

2.5 megalitres of low pH, Metal contaminated water treated for irrigation disposal.

July 2009

Name	WDS
Site Location	Miles Queensland
Site Problem	pH, Acidity and Metal Contamination
Water pH	3.2 pH
Acidity	235 Mg/l
Suspended Solids	Above license limits
Treatment Objective	Irrigation Release
What is causing the problem	Contamination pipeline pressure testing
Dams/Pits	1
Length of water body	100 metres
Width of Water body	40 metres
Water Depth	0.9 to 1.5 metres
Bottom Type	Plastic Lined
Aquatic Flora	None
Vehicle Access and Flora	Road access no Flora
Environmental Sensitivity	Contained and Controlled
Aquatic Life	None
Drains or Streams nearby	No
Regulatory requirements	Yes - discharge
Urgency level	Very urgent. Requirement to remove pit



1 INTRODUCTION

Acid Solutions was contracted to treat 2.8 megalitres of acidic metal contaminated water in a holding dam in Miles, Queensland.

Water treatment was required to improve quality and reduce contaminants to allow dewatering and evaporative disposal via irrigation and thereby allow removal of the temporary holding dam.

2 OVERVIEW

Approximately 2.8 Megalitres was contained in a sealed dam approximately 100 metres by 40 Metres by 0.9 to 1.5 metres deep. Water was to be treated to neutralise acidity and reduce metal contaminants and suspended solids from the water body before dewatering.

The site contained no fish, turtles, eels or aquatic flora.

Water was to be treated to better than ANZECC irrigation quality and then pumped onto the surrounding land for disposal and allowed to evaporate.

3 TREATMENT METHOD USED

Acid Solutions used its patented water treatment technology called the CRAB™.

The **Calibrated Reagent Applying Blender**.

The Acid Solutions CRAB™ treatment system provides several methods to deal with many different types of sites and contaminants.

The treatment method used on this site was in-situ treatment.

This method is the most cost effective and efficient considering the water quality requirements. The other methods are inline bulk treatment which can treat over 1 million litres per hour and our high quality, single or multi process pit treatment which can incorporate floc extraction and processing.

4 ACID SOLUTIONS TREATMENT SYSTEMS

THE CRAB TREATMENT TECHNOLOGY

The primary objectives of the *Acid Solutions* CRAB™ technology are to solve or minimise the drawbacks of conventional systems and to be cost effective, simple and portable for mining and construction applications. The CRAB™ is an accurate, computer controlled multi reagent blending system with a diverse range of add on application systems.

This technology uses proprietary processes with commonly used reagents to achieve outstanding results. The technology is compact, adaptable and self powered. It offers significant economic advantages over other treatment designs in terms of infrastructure, operator requirements, safety and efficiency.

Acid Solutions CRAB™ treatment system has many benefits above all other treatment system designs available.

We have refined and perfected these portable, multipurpose, adaptable treatment systems that suit the type and quality of treatment required quickly and easily.

The CRAB™ systems are surprisingly small considering their capability and output.

Acid Solutions presently manufactures and uses 3 sizes of the CRAB™ CX series of machines with the largest CRAB™ CX1500 being able to process within 2% accuracy up to 4450 kg per hour of hydrated lime or other powdered reagents in the right circumstances.

The CRAB™ CX500 will process powdered reagents from 200Kg/Hr down to as low as 1.0 kg/hr.

The CRAB™ has the capability to accurately process and blend liquid reagents with difficult powdered and granular reagents. Liquid and powder reagent combinations can produce outstanding results using off the shelf products and chemicals without the extreme costs of proprietary reagents.

The CRAB™ can be semi automated with Auto pH Correlation, Auto Shutdown, Silo Feed Correlation with many more integrated system controls. All these integrated and automated systems provide security, reliability and safety for environmentally sensitive treatments.

The *Acid Solutions* Treatment System occupies an extremely small footprint and has a very short installation period.

CRAB AUTOMATION AND INTEGRATED SAFETY SYSTEMS

Many safety systems and automatic shutdowns featured are integrated such as: Ph overcorrection, Loss of prime, Overflow, drive jam, hopper unlatched and door safety. The CRAB™ will shutdown external systems (pumps) when it senses errors and can be shut down by external inputs (emergency stop systems, float levels etc). These capabilities are not only essential for WPH&S but are also invaluable when environmental safety is involved.

5 WATER QUALITY OBJECTIVES

It was proposed that the water be improved to reduce metal contaminants, acidity and to raise pH to irrigation quality (ANZECC Short Term Guidelines) so as to allow irrigation and evaporative disposal over the nearby site.

6 TREATMENT REAGENTS

Reagent used were Calcium Hydroxide and 2 other of our proprietary reagent blends. Acid Solutions used our proprietary reagents during the treatment process to benefit and improve contaminant reduction. Accurate application of these reagents produces Ferric Hydroxide Complexes. Minimum quantities of reagents will be used to minimize Floc produced. Acid Solutions maintained water between 6.5pH to 9.5pH throughout the treatment process. These reagents provide cost efficient and safe removal of contaminants when applied using the Acid Solutions CRAB treatment system.

7 TREATMENT RESULTS

Contaminant Mg/L	Treatment Results	Short term Irrigation quality ANZECC
pH	7.7	
Electrical Conductivity	648	
Total Dissolved Solids	526.0	
Aluminium	<0.01	20.0
Arsenic	<0.005	2.0
Boron	0.06	15.0
Cadmium	<0.05	0.05
Chloride	45.5	-
Cobalt	<0.01	0.1
Copper	0.02	5.0
Chromium	<0.01	1.0
Iron	0.09	10
Lead	0.06	5.0
Lithium	<0.01	2.5
Magnesium	4.4	-
Manganese	2.50	10.0
Mercury	<0.001	0.002
Molybdenum	0.01	0.05
Nickel	0.05	2.0
Sodium	25.9	-
SO4 Sulphate	137.0	-
Zinc	<0.01	5.0

8 DEWATERING AND DISPOSAL

The water was to be dispersed over the existing irrigation site and evaporated.

Acid Solutions dewatered the dam using 2 pumps at 85,000 litres per hour. The water was transferred via 3" lay flay pipeline in 25 to 30 Metre lengths.

700 metres of pipeline was positioned to disperse the water onto the areas required.

As the outlet areas became saturated, sections of piping were disconnected to relocate outlet and prevent runoff.

9 BENEFITS

Benefits of this treatment system include, but are not limited to:

- It has an extremely fast installation time.
- It is very cost effective in comparison to other treatment methods.
- It is self powered and requires less infrastructure than other treatment methods.
- It remains flexible in regard to site location required.
- The portability of the mobile CRAB™ Treatment system provides fast setup and dismantling, leaving no permanent infrastructure to dispose of.

The Mobility, Multi Reagent Capability, inbuilt Automation and easy adaptation to suit water quality and site requirements ensure safety, efficiency and reliability from Acid Solutions CRAB™ Bulk Water Treatment Services.

The CRAB is a powerful compact system even in comparison to the largest of permanent treatment infrastructure



Website - www.ACIDSolutions.com - email pH@ACIDSolutions.com
phone : +61 7 55 22 1789 - freecall : 1800 11 ACID