EnviRemed
Simple Solutions to Complex Environmental Problems

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Clean Mining Technology

Purify Highly Contaminated Wastewater and Soils

Problem

ACID ROCK DRAINAGE

It has only been in the last 25 years that regulators have understood the devastating impact of Acid Rock Drainage (also referred to as Acid Mine Drain-age or AMD). It is considered to be the principal threat posed by mining activity, past, present and in the future.

Typical sources of Acid Rock Drainage (ARD) at mine sites are underground workings where ground water percolates through a honeycomb of tunnels and shafts piles of waste rock, mining overburden and exposed tailings. Mines may be a source of Acid Rock Drainage for thousands of years.

ARD pollution can poison drinking water, contaminate ground water and destroy aquatic life. Many of the contaminates, such as arsenic, cadmium, copper and lead, are highly toxic, and can produce devastating effects on the environment.

TAILINGS DAMS

It is estimated that some 13 billion tons of stone, 10 billion tons of sand and gravel, and 500 million tons of clay are used annually in the construction of tailings dams.

"[It] may be the only acceptable and sustainable solution from an economic point of view to solve acid rock drainage and acid sulphate soils,"

according to Professor Schulling from the International Institute of Environmental Engineering in Delft, The Netherlands.

Accordingly, there are tens of thousands of tailing dams containing billions of tons of mineral processing wastes.

Due to their vast quantities, liquid nature and very high content of toxic metal contaminants, their containment and control are an ongoing management concern at virtually all mine sites. The impact of seepage is a constant concern.

The most serious issue relates to the potential of tailings dams to fail or collapse, claiming lives and causing considerable environmental damage. The damage caused by these failures in terms of human casualties, destruction of property, disruption of communications, pollution of the environment and economic loss to the mining industry is enormous. There has been a reported failure of a tailings dam almost every year for the past two decades, each with widespread and devastating results.

Solution

When reagents are applied to ARD they purify the contaminated water too stringent environmental standards. Tailings dams and exposed waste rock can be treated both effectively and economically. This remarkable technology can be applied to economically treat AMD, tailings dam water, sulphidic mine tailings acid sulphate soils and waste rock dumps to:

> Permanently neutralize acid,

> Trap metals and prevent leaching,

> Enhance nutrient retention capacity and promote vigorous plant growth.

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ViroMine™ Case Study

Gilt Edge Mine in South Dakota was experiencing severe ARD resulting from mining operations. Recent tests conducted by the US EPA have demonstrated that ViroMine™ Technology was able to treat the water to a high standard without creating a toxic sludge.

The Problem

The Gilt Edge Mine is just five miles east of Lead at the headwaters of cold-water fisheries and municipal water supplies of the northern Black Hills. It is a 110-hectare open pit, cyanide heap leach gold mine, developed in highly sulphidic ore bodies. The mine consists of 570 megalitres of acidic, heavy-metal laden water in three open pits, as well as millions of cubic yards of acid-generating waste rock that need cleanup and long-term treatment.

Sulphide waste rock and exposed ore zones (which enerate leachates to surface and ground water) contain heavy metals, including arsenic, cadmium, copper, lead and zinc.

Elevated nitrates and sulphates are also present in heap leach residues. Copper, cadmium and zinc are the major polluting risks to the habitats of the receiving water catchment.

The Solution

The data collected from the various trials the US EPA performed clearly demonstrated the technology's capability of removing heavy metals from water and reducing eachate from waste rock dumps. As Professor David McConchie of Southern Cross University has stated: "***The new technology...is able to reduce the concentration of many environmentally hazardous trace metals by over one hundred thousand times.***"

Reagents, both prior to and after application cannot be classified as either a hazardous or dangerous waste, as defined by regulatory guidelines worldwide, including the Hazardous Waste Act. For these reasons, reagents are considered safe to transport, safe to handle, and safe to apply, and are not toxic to plants, soil biota, fish or other aquatic life when assessed using world-wide standards of toxicological practice. Reagents are therefore considered to be fully sustainable and healthy for the environment.

Parameter	Control	Amended Rock
pH	3.73	8.00
Arsenic	1,975	Below Detection
Cadmium	671	0.4
Chromium	85	Below Detection
Copper	31,250	12.9
WAD Cyanide	5	2.5
Lead	20	1.8
Nickel	1,985	2
Zinc	34,950	29.2

For complete studies, call 888.575.3573

EnviRemed

EnviRemed is a consortium of top scientists, engineers, contractors and businessmen who have united to offer the best available technology to provide safe and natural solutions for governmental authorities, corporations, and private citizens to create a cleaner future for our planet.

Available worldwide, we offer environmentally friendly solutions that help your bottom line and the expertise to implement them. Through simple processes we have saved our customers millions of dollars, thousands of man hours, and improved the way they take care of their business.

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