



Acid Solutions[®]

Contaminated Water Treatment

**EMERGENCY WATER TREATMENT
AT THE
MOUNT MORGAN MINE SITE
FOR
DEPARTMENT OF EMPLOYMENT, ECONOMIC DEVELOPMENT
AND INNOVATION.**

30 MAY 2012



1. INTRODUCTION

Acid Solutions was contracted to install a temporary mobile water treatment system to treat to release quality, water from the Mt Morgan open cut mine pit to provide support for the DEEDI permanent water treatment plant prior to the potential 2011/12 wet season rains. The in-ground land based pit treatment system treated the extreme contamination and high percentage of sludge/floc produced, achieving the required discharge quality and completing the treatment contract requirements.



Containerised pumping and control systems with CRAB treatment system and 15 Tonne silo. The treatment system would receive reagents in both tanker loads and Bulk Bags.



Short term, in-ground treatment and floc processing pits treating over 200,000 litres per hour.

Prepared and Submitted by Acid Solutions Pty Ltd

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2. TREATMENT RATE ACHIEVED

Treatment was achieved at discharge rates ranging between 140,000 and 205,000 litres per hour. The average discharge rate was 168,800 litres per hour.

3. REAGENTS USED

507 tonnes of Hydrated Lime was used in 46 days to treat the highly contaminated pit water. The treatment system provided very efficient utilisation of lime in the process.

4. FLOC PRODUCED DURING TREATMENT OF THE MT MORGAN WATER

Unlike any other Australian AMD pit water we have encountered, the Mt Morgan pit water produced extremely large and heavy volumes of sludge floc.

The floc produced during treatment after settling for 12 hours had a volume of approximately 29 percent. Most AMD waters show a floc volume of 1.5 to 16%

The extremely high levels of Sulphate, Aluminium, Magnesium, Manganese, copper and Zinc make up the bulk of this very heavy floc. The nature of the Gypsum metal matrix formed during treatment along with the polymer used makes this floc quickly thicken over a short time. It continues to flow as expected for up to approximately 6 hours but after this time it starts to gel to a point over 24 hours when it forms a consistency of thick and heavy cream.

5. GYPSUM BLOCKING PUMPS AND PIPES DURING TREATMENT

The extreme sulphate levels almost instantly formed gypsum on contact with reagents.

The photos below show blockages formed over several days.

This blocked pumps and pipe work until the process was modified to account for this problem.



Reagent pipeline blockage due to Gypsum formation.



8" pump prior to relocation of reagent input.

6. CONCLUSION

We completed the contract for treatment of this very difficult and highly contaminated water to the required release quality requirements.

The following year we received a request from DEEDI requesting that we return to conduct further emergency water treatment on site but due to an already extended workload we had to decline the offer.

7. TREATED WATER QUALITY ACHIEVED

CONTAMINANT	CONTAMINANT REDUCTION %
pH	Discharge pH raised to 7.53
Electrical Conductivity	36.838 %
Aluminium (Total)	99.999 %
Arsenic (Total)	96.894 %
Cadmium (Total)	94.505 %
Cobalt (Total)	98.376 %
Copper (Total)	99.969 %
Chromium (Total)	76.190 %
Iron (Total)	99.899 %
Lead (Total)	95.897 %
Manganese (Total)	87.731 %
Molybdenum (Total)	77.142 %
Nickel (Total)	98.667 %
Sulphur (as SO ₄)#	53.679 %
Zinc (Total)	99.943 %

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Contaminated Bulk Water Treatment Pty Ltd

31 May 2012



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