nyrstar

1AR-NAN0914 Application for Renewal and Amendment of Nanisivik Water Licence

Public Hearing - Community Session

Arctic Bay, 8 October 2014

Executive Summary

- Operations at the Nanisivik mine were terminated in 2002 and all mining areas and associated infrastructure were successfully closed and rehabilitated over the period 2002 to 2008. The Water Licence, issued in 2009, authorizes CanZinco Mines Ltd. to conduct closure and reclamation activities and post-closure monitoring.
- Activities carried out under the licence comprise three principal components:
  - Post-closure monitoring of surface water quality
  - Post-closure geotechnical monitoring of earthworks and engineered structures
  - Remediation of petroleum hydrocarbon impacted soil at the dock site
- *The nature and overall scope of these undertakings, as described in the renewal/amendment application, are fundamentally the same as those authorized through the 2009 licence.*
- The results of the water quality monitoring program implemented since 2009 have demonstrated stable conditions and confirmed that implemented closure and rehabilitation measures perform as expected. The water quality monitoring program will continue under the renewed licence. Minor modifications to monitoring stations, frequencies and parameters are proposed to account for the positive monitoring results achieved to date.
- The geotechnical monitoring program implemented since 2009 has demonstrated that completed surface reclamation covers and other geotechnical installations are performing in accordance with their design intents. The geotechnical monitoring program will continue under the renewed licence. Minor modifications to monitoring periods, frequencies and the type of instruments being monitoring are proposed to account for the encouraging monitoring results achieved to date.
- At the end of the 2014 season, approximately 6,000 m^3 of petroleum hydrocarbon contaminated soil remains at the dock site. This compares to the 17,000 m^3 of contaminated soil that existed on site when the remediation works commenced in 2011. The remaining soil is located in lined treatment areas and on the concrete pad of the former concentrate storage shed. The licence amendment/renewal application seeks to maintain the existing approach to the remediation of petroleum contaminated soil and, based on the updated Abandonment and Reclamation (A&R) Plan filed with the NWB, the remediation works are expected to be completed by September 2016.
- The proposed amendment seeks to establish a small landfill for the disposal of non-hazardous wastes generated during ongoing remediation and monitoring activities. The total quantity of non-hazardous waste to be placed in the landfill is expected to be around 50 m^3. The preferred location for the landfill is the former outdoor warehouse yard, located three kilometers south of the dock area.
- The proposed term of the renewed licence is 5 years.

