

PROJECT PROFILE SERIES #66

Aquatech Supplies Zero Liquid Discharge Treatment for FGD System at the Iatan Generating Station



The Facility

The 670-Megawatt Iatan Station 1 and the 850-Megawatt Iatan Station 2 are coal-fired electric generating stations located approximately 30 miles northwest of Kansas City, Missouri near Weston, Missouri. To meet strict air quality requirements, the facility installed a wet flue gas desulfurization (FGD) system and included an FGD wastewater treatment system. The wastewater treatment system allows the FGD scrubbers to achieve zero liquid discharge (ZLD).

The project was engineered and constructed by Burns & McDonnell for the Kansas City Power and Light utility. Iatan Generating Station 1 began operation in 1980 and Iatan Generating Station 2 will be operational in 2010. The FGD wastewater treatment system began operation in May 2009.

The Problem

To operate Iatan Generating Station 2, the Environmental discharge permits would have to be modified to allow discharge of the FGD scrubber wastewater. The permitting process can cause extensive delays to a project.

It was decided that going to Zero Liquid Discharge would improve the environmental footprint of the power station while minimizing delays to bringing Iatan Generating station 2 on line.

The Solution

Aquatech supplied a solids contact clarifier followed by two mechanical vapor compressor driven seeded slurry Brine Concentrators. The water treatment design for Iatan Station is a 1 x 60 gpm clarifier followed by 2 x 30 gpm brine concentrators operating in parallel. The Brine Concentrators reduce the volume of wastewater allowing for final disposal by mixing with fly ash.

The Iatan Station FGD scrubber blowdown contains high concentrations of hardness, chlorides and suspended solids. The first stage of the water treatment system is a solids contact clarifier to reduce the concentration of suspended solids in the feed to the evaporators. Chemicals dosed to the clarifier include coagulant and polyelectrolyte to enhance settling and removal of suspended solids. The generated sludge is dewatered with a belt press prior to disposal.

The clarified scrubber blowdown is processed by the Brine Concentrator system. A parallel configuration was designed that uses 2 x 30 gpm Brine Concentrators to reduce the wastewater volume. The Brine Concentrators produce a high purity distillate stream that is recycled to the plant's water system. The distillate purity achieved at Iatan is less than 10 ppm total dissolved solids. The concentrated wastewater leaving the Brine Concentrator system is sent to the fly ash silo where it is mixed with the fly ash for disposal at the on-site landfill.

The minimization of wastewater using evaporation and disposal of the concentrate with the fly ash is an elegant solution that avoids the higher capital and operating costs of a crystallizer and solids removal device. The high purity distillate can be used for boiler feedwater providing additional operational savings.



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DESIGN FGD WASTEWATER ANALYSIS

Design Flow Rate.....60 gpm

Calcium.....4,250 ppm
 Sodium.....590 ppm
 Iron.....15 ppm
 Sulfate.....1,320 ppm
 Fluoride.....12 ppm
 Silica28 ppm

Magnesium.....950 ppm
 Potassium.....25 ppm
 Chloride.....10,000 ppm
 Nitrates.....90 ppm
 M-Alkalinity.....20 ppm
 TSS.....30,000 ppm

