

3D TRASAR™ Boiler Technology Helps Australian Dairy Realize US\$ 196,000 Savings through Asset Protection and Chemical Reduction

BACKGROUND

A leading global dairy operates many processing sites in Australia. One of their plants in Melbourne, Victoria produces dairy products for both the Australian and export markets. With increasing exports, this dairy plant had made capex investments to boost production.

The capex investment included installation of new economizers to the boiler system in order to improve the overall energy efficiency. With the high capital investment in place, the plant was looking out for improved asset protection through reliable boiler water management and optimized total cost of operations.

SITUATION

The plant was equipped with three water-tube boilers with a maximum steaming rate of 15.9 tons per hour.

These boilers were experiencing the following concerns:

1. Unreliable boiler system corrosion monitoring and control
2. High chemical usage
3. Unsafe chemical storage

It is common industrial practice to use oxygen scavengers to protect boilers against corrosion. Oxygen scavengers provide corrosion protection by 'mopping' up dissolved oxygen that has escaped from the de-aerator. Without a reliable monitoring system that can provide constant feedback to the end user, it is not possible to ensure the effectiveness and economics of oxygen scavenger use.

Faced with these challenges, the plant was seeking to improve real-time monitoring and control of key chemical parameters in the boiler system and also to ensure demand-based dosing of boiler treatment chemicals (scale inhibitor, oxygen scavenger, and

CUSTOMER IMPACT

Prevention of Economizer corrosion

eROI™



ASSETS

ECONOMIC RESULTS

Savings of US\$ 185,000 on economizer replacement cost

Reduced boiler chemical usage by 1.5 tons



WASTE

Savings of US\$ 11,000 per year on reduced chemical usage

alkalinity control). This control would eventually protect the economizers and boiler system from corrosion, improve asset reliability and reduce operation cost through chemical savings.

SOLUTION

Following a detailed Mechanical - Operational - Chemical survey of the boiler system, Nalco Water introduced 3D TRASAR Technology for Boilers.

3D TRASAR Technology provided significant benefits to the dairy plant by continuously monitoring boiler feed water quality and treatment program activates, immediately responding to the changing conditions and keeping the stakeholders informed of the overall boiler performance.

The innovative Nalco Water Corrosion Stress Monitor™ (NCSM), part of the 3D TRASAR Technology for Boilers, provided superior boiler corrosion control. The NCSM measures the actual oxidation/reduction potential (ORP) of the feedwater at actual boiler operating temperatures and pressures and responds by adjusting the oxygen scavenger dosage to maintain a set ORP level at all times.

AT ORP trend

Positive values of AT ORP indicate high Dissolved Oxygen (DO) levels/ corrosive water and negative values of AT ORP indicate lesser DO levels/less corrosive water. AT ORP of -650 mV indicates '0' ppb of dissolved oxygen. Figure 2 shows AT ORP trend against the feedwater temperature.

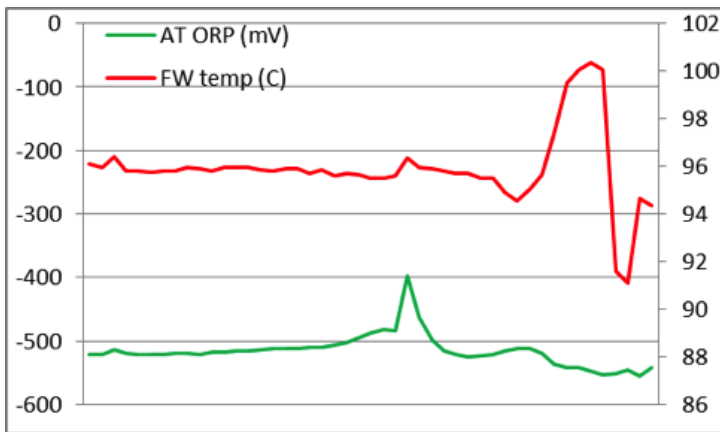


Figure 1 - AT ORP and feedwater temperature.

AT ORP values are affected by deaerator temperature. When temperature is high, AT ORP values shift towards negative values, indicating less DO and less corrosive atmosphere. In response to this, oxygen scavenger (780) pump optimizes the chemical dosage by dosing less chemi-

cal. When temperature decreases, value of AT ORP shifts to positive, which is indicative of higher DO and more corrosive environment in the boiler system. In response to this, oxygen scavenger pump doses more chemicals.