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- ᐱᓕᕆᐊᕆᔭᐅᔪᑦ ᓇᓂᓯᕕᐅᑉ ᐅᔭᕋᖕᓂᐊᕐᕕᐊᓂ ᐃᓱᓕᓚᐅᕐᒪᑦ 2002-ᒥ ᐊᒻᒪᓗ ᑖᕝᕙᓂ ᐅᔭᕋᖕᓂᐊᕐᕕᓪᓗᑐᕐᒥ ᐱᕐᑯᑎᓕᒫᖏᑦ ᐃᒡᓗᐃᑦ ᓴᓇᕖᑦ ᒪᑐᔭᐅᓪᓗᑎᒃ ᐊᒻᒪᓗ ᓴᓗᒻᒪᖅᓴᖅᑕᐅᕙᓪᓕᐊᓯᒪᖕᒪᑕ ᑕᒪᑐᒪᓂ ᐅᑭᐅᓂ 2002-ᒥᑦ 2008-ᒧᑦ. ᓴᓗᒻᒪᖅᓴᐃᔾᔪᑦ ᐃᒥᖃᕿᓐᓇᐅᑎᒥᒃ ᓯᓕ ᓚᐃᓴᑖᒃᑲᓐᓂᓚᐅᖅᑐᑦ 2009-ᒥ, ᐱᔨᓐᓇᐅᑎᒋᓪᓗᒍ ᑳᑯᐊ ᑎᒥᖁᑎᖓᑕ CanZinco Mines Ltd.-ᑯᑦ ᐋᕿᒃᓯᐃᓂᖓᓂ ᒪᑐᔭᐅᔪᓂᒃ ᐊᒻᒪᓗ ᒪᓂᕋᖓᓂᒃ ᐱᖅᑯᓯᑐᖃᖓᓄᑦ ᐅᑎᖅᑎᑉᐸᓪᓕᐊᓪᓗᒍ ᓯᕿᔮᒃᓯᒪᓂᑯᐃᓪᓗ ᐅᔾᔨᖅᓱᖅᑕᐅᓪᓗᑎᒃ.
- ᑕᐃᒪᖓᓂᑦ ᐱᓕᕆᐊᕆᐊᖃᖅᓯᒪᔪᑦ 2009-ᒥᑦ ᑖᓐᓇ ᓚᐃᓴ ᐊᑐᕐᓗᒍ ᐱᖓᓱᐃᓕᖓᔪᓂᒃ:
  - ᒪᑐᓯᒪᓕᖅᑎᓪᓗᒍ ᐅᔾᔨᖅᓱᖅᑕᐅᓪᓗᑎᒃ ᒪᓂᕋᖓᓂ ᐃᒪᖅᓯᐃᑦ ᖃᓄᐃᓪᒪᖔᑕ
  - ᒪᑐᓯᒪᓕᖅᑎᓪᓗᒍ ᒪᓂᕋᖓᑕ ᓯᕙᓪᓕᐊᓂᖓ ᓄᓇᖓᓗ ᓴᓇᕕᐅᓯᒪᓂᑯᐃᑦ ᑕᒪᒃᑯᐊ ᖃᓄᐃᓪᒪᖔᑕ
  - ᐱᖅᑯᓯᑐᖃᖏᓐᓄᑦ ᐅᑎᖅᑎᑕᐅᕙᓪᓕᐊᓪᓗᑎᒃ ᐅᕐᓯᐊᓗᕈᔭᖃᐅᖅᑐᑦ ᓯᓕ ᓴᓗᒻᒪᖅᓴᖅᑕᐅᓪᓗᑎᒃ ᑐᓚᒃᑕᕐᕕᖓᓂ.
- *ᖃᓄᐃᓕᖓᓂᖏᑦ ᐊᒻᒪᓗ ᑕᒪᐃᑎᒍᑦ ᐃᒃᐱᖕᓇᕐᓂᖏᑦ ᖃᐅᔨᓴᖃᑦᑕᖅᓯᒪᖏᑦ ᓴᓇᕕᕕᓃᑦ, ᐅᖃᐅᓯᐅᓯᒪᔪᑦ ᑐᒃᓯᕋᐅᑎᕐᑎᓐᓂ ᓄᓇᕗᑦ ᐊᖅᑎᑕᐅᓪᓗᑎᒃ, ᐅᑯᐊᕝᕕᔪᑦ ᑕᐃᒫᓴᐃᓐᓇᖅᓯᓕ ᑲᒪᒋᔭᐅᓪᓗᑎᒃ ᐊᑐᐊᖅᓯᒍ ᑖᓐᓇ ᐱᔨᓐᓇᐅᑎᑖᕗᑦ ᓚᐃᓴ 2009-ᒥ.*
