



PO Box 1037 TCAS, Blountville, TN 37617
P: 423.323.4195, 800.999.4195
f: 423.323.4908

PO Box 30731, Knoxville, TN 37930
P: 865.984.3430, 800.999.4195
f: 865.983.9686

PO Box 2820, Greenville, SC 29602
P: 864.295.9500, 800.358.9981
f: 864.295.1360

PO Box 1839, Skyland, NC 28776-1839
P: 828.251.2420, 800.999.4195
f: 423.323.4908

Date: May 4, 2010
To: Water Solutions Engineering Customer
Subject: Boiler Inspection on April 29, 2010

Background

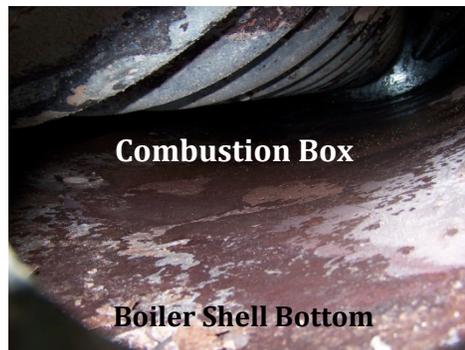
One (1) gas fired 250 HP boiler is used to supply steam needed for multiple processes throughout the facility. It is estimated that approximately 75% of the condensate (condensed steam) is returned to the boiler. In mid 2009, a water softener was installed to provide softened make-up to the boiler; however, prior to that the boiler make-up water was unsoftened city water. The boiler water treatment chemical to control scale and corrosion inside the boiler as well as throughout the steam piping is added using a SeaMetrics PT35 pulse timer connected to the make-up flow meter. The boiler is blown down daily by maintenance and both bottom blow downs and surface blow downs are performed. However, the conductivity inside the boiler is not controlled or maintained within limits. Typically and at each annual inspection, approximately 5-7 pails (5 gallon) of scale has been removed from this boiler.

Inspection

On Thursday April 29, 2010 the boiler was cooled, drained, and two ports (front and top) were removed to view the water side of the boiler. In addition, the fire side door was opened to view this section of the boiler. Only one (1) 5 gallon pail of scale was removed from the boiler.

Front Port—Boiler Shell Bottom

Pictures were taken through the front port (see below) and, as you can see, the boiler has some scale but very minimal.



PO Box 1037 TCAS, Blountville, TN 37617
P: 423.323.4195, 800.999.4195
f: 423.323.4908

PO Box 30731, Knoxville, TN 37930
P: 865.984.3430, 800.999.4195
f: 865.983.9686

PO Box 2820, Greenville, SC 29602
P: 864.295.9500, 800.358.9981
f: 864.295.1360

PO Box 1839, Skyland, NC 28776-1839
P: 828.251.2420, 800.999.4195
f: 423.323.4908

Top Port—Top Section of Fire Tubes (Water Side)

Pictures were taken through the top port (see below) and, as you can see, the fire tubes have some scale on the water side but minimal amounts. Some iron flaking of the pipes is evident but nothing to be concerned about at this time.



Fire Tube (Water Side)

Fire Side of the Fire Tubes and the Open End of the Fire Section

The fire section of the boiler was inspected and there were not any evidence of fire side or fuel deposits. JCI was working to repair the insulation and insulation sheft that was damaged. Pictures are below.



Fire Side of Fire Tubes



Fire Section of Boiler



PO Box 1037 TCAS, Blountville, TN 37617
P: 423.323.4195, 800.999.4195
f: 423.323.4908

PO Box 30731, Knoxville, TN 37930
P: 865.984.3430, 800.999.4195
f: 865.983.9686

PO Box 2820, Greenville, SC 29602
P: 864.295.9500, 800.358.9981
f: 864.295.1360

PO Box 1839, Skyland, NC 28776-1839
P: 828.251.2420, 800.999.4195
f: 423.323.4908

Conclusion

It is evident in the scale reduction that the addition of the softener in 2009 made a drastic improvement in the overall operation and condition of this boiler. With the addition of the boiler controller after this inspection, we expect the boiler inspection in 2010 to be even better. Not only should the boiler open up cleaner with less corrosion, but it will also produce steam more efficiently as the scale will not be present to act as an insulator on the tubes.

Thank you for your business and please let us know if you have any questions about this report.

Water Solutions Engineering