

Boiler Room Care (part 2)
by Harry de Jong

Daily Maintenance

Check water level.

An unstable water level can indicate excessive solids or water treatment, contamination from oil, overload or control malfunction. Upon entering the boiler room, check to ensure there is water in the gauge class.

Blow down boiler.

Blow down boiler in accordance with the recommendation of your feedwater consultant.

Blow down water level controls to purge float bowl of possible sediment accumulation.

Check combustion visually.

Look at the flame to see if something has changed. Changes may be an indication that a problem is developing.

Treat water according to the established program.

Add chemicals and take tests as outlined by consultant.

Record boiler operating pressure or temperature.

Excessive steam or water temperature drop will alert you to excessive loading on the boiler.

Record feedwater pressure and temperature.

Change in pressure or temperature may indicate a problem is developing with feed system.

Record stack temperature.

Changes in stack temperatures could indicate a boiler heat transfer problem.

Record oil pressure and temperature.

Changes in pressure and/or temperature could influence combustion in the boiler.

Record oil atomizing pressure.

Changes in pressure could influence combustion in the boiler.

Record gas pressure.

Changes in pressure could influence combustion in the boiler.

Check general boiler/burner operation.

Maintaining top efficiency is the simple and basic reason for having operating personnel.

Record boiler water supply and return temperatures.

Check temperatures to detect system changes.

Record makeup water usage.

Excessive makeup water could be an indication of system problems in both steam and hot water systems.

Weekly Maintenance

Check for tight closing of fuel valves.

Check to ensure fuel does not flow through the fuel valve(s) when the burner is shut off.

Check fuel and air linkages.

Check to ensure all set screws on linkages are tight and securely holding the linkage in place.

Check indicating lights and alarms.

Check for burned out or loose light bulbs. Also check to ensure the alarm bell or horn sound on the

appropriate shut down condition.

Check operating and limit controls.

Check to ensure the controls shut the burner down at their predetermined set point. Settings should be verified with actual pressures and temperatures on the boiler gauges.

Check safety and interlock controls.

Check to ensure the controls shut the burner down at their predetermined set point. Settings should be verified with actual pressures and temperatures on the boiler gauges.

Check safety and interlock controls.

Check to ensure the controls shut the burner down at their predetermined set point. Settings should be verified with actual pressures and temperatures on the boiler gauges.

Check for leaks, noise, vibration, unusual conditions, etc.

Checking for these items is a cost-effective way to detect system operational changes.

Check operation of all motors.

By developing a routine, any change in operation or bearing temperature will usually be caught in time to avoid a failure.

Check lubricating levels.

Check levels of any oil bath filters, oil level in air/oil tank, oilers on pumps, etc. Add oil in accordance with the manufacturer's recommendations.

Check flame scanner assembly.

Using the appropriate meter, check the flame signal strength at the program relay flame amplifier.

Ensure the scanner assembly is clean and dry.

Check packing glands on all pumps and metering devices.

Proper tension on packing glands will extend life of equipment.

Check gauge glass.

Ensure there are no cracks or etching in the glass or leakage around the packing.

Check operation of water level controls.

Stop the boiler feed pump and allow control to stop the boiler under normal low fire conditions. See your operating and maintenance manual for a more detailed procedure.

Monthly Maintenance

Inspect burner operation.

Visually inspect the pilot flame, main burner flame throughout the firing range, free movement of linkages and general burner operation.

Analyze combustion.

Take the flue gas analysis over the entire firing range, comparing these and stack temperature readings with previous month.

Check cams.

Inspect cam springs for scoring, tightness of set screws, free movement, alignment of cam followers, etc.

Check for flue gas leaks.

Ensure something hasn't changed in the breeching, stack or overall system that allows flue gas to be drawn into the boiler room.

Inspect for hot spots.

Inspect the boiler to ensure no hot spots are developing on the outside of the boiler. Hot spots can indicate a refractory failure or baffle failure, thus causing improper gas flow through the boiler.

Inspect burner operation.

Visually inspect the pilot flame, main burner flame throughout the firing range, free movement of

linkages and general burner operation.

Analyze combustion.

Take the flue gas analysis over the entire firing range, comparing these and stack temperature readings with previous month.