- ᓯᕗᓪᓕᐅᑕᐅᔭᕕᓃᑦ ᓚᐃᓴ ᑖᓐᓇ ᐊᑐᖅᓯᒍ ᐅᔾᔨᖅᓱᕈᑏᑦ ᒪᓂᕋᖓᓂ ᐃᒪᖅᓯᓂᒃ ᑲᔪᓯᑎᑕᐅᓪᓗᑎᒃ 2009-ᒥ ᓇᓗᓇᐃᖅᓯᔪᑕᐅᓚᐅᖅᑐᑦ ᖃᓄᐃᖏᓐᓂᖏᓐᓂᒃ ᐱᕝᕙᓪᓕᐊᓂᖓᑕ ᐊᒻᒪᓗ ᐊᖏᕈᑕᐅᓪᓗᑎᒃ ᓇᓚᐅᑖᕈᑕᐅᓯᒪᔪᓂᒃ ᑕᒪᐃᓐᓂᐊᕐᓂᕋᖅᑕᐅᔪᓂᒃ ᑲᔪᓯᑎᑕᐅᓂᐊᓚᐅᖅᑐᓂᒃ ᒪᑐᓯᒪᓕᖅᐸᑦ ᐱᖅᑯᓯᑐᖃᖏᓐᓄᑦ ᐅᑎᖅᑎᑕᐅᒋᐊᑖᑦ ᑲᔪᓯᑎᐊᖅᓯᒪᔪᑦ. ᐃᒪᖓ ᑕᒪᑐᒪ ᐅᔾᔨᖅᓱᖅᑕᐅᖏᓐᓇᖅᑐᖅ ᐊᑐᐊᒃᓯᒍ ᑖᓐᓇ ᓚᐃᓴ. ᒥᑭᔪᓂᒃ ᐋᕿᒋᐊᖅᓯᒪᓖᕈᓗᐊᑦ ᐅᔾᔨᖅᓯᕐᕕᐊᓂ, ᐊᑯᓪᓚᐃᓐᓂᖏᓪᓗ ᐅᔾᔨᖅᓯᓇᐊᖅᑐᖃᑦᑕᖅᑐᑦ ᐊᒃᑎᒥᓂᖏᓪᓗ ᐃᓗᐊᕐᓂᖅᓴᒍᑦ ᐋᕿᒋᐊᖅᑕᐅᕙᒃᓯᑎᒃ ᑲᔪᓯᑎᐊᖅᓯᒪᔪᑦ ᐅᔾᔨᖅᓱᕈᑏᑦ ᒫᓐᓇᒧᑦ ᑎᑭᓯᒍ.
- ᓄᓇᖓᓂ ᓴᐅᔭᐅᓯᒪᓂᑯᐃᓪᓕ ᐅᔾᔨᖅᓱᖅᑕᐅᓯᒥᐊᓚᐅᖅᑐᑦ 2009-ᒥ ᓚᐃᓴᖓ ᐊᑐᖅᓯᒍ ᓇᓗᓇᐃᖅᓯᔪᑕᐅᓚᐅᖅᑐᑦ ᐱᖅᑯᓯᑐᖃᖏᓐᓄᑦ ᐅᑎᖅᐸᓪᓕᐊᑦᑎᐊᕐᓂᖏᓐᓂᒃ ᒪᓂᕋᖓᓂ ᐊᓯᔾᔨᖅᑎᑕᐅᓯᒪᔪᕕᓃᑦ ᐋᕿᒃᓯᖅᑕᐅᓪᓗᑎᒃ ᐃᒪᐃᓕᐅᕐᑯᔭᐅᓚᐅᖅᑐᑦ ᒪᓕᒃᓯᒋᑦ. ᒪᓂᕋᖓᓂᒃ ᐅᔾᔨᖅᓱᕈᑏᑦ ᑲᔪᓰᓐᓇᕐᓂᐊᖅᑐᑦ ᓚᐃᓴᑖᕆᓚᐅᖅᑕᖓ ᒪᓕᓗᒍ. ᒥᑭᔪᑎᓂᒃ ᐋᕿᒋᐊᖅᓯᒪᓕᖅᑐᒍᑦ ᐅᔾᔨᖅᓱᕈᑎᓂᒃ, ᖃᖓᐅᓂᖏᓐᓂᒃ, ᐊᑯᓪᓚᐃᓐᓂᖏᓐᓂᒃ ᓴᓇᖅᑯᑏᓪᓗ ᐊᓯᔾᔨᖅᑕᐅᖃᑦᑕᖅᓯᑎᒃ ᐅᔾᔨᖅᓱᕈᑏᑦ ᑲᔪᓯᑎᑦᑎᔪᑕᐅᓪᓗᑎᒃ ᒫᓐᓇᒧᑦ ᑲᒪᒋᔭᐅᔪᓂᒃ.
