

Implementing Mine Closure Plans



Ontario's Experience

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Abstract

- MNDM has the mandate under the Mining Act to hold financial assurance equivalent to the costs for rehabilitation of mine sites when they close.
- The intent is to ensure that the Crown has resources to implement the Closure Plan if the proponent is unwilling or unable to do so.
- In August, 2012 the Crown became responsible for implementing the Closure Plan for the former Timminco Mine site near the community of Renfrew, Ontario, approximately 100 km northwest of Ottawa.
- In August 2015, the Crown became responsible for implementing the Closure Plan for the former Lockerby Mine site near Sudbury, Ontario.
- Both projects have been challenging and the lessons learned are sculpting MNDMs approaches to mine closure.

Bankruptcy - Process

- Two pieces of legislation:
 - Bankruptcy and Insolvency Act (BIA)
 - Companies Creditors Arrangement Act (CCAA)
- BIA
 - Available to insolvent debtors owing \$1000 or more, regardless of whether they are natural or legal persons.
 - Contains mechanisms for debtors to make proposals to their creditors for the adjustment of debts.
 - If a proposal fails, the BIA contains a bridge to bankruptcy whereby the debtor's assets are liquidated and the proceeds paid to creditors in accordance with the statutory scheme of distribution.
- CCAA
 - Provides for a re-organization of the business and operations where the debt is more than \$5 million.
 - Supervised by the Courts, there is a court-appointed monitor.
 - If the restructuring plan is not accepted by the creditors or sanctioned by the court, the result is usually liquidation of assets through bankruptcy or receivership.
- Timminco = CCAA followed by liquidation of assets by Trustee
- Lockerby = BIA liquidation of assets after Creditors obtained a Bankruptcy Order
- These processes are controlled by the courts for the benefit of the Creditors.

Location



Lockerby Mine Site

Timminco Mine Site

Timminco

- Open pit magnesium producer
- Mining active from 1941-2005
- Magnesium processing continued on the site until 2007
- Timminco implemented mine closure 2007-2012
- Two pits, one rehabilitated, one used as a retention pond in the effluent treatment system
- Surface infrastructure includes:
 - Admin Building
 - R+D Buildings
 - Casthouse
 - Auxiliary Metals Building
 - Extrusion Plant
 - Solid Mill Tailings
- Insolvent in 2012

Lockerby

- Underground Ni-Cu producer
- In production from 1974 - 2015
- No tailings impoundment
- Surface infrastructure includes:
 - Two headframes and shafts
 - Ventilation and exhaust raises
 - Adit
 - Backfill Plant
 - Effluent treatment plant
 - Waste Rock pile = 280,000 tonnes PAG rock
 - PAG tailings were used for backfill, 8000 tonnes remain on site
- First Nickel insolvent in 2015, no mine closure
- MNDM undertook underground decommissioning in September 2015

Timminco - Current Site Layout



Timminco – The Pidgeon Process

- Magnesium was produced from dolomite using the “Pidgeon Process”
 - Process developed by NRCAN (Dr. Montgomery Pidgeon)
 - ore was calcined in rotary kilns, mixed with ferrosilicon and fired in retorts, producing magnesium metal “crowns”.
 - The magnesium crowns were then post-processed for shipping by casting or extrusion to meet customer/market needs.

Timminco – Water Quality

- Solid Mill Tailings
 - CaO, SiO₂, MgO, Al₂O₃, Fe₂O₃
 - Minor MgN₃ and/or Mg(NO₃)
 - NO_x likely from air introduced during calcining/reduction
 - Ammonia produced and mobilized by reactions with water
 - Surface waters characterized by high pH (10-12) and elevated ammonia (300-500 ppm)





