

Spectrus* Decreases Biofouling, Improves Water Recirculation and Saves US\$19.5 Million at a South African Steel Mill

Challenge

A South African steel mill producing 3 to 3.5 million metric tons (3.3 to 3.9 million short tons) of steel per year had a huge volume of hydraulic oil and grease leakage from its twin strand casters.

Because of the leaks, hydraulic oil and grease consumption was close to twice the design value of 3,170 US gallons (12,000 liters) and 1,321 US gallons (5,000 liters) per month, respectively. The leaks resulted in poor plant availability with frequent shutdowns to clean strainers and nozzles. These unscheduled shutdowns increased from once to twice a week, each lasting six to eight hours. The mill had no provisions for this downtime, which was costing it approximately US\$80,000 per hour.

Whenever biocide was added at the dissolved air flotation (DAF) overflow, the cooling tower became cleaner but there was not enough residual to clean the rest of the system. If the biocide was added to the cooling tower sump, it resulted in a cleaner system but left the cooling tower severely fouled. Microorganisms were also becoming resistant to the biocides and the bacterial count remained high.

Solution

At a meeting with caster production and maintenance personnel, GE Water & Process Technologies was given the responsibility for bringing the situation under control. Because of the extent and unpredictability of the leakage, it recommended an aggressive system cleanup followed by an effective microbiological control program.

A task force consisting of operating, maintenance and GE personnel was formed to monitor the sys-

tem. During a downtime, the system was shock dosed with 200 ppm (mg/L) of sodium hypochlorite and 40 ppm (mg/L) of Spectrus NX1100 biocide every two hours for 24 hours. This procedure was continued until a 0.2 to 0.5 ppm (mg/L) Cl₂ free residual chlorine was achieved in the entire recirculation system.

Twice weekly thereafter, normal shock dosages were conducted at two locations. Spectrus NX1100/3/4 at 40 ppm (mg/L) and sodium hypochlorite at 100 ppm (mg/L) were fed into the cooling tower sump and the DAF overflow. In addition, chlorine gas was added to the makeup water. A satellite dosing system was installed near the police strainers and sodium hypochlorite was continuously fed at 20 ppm (mg/L) to keep the strainers clean.

Results

- Clean cooling tower, strainers, flexibles and nozzles, including low flow areas
- Microbiological count maintained at BIOSCAN* monitor reading of 300 relative light unit (RLU) and lower
- Free chlorine residual maintained in makeup at 0.05 to 2.5 ppm (mg/L) Cl₂
- Minimized downtime for maintenance
- Savings of US\$19.5 million per year
- Improved caster performance and increased equipment life



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