- ᑕᒪᑐᒪᓂ ᐅᑭᐅᖅ ᐃᓱᓕᓕᖅᑎᓪᓗᒍ 2014-ᒥ ᐅᔾᔨᖅᓯᕈᑕᐅᓚᐅᖅᑐᑦ, ᐃᒻᒪᖄ 6,000-ᓯᒃᑭᑕ-ᒦᑐᓪᓗᐊᓂᒃ ᐊᖏᓂᖃᖅᑐᓂᒃ ᐅᕐᓯᐊᓗᕈᔭᖃᖅᑐᓂᒃ ᐊᒥᐊᒃᑯᓯᒪᓕᖅᑐᑦ ᑐᓚᒃᑕᕐᕕᐊᓂ. ᐃᒃᓗᐊᓄᖔᖅ ᑕᑯᓪᓗᒋᑦ ᐱᒋᐊᓕᖅᑎᓪᓗᒍ 17,000-ᓯᒃᑭᑕ ᒦᑐᓚᐅᖅᑐᑦ ᓯᕈᔪᒃᓯᒪᔪᑦ ᒪᓂᕋᐃᑦ ᑕᒪᓂ ᐅᖅᓴᖅᓴᕐᕕᕕᓂᕐᒥ ᐱᖅᑯᓯᑐᖃᖓᓄᑦ ᐅᑎᖅᑎᑕᐅᕙᓪᓕᐊᖏᓐᓇᖅᑐᒃ 2011-ᓂᑦ. ᐊᒥᐊᒃᑯᖓ ᖃᓕᐹᖃᖅᑐᒥ ᐃᓗᐊᓃᑦᑐᖅ ᓴᓗᒻᒪᖅᓴᖅᑕᐅᕙᓪᓕᐊᔪᖅ ᑭᑯᒃᓯᒪᔫᑦ ᖄᖓᓂ ᑕᐃᑲᓂ ᓴᕕᕋᔭᒃᓴᓄᑦ ᓯᕐᓗᐊᕕᓂᕐᒥ. ᑕᐃᓯᒪᖓᓂᓂ ᓚᐃᓴᖓ ᐋᕿᒋᐊᖅᑕᐅᓚᐅᖅᑎᓪᓗᒍ/ᓄᑖᙳᐊᖅᑕᐅᓪᓗᓂᓗ ᑐᒃᓯᕋᐅᑎᒋᔭᕐᑎᓐᓂᒃ ᐃᓚᔭᐅᓪᓗᓂ ᑕᐃᒪᓐᓇ ᓯᓕ ᓴᓗᒻᒪᖅᓴᐃᖏᓐᓇᕐᓂᐊᖅᑐᒍᑦ ᓯᕿᔮᒃᓯᒪᔪᓂᒃ ᒪᓂᕋᖓᑕ ᓄᓇᖓᓂᒃ ᐊᒻᒪᓗ, ᐋᕿᒋᐊᖅᑕᐅᓚᐅᖅᑐᑦ ᒪᓕᒐᖓᓂ ᒪᓕᓗᒋᑦ ᐱᖅᑯᓯᑐᖃᖓᓄᑦ ᐅᑎᖅᑎᕐᑎᔪᑕᐅᓂᐊᖅᑐᓄᑦ (A&R) ᐸᕐᓇᐃᔭᑕᐅᓯᒪᔪᑦ ᐅᓂᒃᑳᖏᑦ ᑐᓂᔭᐅᓚᐅᕐᒪᑕ NWB-ᒃᑯᓐᓄᑦ, ᐱᖅᑯᓯᑐᖃᖏᓐᓄᑦ ᐅᑎᕐᑎᕐᑎᔨᑏᑦ ᐱᐊᓂᒃᑕᐅᓇᓱᐊᓚᖓᔪᑦ ᑎᑭᑦᑐᒍ ᓯᑎᐱᕆ 2016.
- ᐋᕿᒋᐊᖅᓯᔪᑕᐅᓚᐅᖅᑐᑦ ᐊᑐᐊᒐᖏᓐᓄᑦ ᒪᓕᒃᓯᒋᑦ ᒥᑭᔪᒥᒃ ᓴᐅᕝᕕᓕᐅᕐᓂᐊᖅᑐᑦ ᓯᕿᕐᓂᕐᓗᑯᓂᒃ ᐊᑦᑕᕐᓇᖏᑦᑐᓂᒃ ᓄᓇᒥᐅᑕᓄᑦ ᓴᓗᒻᒪᖅᓴᐃᔭᓄᑦ ᐊᑐᖅᑕᐅᓂᑯᓂᒃ ᓴᐅᔭᐅᓯᒪᓕᖅᑎᓪᓗᒋᑦ ᐅᔾᔨᖅᓱᖅᑕᐅᓂᐊᕐᒥᔪᑦ. ᑲᑎᓪᓗᒋᑦ ᐊᑦᑕᕐᓇᖏᑦᑐᓂᒃ ᓴᐅᔨᓯᒪᓕᕐᓂᐊᖅᑐᑦ 50-ᒦᑐ ᓯᒃᑭᑕᓪᓗᐊᒥᒃ. ᓴᐅᓯᕕᐅᓂᐊᖅᑐᖅ ᒪᓂᕋᖓ ᑕᐃᓐᓇ ᓯᕐᓗᐊᖃᕐᕕᕕᐅᑉ ᓯᓚᑎᕐᑎᐊᖓᓂ, ᐃᒻᒪᖄ 3-ᑭᓛᒥᑐᒥᒃ ᐅᖓᓯᖕᓂᖃᖅᑐᒥ ᑐᓚᒃᑕᕐᕕᐊᓂ.
- ᐊᑐᕈᓐᓇᕐᓂᐊᖅᑕᕗᑦ ᑖᓐᓇ ᓚᐃᓴ ᐅᑭᐅᓄᑦ ᑕᓪᓗᒪᓄᑦ ᓄᑖᙳᐊᖅᑕᐅᖏᓐᓂᖓᓂ.

