

Closure of Jarosite Pond Facility, Timmins, Ontario

Design and Construction

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December 2013

Outline



- Introduction
- Site description
- Closure options
- Design criteria
- Design
- Construction
- Water treatment
- Current conditions



- John Stroiazzo, Reclamation Manager, Glencore
- Ian Walton, Site Manager, Glencore
- Rick Schwenger, Glencore
- John Pugh, Project Manager, AMEC

Located Near Timmins, Ont





Kidd Metallurgical Site, East of Timmins, Ont







- Kidd Creek Mine (28 km northwest of the Met Site) started operations in 1965
- Ore transported to the Met Site for concentrating, smelting, and refining
- Produced copper and zinc
- Refining and smelting discontinued in 2010
- Concentrating to continue until 2020
- Tailings discharged to TMA
- Owned and operated by Glencore (formerly Xstrata, Falconbridge, Noranda, etc.)



Plantsite and Jarosite Pond - 2010







- Used to store jarosite sludge and gypsum sludge generated by the smelting and refining process as well as other waste materials from the process
- Jarosite by product for iron control at the Zinc plant, a sludge like material, highly acidic
- JPF initially constructed in 1971 and raised in 2007
- Perimeter embankments made of sand and gravel and partial clay core
- Contaminated seepage collected and pumped

Jarosite Pond Facility



Prior to closure







Area: 31 Ha

Perimeter dams: 8 m high maximum

Foundation: low permeability silty clay over till and bedrock



JPF





Downstream slope of North Dam

Upstream showing jarosite







Jarosite Pond water samples from 2000 to 2009					
	Max (mg/L)	Min (mg/L)	Average (mg/L)		
Copper	483	100	236		
Iron	1,730	5.90	733		
Zinc	1,880	708	1,350		
	Мах	Min	Average		
PH	2.38	1.40	N/A		

Jarosite Pond seepage water samples from 2000 to 2009					
	Max (mg/L)	Min (mg/L)	Average (mg/L)		
Copper	141	0.21	30		
Iron	355	0.67	81		
Zinc	12,790	23.50	3,247		
	Max	Min	Average		
PH	7.06	3.50	N/A		

Water sent to plant for treatment





- Key assumption water treatment planned for the TMA in perpetuity
- In-situ encapsulation of the pond contents with a "trough" configuration
 - Limit fill placement over jarosite
 - Direct surface runoff to one location
- Water from the JPF (surface and seepage) directed to the TMA (no plant)
- Considered dome configuration
- Considered relocation to TMA





- Do not have an adverse effect on the TMA treatment system
- Move to a "Passive Care Phase" as soon as possible
- Reduce seepage quantity
- Design surface drainage measures to withstand the 1 in 1,000 year runoff event
- Meet Ontario and Canadian dam safety guidance





Low permeability liner system (HDPE)



HDPE liner selected because site will be maintained in perpetuity





Central Trough



Trough Configuration





Pre Construction



- Water Removal and Treatment
- Sanexen contracted to treat the water (lime addition)
- Rockfill placement trials to establish construction method over soft jarosite



Phase 1 Construction



Rockfill platform (Aug 2011 to March 2012)







Some areas of soft jarosite, used geotextile when required





- Water treatment continued during construction
- "Jaro-juice", surface water runoff, and seepage directed to Sanexen treatment system (pH = 2)
- Treatment system consisted of four tanks installed in series.
- Lime slurry sourced from plant
- Neutralized water pumped tank to the TMA



Water Treatment (cont'd)



- Volume of Water treated before construction: ~58,000 m³
- Volume of water treated during construction: ~121,000 m³
- Total volume treated: ~179,000 m³
- 10,000 m³ of lime slurry used during treatment

Construction (cont'd)



Phase 2 – Liner Placement (April to December 2012)



Substantial Completion



Low k cover in place, soil cover nearing completion







- Seepage quantity significantly reduced
- Seepage water quality improved

Zinc Concentrations					
	Max (mg/L)	Min (mg/L)			
Seepage (2000 to 2009)	12,790	23.50			
Seepage 2012	11,000	1,500			
Seepage 2013	5,000	2,000			

- Seepage collected and trucked to TMA for treatment
- Surface runoff from the trough good quality

Final Completion

Completed on time and under budget with excellent safety record

- Performing as expected
- No settlement concerns
- No erosion concerns









Perimeter containment no longer dams







Questions