The First Full-Scale Activated Iron Solids (AIS) Treatment System: A Non-Chemical Active Treatment Approach for Net Alkaline Iron-Contaminated Water

By Jon Dietz

Iron Oxide Technologies, LLC has developed an innovative treatment approach for iron-contaminated waters that eliminates all alkaline and oxidant chemicals. This technology was originally bench-tested and pilot tested at a number of deep mine locations in Pennsylvania including the Scotts Tunnel discharge, Phillips discharge, and Lancashire AMD Treatment Plant. The process utilizes a unique and continuous heterogeneous oxidation process to remove iron rapidly at slightly acidic pH, thereby eliminating and need for alkaline chemicals (e.g., lime) to raise the pH or chemical oxidants (e.g., hydrogen peroxide) to remove iron. The presentation will provide an overview of the system technology and summary of the first full-scale AIS system installed to treat an iron-contaminated water containing approximately 20 mg/L.

[1] Iron Oxide Technologies, LLC,
[2]Robindale Energy, Inc.

An Innovative Treatment System for a Highly Acidic Coal Waste Discharge: Charles Coal Refuse Site

By Jon, Dietz1, Jeff Polenik2, and Jim Panaro2

The Charles Refuse AMD is a low flow (15 to 80 gpm) toe-of-refuse source water with low pH (~2), extremely high acidity (~6,000 mg/L), iron (~2,000 mg/L), aluminum (~350 mg/L), and manganese (~15 mg/L). A new treatment system was installed in the Spring of 2017 with a number of unique and innovative treatment components including powdered hydrated lime addition, lime mixing tank, oxidation reactor, effluent pumping system, geotube solids removal, and effluent polishing. The operational pH for the system is circumneutral, pH 6.8 to 7.2. All system components can be monitored continuously and remotely through a cellular/internet system. The treatment system was designed to meet stringent effluent limits including total iron of 1.5 mg/L, total manganese of 1.0 mg/L, and total aluminum of 0.75 mg/L. The system met the effluent limits at startup and has continued to achieve the limits since the system was started, despite some initial startup issues.

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