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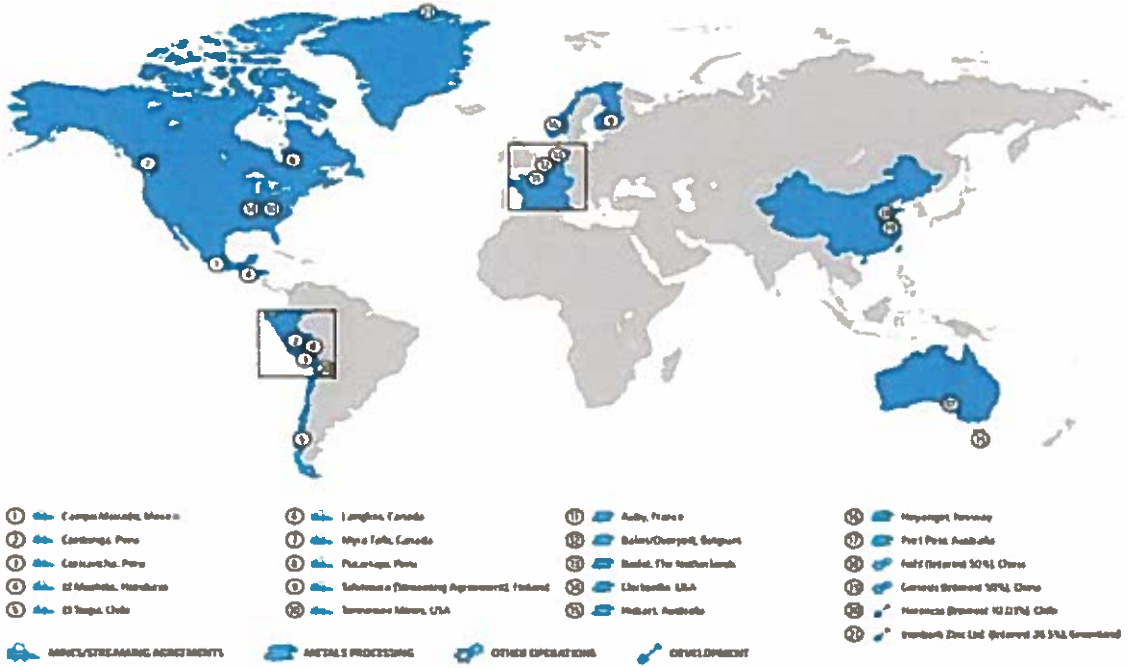
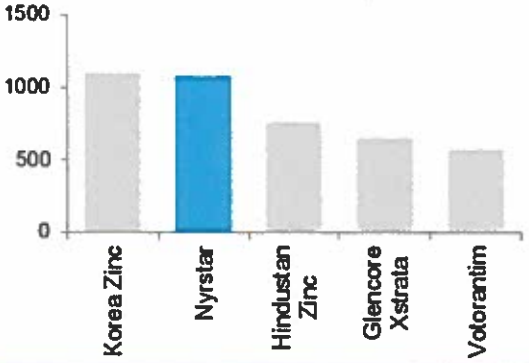
Introduction to Nyrstar