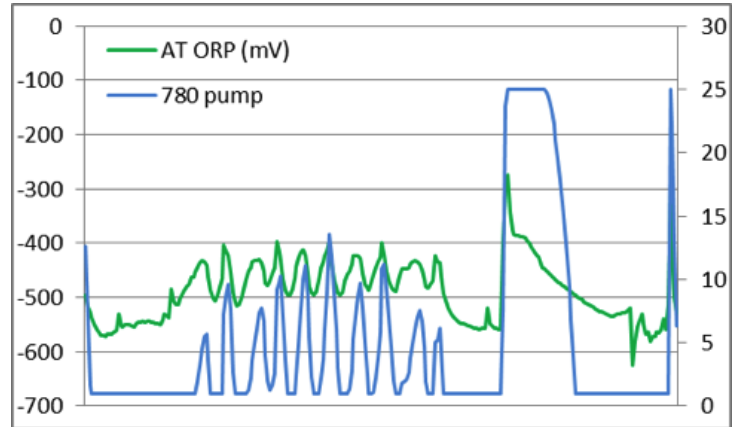


Figure 2 - Oxygen scavenger pump response to the varying AT ORP levels

The mini PORTA-FEED™ system and Tank Level Monitoring (TLM) system eliminated the need to handle chemicals. Since these systems were linked to the 3D TRASAR Controller, the plant was able to gain easy access to useful information such as water consumption, chemical usage rates and low stock level alarms, which greatly improved chemical inventory management.

RESULTS

The dairy plant derived the following benefits after implementation of Nalco Water's 3D TRASAR Technology for Boilers:

Asset Reliability:

The value derived from the use of the 3D TRASAR Technology for Boilers at this dairy plant has been largely preventative in nature. The technology ensured superior feedwater corrosion control thus maximizing the life and performance of the new economizers, and saving an estimated US\$ 185,000 in replacement cost.

Chemical Reduction:

The Nalco Water chemical treatment regimen enabled variable dosing based on system demand thus minimizing the chance of chemical overdose. A total savings of US\$ 5,360 in boiler chemical was achieved, equating to an annual saving of around US\$ 11,000. The use of Nalco Water's 3D TRASAR monitoring and control system was the key to managing a 'demand based' chemical feed to the boiler system instead of the conventional practice of using best estimates and manual settings.

Table 1 - Chemical usage comparison

Chemical Names	July 2012-Jan 2013	July 2011-Jan 2012	Variance	Variance %
22310	US\$ 7,450	US\$ 7,028	US\$ 424	6%
2584	US\$ 2,421	US\$ 6,855	-US\$ 4,433	-65%
780	US\$ 1,520	US\$ 2,870	-US\$ 1,350	-47%
Boiler Water (Total)	US\$ 11,392	US\$ 16,750	-US\$ 5,360	-32%

Improved Safety:

The installation of the mini PORTA-FEED system has eliminated the need to handle chemicals.

Intelligent Chemical Stock Management:

The Tank Level Monitoring (TLM) system monitors product levels remotely. This information is made available over the Internet to improve chemical inventory management. The TLM system is also used in conjunction with the 3D TRASAR unit which has enabled the monitoring of other parameters such as feedwater flow rates and chemical usage rates. A reordering alarm at a level of 70 lit has been set to avoid chemical low/no-stock situations.

Peace of Mind

Data for optimization and performance monitoring is available around the clock to operators and Nalco Water. All key parameters have been set up to provide alarms in the

event of any excursions. This has been successfully implemented when there have been alarms due to plant shut downs or any other issues. Operators now understand and have an insight into their steam generating operations that they did not have previously. This has allowed for faster and more accurate actions to be taken to address out of control situations.



Figure 3 - Installed 3D TRASAR unit at the plant site

CONCLUSION

Nalco Water's 3D TRASAR Technology for Boilers combined with mini PORTA-FEED and Tank level monitoring (TLM) systems have been successful in providing effective water treatment for the boiler systems at this dairy plant. The result has been reduced total operating costs, enhanced equipment reliability and longevity, improved safety and increased peace of mind for the plant engineers.

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