

Development of a Treatment Technology for Mercury Impacted Wastes

The pyrometallurgical recovery of zinc and lead results in the production of large quantities of sulfuric acid as a by-product., however this typically contains mercury. Before the sulfuric acid can be sold as a commercial commodity, the mercury must be removed. Entech developed the use of the Dolocrete® technology to immobilise the mercury. The treatment involves the mixing of a sulfide reagent with Dolocrete® with a high shear mixer in conformance with the regulators mixing policy.

The Problem

One of the primary by-products from the pyrometallurgical recovery of zinc and lead is sulfuric acid. Sulfuric acid is produced by the smelting of sulfidic ores to produce sulfur dioxide which is scavenged and recovered as sulfuric acid. During the production of sulfuric acid mercury that is present in the original aore can condense in the sulfic acid at levels of ~ 2mg/L. This mercury needs to be removed from the sulfuric acid prior to it being sold commercial.

The removal of mercury from sulfuric acid is a complex process and typically involves the precipitation of mercury as mercury iodide via the addition of potassium iodide salt. The precipitant is the removed from the acid by filtration and is subsquently neutralised to remove residual acid. Although mercury iodide is insoluble under acid condistions, upon neutralization it becomes highly mobile.

Entech was presented with 300 tonnes of mercury iodide residue containing 100,000 mg/kg with TCLP leachability of 140 mg/L. In order for the waste to be disposed of it required treatment in conformance with NSW Department of Environment, Conservation and Climate Changes Immobilisation Approval scheme.

Our Solution

Entech developed the use of the Dolocrete® technology to immobilise the mercury in conformance with the above-mentioned approval. The treatment involves the mixing of a sulfide reagent with Dolocrete® with a high shear mixer in conformance with the regulators mixing policy.

Dolocrete® is a magnesium oxide-based binder prepared to a patented process from very high magnesium carbonate content dolomite or magnetite material. Depending on the waste material, a selection of proprietary catalysts can be used to facilitate the formation of chemical bonds in a mineral matrix. Dolocrete® additives and special binders work synergistically to form "a double layer" barrier, trapping the waste and repelling moisture.

The Outcome

The treatment of mercury impacted wastes using the Dolocrete® technology provided a safe, reliable and economic treatment solution.