Nyrstar Overview

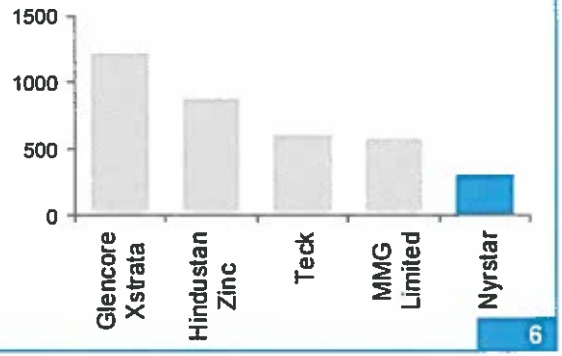
- Integrated mining and metals business.
- One of the world's largest zinc producers.
- Market leading position in lead, and growing positions in other base and precious metals including copper, gold, silver.
- Nine mining operations.
- Five zinc smelters, one lead smelter.
- Employing approximately 6,500 people across five continents. Corporate office in Switzerland.



Top Five Zinc Smelters
(zinc metal production in '000t)



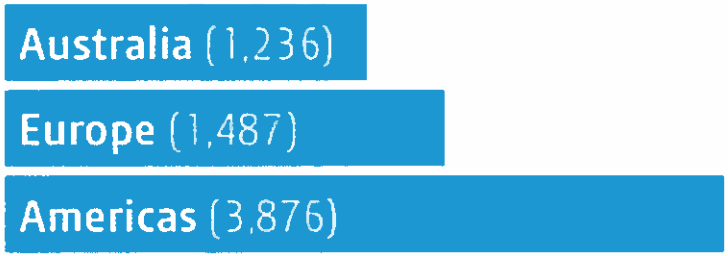
Top Five Zinc Miners
(zinc in concentrate production in '000t)



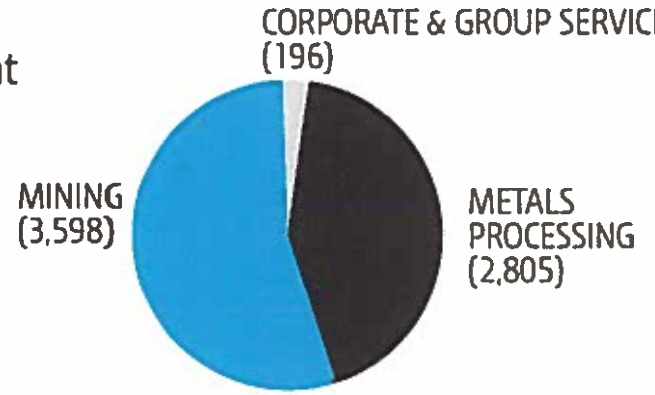
Our People

We have approximately 6,600 skilled employees working across four continents.

By region



By segment



*The numbers of employees are as December 31, 2013

The Nyrstar Way


Prevent harm


Create value


Be open and honest

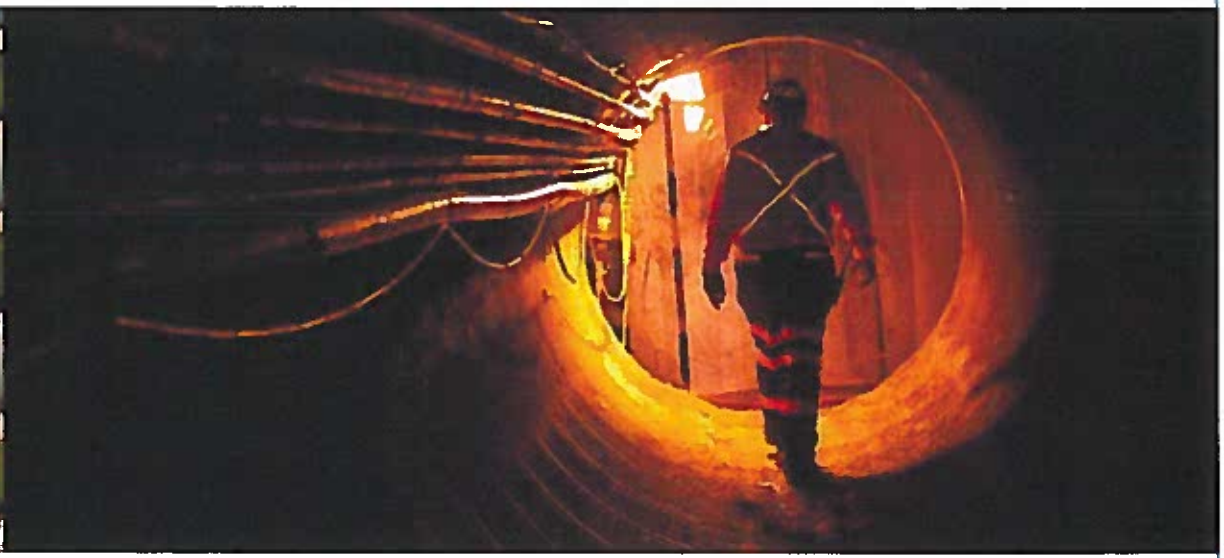

Use innovative and creative thinking


Keep our word


Be driven


Take bold decisions

The culture promoted by the Nyrstar Way provides the foundation for how we operate and engage with stakeholders.

