

New Zealand fellmongery cleans boiler scale and reduces energy costs

Implementation of boiler water management best practices and use of Visentia's V-GUARD* range of boiler water chemicals is key

Situation

During the annual boiler inspection, a New Zealand fellmongery discovered that they had a heavily fouled boiler. There was a large amount of scale and deposits present on the boiler drums and tubes.

Visentia were asked to review the steam cycle system and water treatment practices on site and make recommendations in order to reverse this situation.

The steam cycle system review conducted by Visentia found several areas of concern that were contributing to the boiler fouling.

A significant issue was that the steam and condensate system was being contaminated intermittently by process waters containing large amounts of dissolved organic and inorganic material. This was traced to heat exchangers in a specific area of the plant. Normal practice during such leakage events is to dump condensate to sewer rather than returned to the boiler house for feedwater. However, the contaminated condensate events can't be detected immediately; normally action is taken once the contamination has manifested itself in the boiler water chemistry several days later by such time the contamination would have done a lot of irreversible damage to the boiler internals.

A second area of concern was the quality of the boiler feedwater makeup coming from the softener system. The softener system was found to be slipping hardness due to fouled and exhausted resin. Hardness entering the boiler can overwhelm the internal chemical treatment programme and precipitate to form hard scale deposits on the tubes.

Lastly, condensate pH levels were found to be too low, which were causing corrosion of the condensate system and high levels of iron being returned to the boiler. Suspended iron oxides are problematic to the boiler since they are difficult to remove by blow down and can readily adhere to heat transfer surfaces and increase the bulk of hardness deposits.

Solution

Based on the findings of the system survey, Visentia recommended several changes to implement in order to mitigate the fouling problems:

1. Installation of sensors and automation to monitor the condition of the condensate continuously, so that it can be dumped automatically when a contamination slug is detected.
2. Chemical dosing of the boiler using Visentia's V-GUARD internal treatment products to prevent scale and corrosion. Specially formulated to provide robust control of boiler water during feed water quality incidents and to clean-up scaled boilers over time.
3. Application of Visentia's V-COR corrosion inhibitor to the condensate system to reduce return of iron to the boiler.
4. Replacement of softener resin and appropriate preventative maintenance to ensure reliable operation and good quality feedwater makeup.
5. Water treatment chemistry training for boiler water operators.
6. Regular review of boiler water chemistry testing results with Visentia water treatment consultants.

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Results

As a result of implementing the recommended changes, the fellmongery reported the following benefits:

1. A 50% reduction in boiler water chemical costs due to improved feedwater quality to the boiler.
2. Over the following 2 years, the internal boiler condition showed steady improvement in levels of fouling due to V-GUARD programme providing on line cleaning of old scale deposits.
3. A 5% reduction in energy cost due to improved condensate recovery and improved heat transfer.

This case study highlights the importance of doing the basics well with regard to monitoring and controlling boiler feedwater quality and using the right chemicals for the system requirements.



Plate 1: Photograph of mud drum and boiler tubes taken during annual inspection showing the gradual clean-up of the boiler fouling due to use of Visentia V-GUARD internal boiler treatment.

Further Information

If you require any further details on Visentia's total system approach to steam cycle protection or the V-GUARD range of products, please contact your local Visentia water treatment consultant or call directly to our Auckland head office on +64 9 216 9824.