DUE	LEASE DESCRIPTION
48-C/1-9-3	1-Jan-95	31-Jan-02	$ 1,300.00	1-Jan	West Twin Lake - Original High Water Mark

MINING LEASES — GST not required

3317	4-Jun-89	4-Jun-10	$ 2,713.80	4-Jun	Mill - 17 North
2451	29-Oct-92	29-Oct-13	$13,667.76	29-Oct	Main Mine Lease
2799	4-Nov-96	4-Nov-17	$ 1,218.00	4-Nov	Foreshore (Dock - Eskimo Beach)
2800	4-Nov-96	4-Nov-17	$ 408.00	4-Nov	West of Dock
2801	4-Nov-96	4-Nov-17	$ 740.00	4-Nov	Mt. Fuji

Water License Required Submissions Update

License Requirement	Responsible Department	Technical Support	Submission Date
Annual Earthwork Inspection Part D, Item 10	Geotech Engineer	Manager Environmental	Oct 23/00
Risk Assessment Report as per Above Submission	Geotech Engineer	Manager Environmental	Oct 23/00
Followup Report to RA as per Above Submission	Geotech Engineer	Manager Environmental	Nov 30/00
Dyke Inspection Program Part D, Item 9	Manager Environmental		August 23, 1999
Geotechnical Report Part G, Item 13	Geotech Engineer	Manager Environmental	November 17,1999
Metal Loading Study Update Part G, Item 5	Manager Environmental	Environmental Technician	Nov 30/00
Waste Rock Disposal Plan Part G, Item 8	Tech Services	Manager Environmental	March 15, 2000
Revised Contingency Plan Part E, Item 1	Manager Environmental	All Departments	July 28, 2000
Hydraulic Confinement Part G, Item 1	Manager Environmental	Environmental Technician	Nov 30/00
ARD and Geochem Plan Part G, Item 2	Environmental Consultant	Manager Environmental	January 30, 1998
Final Kinetic Testing Report as per Part G, Item 2	Environmental Consultant	Manager Environmental	September, 1998
OnLand Disposal Monitoring Part G, Item 7	Manager Environmental		January 30, 1998
Updated Drawings WTDA Part G, Item 12	Manager Environmental	Tech Services	Oct 26/00
Long Term Tailing Plan Part D, Item 11	Manager Environmental		January 30, 1998 March 31, 1999 March 31, 2000
Chronic Toxicity Test Program Part G, Item 3	Environmental Consultant	Manager Environmental	February 24,1998 November 15, 2000
Annual Water Report Part B, Item 5	Manager Environmental	Tech Services	31-Mar-00
Tailings Stabilization Program Part G, Item 6	Manager Environmental	Environmental Technician	February 24,1998
Test Cell Evaluation Part G, Item 15	Manager Environmental	Environmental Technician	March 17,1998 April 12, 1999 March 31, 2000
Interim A & R Plan Part H, Item 1	Manager Environmental	Tech Services	May 14, 1998 March 15,2000
Test Cover Study Part G, Item 14	Geotech Engineer	Manager Environmental	March, 1999
Environment Site Assessment Part G, Item 4	Manager Environmental	Tech Services	Phase I April 01, 2000 Phase II - Nov/00

Table II