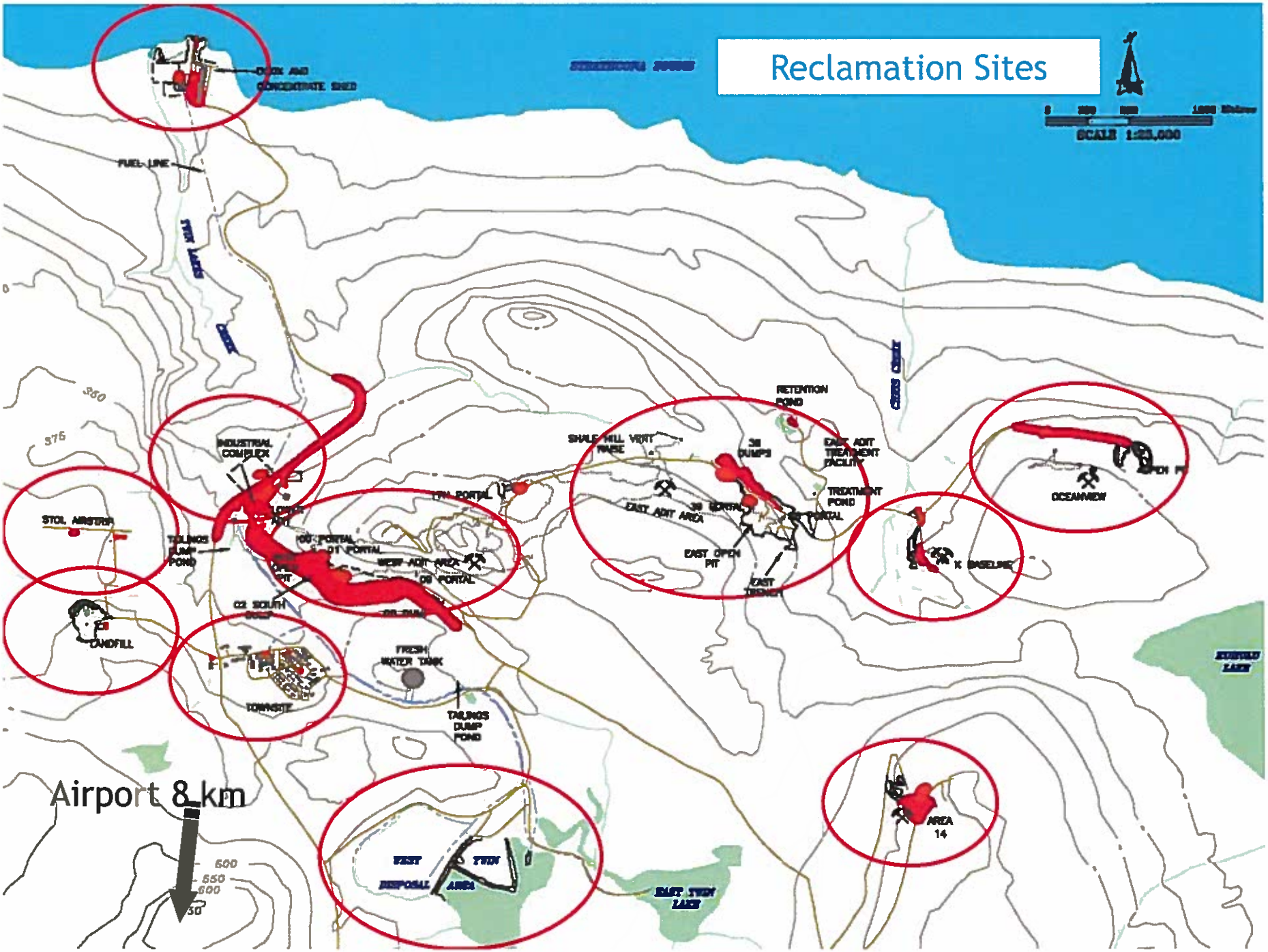


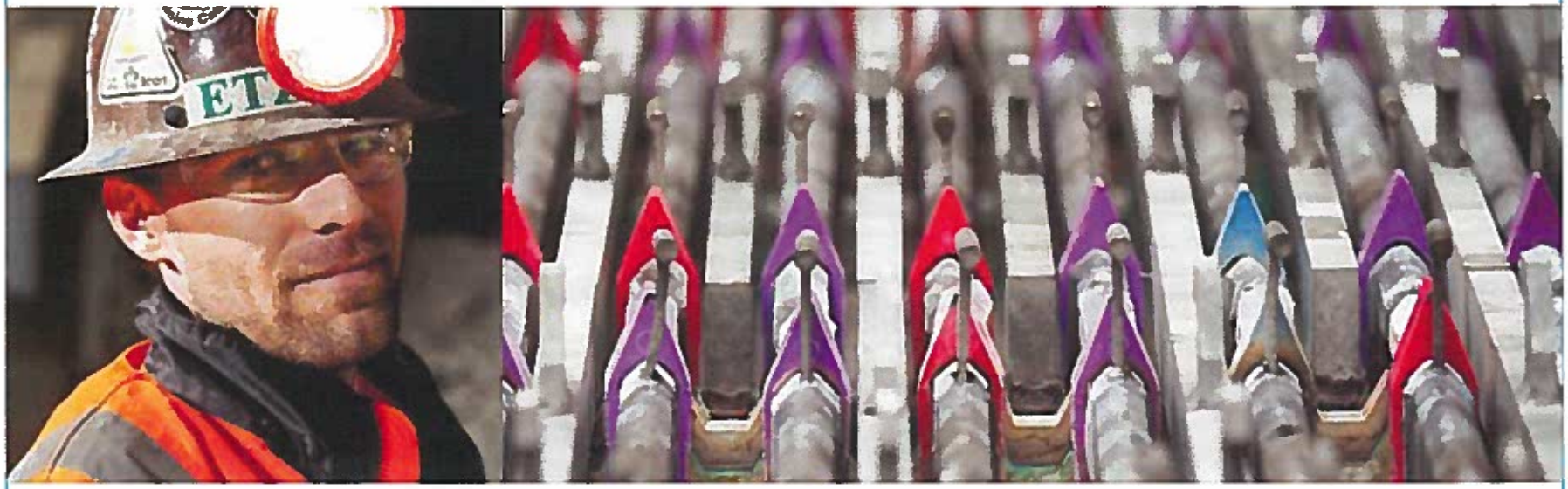
Overview of Site History

Site History

- The Nanisivik mine operated between 1976 and 2002 and produced zinc and lead concentrates
- Nanisivik was Canada's first mine north of the Arctic Circle
- Key facilities included an underground mine, several small open cuts, a 2,200 t/d concentrator and a town site
- Concentrates were stored at and shipped from the dock area
- Process tailings were deposited at the West Twin Disposal Area (WTDA) from which effluent was discharged into Twin Lakes Creek

- Nanisivik announced early closure and produced the last ore in Oct 2002
- Closure activities were completed between 2002 and 2008
- Nyrstar assumed responsibility for the site in 2011 as part of its acquisition of Breakwater Resources


Reclamation Sites
SCALE 1:25,000
FUEL LINE
TWIN LAKES CREEK
INDUSTRIAL COMPLEX
STOL AIRSTRIP
TAILINGS DAM POND
LANDFILL
TOWNSITE
FRESH WATER TANK
TAILINGS DUMP POND
RETENTION POND
SHALE HILL VENT RAISE
EAST ADIT AREA
EAST ADIT TREATMENT FACILITY
TREATMENT POND
EAST OPEN PIT
EAST DISTRICT
OCEANVIEW
AREA 14
EAST TWIN DISPOSAL AREA
EAST TWIN LAKE
Airport 8 km



Summary of CanZinco's Water Licence Renewal/Amendment Application

Introduction to Water Licence Application

- Water Licence 1AR-NAN0914, issued on 1 April 2009, authorises CanZinco to conduct closure and reclamation activities and post-closure monitoring
- Activities carried out under the licence comprise three principal components:
  - Post-closure monitoring of surface water quality
  - Post-closure geotechnical monitoring of earthworks and engineered structures
  - Remediation of petroleum hydrocarbon impacted soil at the dock site
- *The nature and overall scope of these undertakings, as described in the renewal/amendment application, are fundamentally the same as those authorized through the 2009 licence*
- These undertakings are discussed in further detail in the following slides
- The proposed amendment seeks to establish a small landfill for the disposal of non-hazardous wastes generated during ongoing remediation and monitoring activities
- The proposed amendment seeks no changes to water uses
- The proposed term of the renewed licence is 5 years

Water Quality Monitoring

- Water quality monitoring is being completed during the summer months as prescribed in the 2009 licence.
- Monitoring results in the 159-4 compliance station, at the outflow from the former tailing storage facility, have remained significantly below the discharge limits established in the 2009 Water Licence.
- Concentrations of several key parameters have been declining since 2005 and most key parameters (arsenic, cadmium, copper, nickel and total suspended solids) have remained near or below laboratory detection limits.

- In general, the results of the water quality monitoring program have demonstrated stable conditions and confirmed that implemented closure and rehabilitation measures perform as expected.
- The water quality monitoring program will continue under the renewed licence. Minor modifications to monitoring stations, frequencies and parameters are proposed to account for the positive monitoring results achieved to date.

