Remediation Planning for the Sandy Flat Mine Site, Northern Territory, Australia

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Overview

\circ Introduction

- Waste Facilities
- Water Management Facilities
- Downstream Impacts

Current Site Conditions

- AMD Sources
- Groundwater Conditions
- Load Balance

Remediation Planning

- Remediation Objectives
- Approach

Site Location and Physical Setting



General Mine Arrangement



Mine Waste Inventory



Waste Rock Dumps (WRDs) and Sandy Flat Pit in 1996



Tailings Storage Facility (TSF) and Heap Leach Pads (HLPs)



Heap Leach Vats



Flooded Sandy Flat Pit and Paleochannel



Water Management Facilities

SLFWT = Southern Low Flow Water Trench

SLFWT

500,000 m³ (at 167 m AHD) pH 2.5, 500 to 1000 mg/L Cu

> Clean wate overbass

SHIEWT



Aerial Photograph – July 2012



Surface Water Quality Downstream



Contaminant Loads Downstream

Average Annual Load = 54 t/year Cu (2003 to 2017)

Total Copper Concentration

Missing values estimated by rloadest regression model





Groundwater and Surface Water Monitoring Network



Key Transport Pathway – Paleochannel



Simulated Groundwater Flow Field – High Flow



Particle Tracking (High Flow Conditions)



Water and Load Balance Model (WLBM) Structure





Simulated Overflow from Pit (via SLFWT)



Contaminant Loads to Hanrahan's Creek



2020 and 2021 Test Pitting Locations



Total Sulphur Content



Existing Acidity Content and Lime Dosing Rate



SP20-2-2.0 SP20-3-0.5 SP20-4-1.0 TP20-2-2.0 TP20-2-3.0 TP20-2-5.0 TP20-3-1.0 -3.0 4.0 4.5 -1.5 -3.5 4.0 -4.5 6-1.0 -3.5 4.0 4.5 O. O. -2.0 -2.5 -3.5 3-5.0 S TP20-3-1.5 0 TP20-9-1.0 SP20-1-1.0 TP20-3-2.0 TP20-9-2.0 TP20-9-2.5 TP20-9-3.0 TP20-9-5.0 Ņ ς. Ņ Ņ ကဲ့ က် ò TP20-6-2. Ņ TP20-2-TP20-2-TP20-3-TP20-3-TP20-3-TP20-3-TP20-5-TP20-5-TP20-5-TP20-5-TP20-6-TP20-6-TP20-9-TP20-9-TP20-9-യ് TP20-2-TP20-4-**FP20-1** P20-1 **FP20-1 FP20** P20 P20

Conceptual Remediation Plan



Conceptual Remediation Plan

Pump-and-treat ~ 500,000 m³ of pit water to eliminate this "source" and allow access to the pit, if needed

Backfill the permanently flooded zone of the Sandy Flat Pit with 500,000 m³ of waste materials with the highest sulphide content

Amend re-located materials with ~30,000 t of aglime (CaCO₃) to neutralize their existing acidity content and immobilize metals

No active, long-term water management and treatment, as remediation will eliminate the major sources of AMD

Future (post-remediation) water quality in Hanrahan's Creek and other surface waters downstream to be determined

Hanrahan

LEGEND

Drainage Line

Waste Rock Dump (WRD)

Secondary Disturbed Area

NAF materials, not re-located



204,000 m3 of lower-sulphide PAF waste rock that may be re-located to the non-flooded zone

500,000 m3 of the highest sulphide PAF mine waste materials re-located

Topsoil Stockpile

Drainage channel

31,500 m3 of cover material (growth medium), if needed

to permanently flooded zone

Scale 1:5,00

200

SDA1994 MGA Zone 5

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