SITUATION
With steel prices at a premium, it is critical to minimize unscheduled downtime and meet yield expectations. At one Midwest steel mill, downtime caused by poor water quality cost the facility more than $1 million in scrapped heats due to the unavailability of the continuous caster.

The mechanical, operational and chemical (MOC) aspects of the water systems were audited by Nalco to fully understand the factors contributing to the failure of the water systems.

INITIAL CONDITIONS
A thorough review of the system uncovered three areas for improvement.

Mechanical
The facility was failing in part due to the presence of high suspended solids and oil and grease in the water. Maintenance and operational practices for the existing equipment were minimizing the effectiveness of the equipment and negatively impacting water quality. Water quality in this application was even more critical since one cooling water system supplied both the contact and the non-contact cooling water to the caster.

Operational
Several key components of the water system had gone long periods of time without proper maintenance. This caused the limited capacity of the water system to become even more stressed. Poor control of the chemical program, specifically bleach feed and phosphate control, led to increased fouling throughout the system.

Chemical
Computer modeling of the water chemistry using 3D TRASAR technology showed through proper application corrosion rates could be reduced, control of microbiological activity could be maintained, and unscheduled downtime could be minimized.

PERFORMANCE
With the limited capabilities of the equipment, it was critical to restore it to the original design. The entire water system was cleaned. Equipment that had been removed due to maintenance problems was replaced or redesigned.

Nalco’s 3D TRASAR system was also implemented. 3D TRASAR technology combines innovative chemistries, equipment, software, and communications to manage a cooling system based on the stresses placed

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upon it. 3D TRASAR technology measures the key system parameters related to system stress. When upsets are detected, appropriate actions are taken. The communications package ensures system users are kept informed at all times via pager, cell phone or DCS alarms.

By utilizing 3D TRASAR technology, proper control over the corrosion inhibitor was possible. Nalco’s Phosphino Succinic Oligomer (PSO) and High Stress Polymer (HSP)-based chemistry decreased the amount of calcium fluoride deposition in the caster.

Nalco corrosion monitors (NCM-100s) provide continuous, real-time corrosion data, indicating any performance changes in the program.

RESULTS

After the start-up of the 3D TRASAR program, the plant realized their objectives.

- For three months prior to transition to Nalco, the plant performed 7 QC (Quick Change Segment) changes because of water fouling. During the first four months of using 3D TRASAR technology, there were no QC changes related to water fouling.

- Segment changes related to bearing failures were reduced from an average of 2 per month to none. Prior bearing failures were attributed to deposition in water channels leading to overheating.

- Strainer assembly cleanings were no longer necessary beyond normal maintenance procedures. Prior to the Nalco program, cleanings were occurring at a rate of four times the normal rate due to poor microbiological control.

- Spray nozzle pluggage has been reduced to approximately 1% per week of operation. This is a reduction of 75% from prior performance.

- Quality issues on slabs have been reduced or eliminated, allowing for faster casting speeds and subsequent production increases.

What will 3D TRASAR do for you?

- Minimize spray nozzle blockages, reducing breakouts and negative product quality impacts related to non-uniform strand cooling.

- Maximize casting speeds of the machine, increasing the caster’s productivity and reducing cost/ton.

- Minimize downtime due to forced outages related to poor water treatment, increasing the caster’s productivity while reducing maintenance costs.

- Maximize segment life, reducing cost/ton by minimizing maintenance costs and maximizing output of steel.

Nalco’s 3D TRASAR, proprietary chemical programs and proven steel expertise that are focused to ensure Top Performance of continuous casting cooling systems. The value of Nalco’s offering will improve the Quality of the casted strand, increase Productivity of your caster, reduce Safety concerns and reduce the Cost/Ton of your casting operations.

In order to make a high quality steel product, and meet production quotas, water quality must remain within the tight design parameters of the continuous casting machine.

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