Geotechnical Monitoring

- The Water Licence requires completion of annual site inspections by a Professional Geotechnical Engineer and the collection of geotechnical monitoring data from several monitoring locations.
- The geotechnical monitoring program has demonstrated that completed surface reclamation covers and other geotechnical installations are performing in accordance with their design intents.
- In particular, geothermal monitoring data indicates that installed thermal covers achieve their design objectives by confining the active thaw layer within the covers and maintaining the underlying waste materials in a frozen state.
- The geotechnical monitoring program will continue under the renewed licence. Minor modifications to monitoring periods, frequencies and the type of instruments being monitoring are proposed to account for the encouraging monitoring results achieved to date.

Soil Remediation at the Dock Site

Recap of Completed Remediation Works

- Decommissioning of the fuel tanks was undertaken in May and June 2011.
- Excavation, screening and treatment of PHC contaminated soil proceeded throughout 2012, 2013 and 2014.
- The excavated soil is placed in lined facilities and treated using landfarming methodologies.

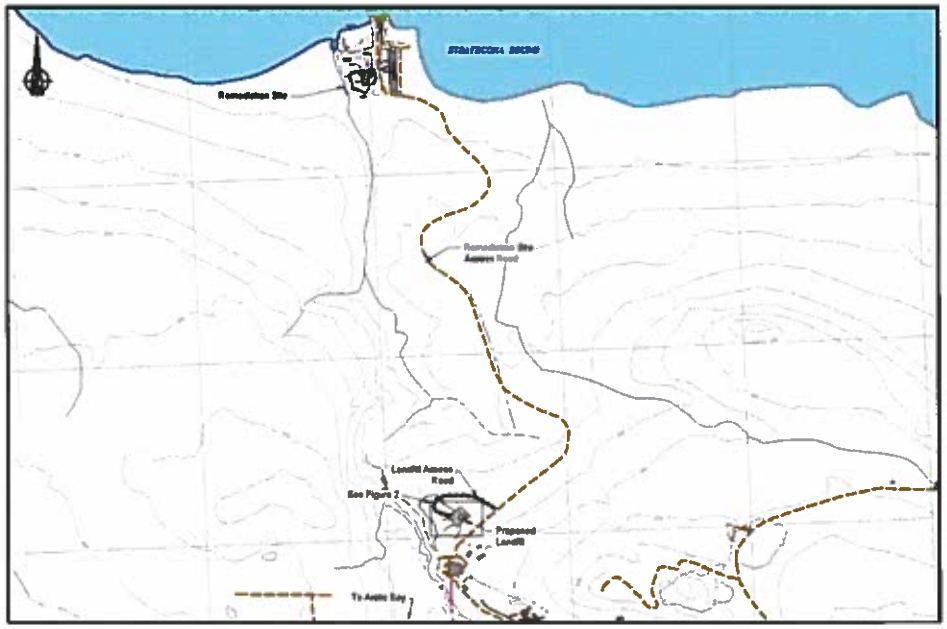
- The excavation of contaminated soil is fundamentally completed. A small lens of contaminated soil (approximately 50 m^3) will be removed at the start of the 2015 field season.
- At the end of the 2014 field season, approximately 6,000 m^3 of contaminated soil remains to be treated. This soil is located in the Upper Treatment Area, Lower Treatment Area and on the Concrete Pad.

Proposed Remediation Works under Renewed Licence

- The licence amendment/renewal application seeks to maintain the existing approach to the remediation of petroleum contaminated soil. This soil treatment approach has already been approved by the NWB and has proven to be effective.
- An updated Abandonment and Reclamation (A&R) Plan has been prepared and filed with the NWB as part of the license application process.
- Under the updated project schedule included in the new A&R Plan, the remediation works are expected to be completed by September 2016.
- Following the completion of the soil remediation, the treatment facilities will be decommissioned and the land surface contoured to prevent ponding of water.
- Confirmatory soil sampling is, and will continue to be, undertaken in accordance with the Remediation Confirmatory Sampling Methodology approved by the NWB. A memo clarifying this methodology was prepared and filed with the NWB as part of the license application process.
- CanZinco is pursuing the development of a site specific remediation objective (SSRO) for the F2 diesel fraction (the key contaminant of concern). The SSRO development accounts for the specific contaminant profile, soil characteristics and plant and soil invertebrate species that exist at the Nanisivik dock site. The approach used for the development of the SSRO is the same as that used for establishing generic soil quality standards applying Canada-wide.

Landfill for Non-Hazardous Waste

- The renewal/amendment application proposes the construction of a small landfill for the disposal of non-hazardous wastes generated during the remediation and monitoring activities.
- Wastes intended to be disposed in the landfill includes metal reinforcement bars, non-reusable sheet metal and scrap steel, and geomembrane liners.
- The total quantity of non-hazardous waste to be placed in the landfill is expected to be around 50 m^3.
- The preferred location for the landfill is the former outdoor warehouse yard, located three kilometers south of the dock area.
- The waste will be covered by soil and a geomembrane liner to isolate it from contact with wildlife. A 60 cm thick soil cover is proposed.
- The performance of the landfill installations will be monitored as part of the annual geotechnical inspection conducted at the mine site.




Thanks for Listening