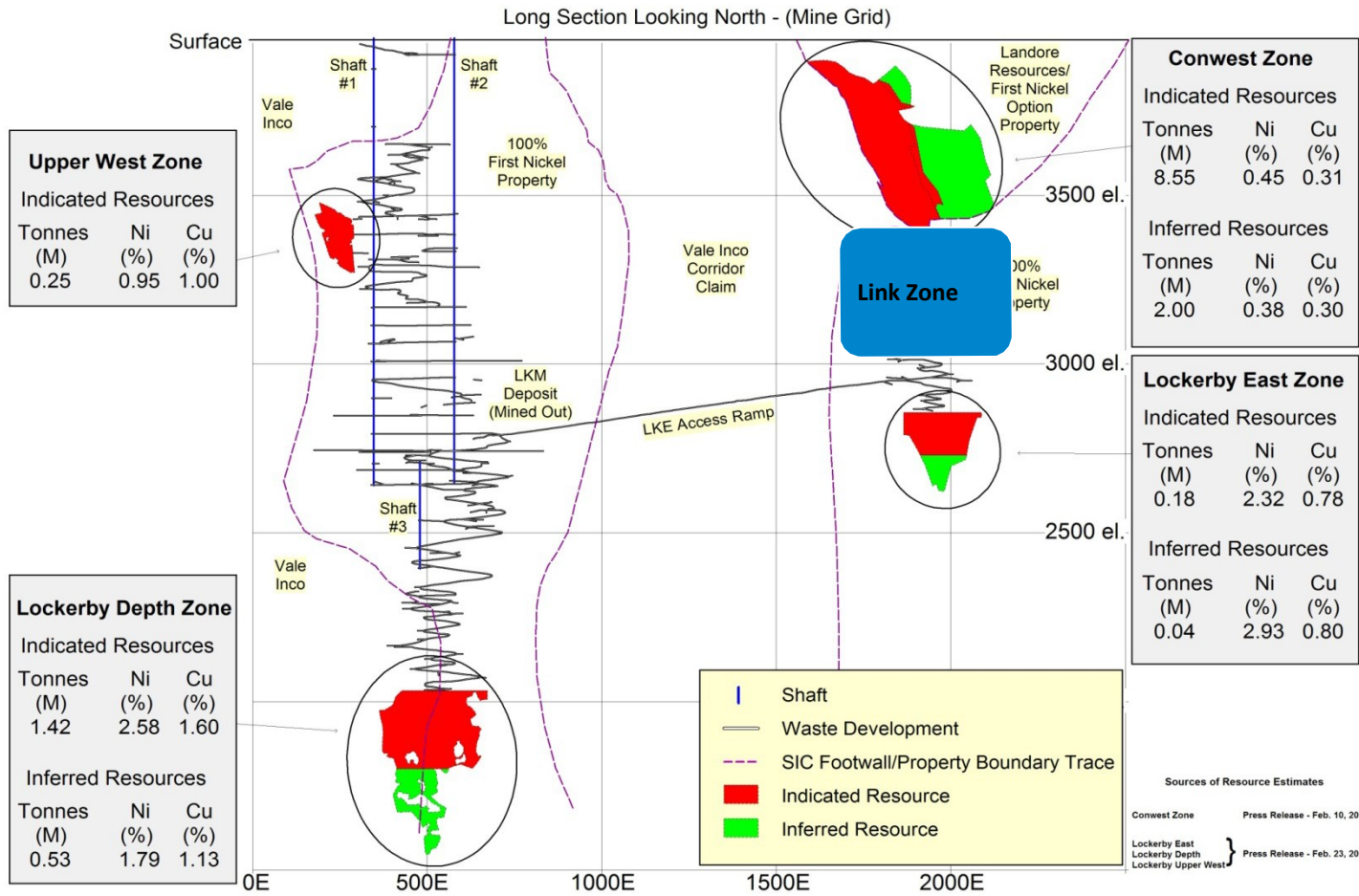




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Lockerby Mine – Underground Layout











Lessons Learned

Challenge	Timminco	Lockerby	Impact
Electricity	IESO supply	IESO supply	Costs
Building Demolition	Buildings not included with CP	Demolition costs under represented	
Water Management	Aging infrastructure, Electrical costs	Aging infrastructure, Electrical costs	
Closure Project Management	Not included as a cost item	Not included as a cost item	
Orderly Closure VS Abandonment	<ul style="list-style-type: none"> • Aging systems • No personnel • Sale of assets 	<ul style="list-style-type: none"> • Aging systems • No personnel • Sale of assets 	

