

# **SINTER PLANT DE-SCALES**

## **LEADING UNIVERSITY VERIFIES SCALE AND CORROSION CONTROL OF SCRUBBER RE-CYCLE WATER**

### **INDEPENDENT ANALYSIS OF CUSTOMER DATA CONFIRMS HYDROLATOR SUCCESS OVER CHEMICAL TREATMENT HYDROLATOR THEORY ALSO CONFIRMED.**

**ABSTRACT** - Like the blast furnace scrubber water success story before it, this report describes the spectacular de-scaling and corrosion control at this Sinter Plant site. A leading university monitoring report edited slightly is also discussed, as well as verification of HYDROLATOR theory!

**BACKGROUND** - Historically, this system has suffered from aggressive system-wide corrosion and scale build-up in the scrubber; together with sedimentary fouling throughout the piping system and hot-well. (up to 10 ft/ deep at times) Corrosion values measured since 1991 ranged from 50 to 150 MPY (mild steel) in this chemically treated system.. Although most of the system piping is interior coated or made of fiberglass, there are many mild steel components which show the ravages of corrosion levels out of the reach and control of chemical water treatment. Failures in launder welds and piping leaks have been part of the high cost of past chemical dependency.

**SINTER PLANT COOLING WATER SYSTEM DESCRIPTION** - Approximately 6700 gpm of clarified water is used to scrub process gases from the sintering plant furnace in a loop system.. Effluent from the scrubber contains particulates from the gas and ph is at 2.5. The ph is raised to 5.5 using lime slurry, and makeup water is added before it enters a 1.8 million-gallon thickener (along with underflow from the blast-furnace thickener). The particulates are removed during the retention time in the thickener. The flow next enters a cooling tower and eventually is collected in the cooling tower basin where the ph is 6.0. Makeup water is added and a blowdown of 400 gpm is made. This water is recycled to the scrubber.

**INDEPENDENT EXPERT AUDIT** - A leading University's Department of Civil Engineering team has been monitoring the HYDROLATOR installation under contract with my customer. The study was ordered to provide independent and credible witness to what the blast furnace operators already verified with their own data, that "HYDROLATOR technology was controlling corrosion and scale in the blast furnace recycle, as well as the Sinter plant far better than with chemical treatment."

The three primary factors studied: corrosion control, de-scaling and solids loading. Also, the team collected water chemistry data over the two years of the study. The funding for the study came from an Industrial Program Development contract, underwritten 50/50 by the State and my customer. The team is headed by an Associate Professor in charge of the Environmental Engineering Program in the engineering Research Center at this University. His final report is due this summer.

**NOVEMBER 21, 1996 - HYDROLATOR INSTALLED** - Two specially designed HYDROLATOR magnetic rack units were lowered by crane into each of the two launders exiting the thickener. By design, virtually all the scrubber water passes through the units which raised the electrostatic charge in the re-cycled water. (See theory discussion)

**UNIVERSITY MONITORING METHODOLOGY** - To quote in part from the University: "Water sampling began in September 1996 and (was) concluded in May 1998. During this time, HYDROLATOR (was) in place and bypassed at various intervals. The system operated without any chemical addition. This on/off cycle would be repeated throughout the two year investigation. During this time, at least weekly measurements on water quality were made. These include selected parameters from the list above. i.e.

Conductivity Temperature Zinc

Total Dissolved Solids (TDS) Alkalinity pH

Hardness Iron Sulfate

Total Suspended Solids (TSS) Chloride Turbidity

Fluoride

Analyses of all parameters were made in the Environmental Engineering Laboratory at the University. Information on any changes made that may affect water quality were logged for consideration with the water quality data analysis. The goal is to evaluate the system with HYDROLATOR installed and compare this to when HYDROLATOR is off-line."