Check cams.

Inspect cam springs for scoring, tightness of set screws, free movement, alignment of cam followers, etc.

Check for flue gas leaks.

Ensure something hasn't changed in the breeching, stack or overall system that allows flue gas to be drawn into the boiler room.

Semi-Annual Maintenance

Clean low water cutoff (s).

Remove head assembly or probes, inspect and clean out any sediment or contamination in the column or piping. If the condition exists, determine why.

Check oil preheaters.

Remove the heating element and inspect for sludge or scale.

Inspect refractory.

Immediately upon opening fireside areas, give the refractories an inspection and start repairs if necessary, as soon as possible. Read and follow refractory instructions.

Clean oil pump strainer and filter.

Ensure they are not plugged, thus reducing the flow of the required oil to the burner.

Clean air cleaner and air/oil tank.

Inspect and clean out any sediment or contamination. Add oil in accordance with the manufacturer's recommendations.

Check pump coupling alignment.

Check alignment of all couplings to ensure the tolerances are within the manufacturer's recommendations.

Reset Combustion.

The entire combustion process should be carefully checked, 02 readings taken, and necessary burner adjustments made. Make certain the readings are recorded and used as a basis of comparison for future tests. Combustion adjustments should only be made by those thoroughly familiar with all aspects of burner adjustment and combustion.

Inspect mercury switches.

Inspect mercury switches for contamination, loss of mercury, and cracked or broken wires. Replace if any of these conditions are found.

Annual Maintenance

Note:

Coordinate maintenance with the annual pressure vessel inspection performed by insurance or government groups. Establish a firm procedure with all outside inspection groups so that your equipment will be in a proper state of readiness. As a matter of routine, establish a procedure using good safety practices whenever a boiler is taken off the line, such as disconnecting all power supplies and locking switches in the off position. Whenever there is more than one boiler connected to a common header, establish routine procedure of locking the header valve on any unit that is down for cleaning or inspection, etc.

Clean fireside surfaces.

Brush the surface or use a powerful vacuum cleaner to remove soot. After the cleaning process and if boiler is to be left open, spray all fireside surfaces with some type of corrosion preventative.

Clean breeching.

Inspect breeching and stack and remove any soot build up.

Clean waterside surfaces.

Remove all handhole and manway plates, inspection plugs from water column tees and crosses, float assemblies from water columns and thoroughly wash all waterside surfaces.

Check oil storage tanks.

Oil storage tanks should be inspected for sludge and water accumulation. Keep tank filled with oil to prevent condensation during summertime.

Check fluid levels on all hydraulic valves.

If any leakage is apparent, take positive corrective action immediately.

Check gauge glass for possible replacement.

If internal erosion at water level is noted, replace with new glass and gaskets. On all unattended boilers, the gauge glass mounting should be of the safety style with stop checks in case of glass breakage.

Remove and recondition safety valves.

Have them reconditioned by an authorized safety valve facility. The safety valve is the most important device but receives less attention than any other device on the boiler.

If oil fuels are used, check on the condition of the fuel pump.

Fuel pumps wear out, and annual inspection is the opportune time to rebuild or replace them.

Boiler feed pumps.

Strainers should be reconditioned. Feed pump elements wear and must be replaced. Sometimes a review of the condensate return system and chemical feed arrangement will reveal causes of short pump life.

Condensate receivers.

Empty and wash out. Make an internal inspection, if possible. If the receiver has a make-up valve mounted, it should be overhauled and checked for proper operation.

Chemical feed systems.

Completely empty, flush and condition. Metering valves or pumps should be reconditioned also.

Tighten all electrical terminals.

All terminals should be checked for tightness, particularly on starters and movable relays.

Check deaerator or boiler feed systems.

Inspect to ensure they are not contaminated, corrosion is not taking place, lining has deteriorated and fallen off, etc.

Check linkages.

Check to ensure the linkage ball connectors have not worn out. Worn connectors can cause hysteresis in the linkage and result in unrepeatable excess air levels in the combustion process.

Above information for this article was provided by Harry de Jong of Canadian Boiler Industriess Ltd. For further information regarding boilers and boiler maintenance phone Harry at 255-0186

First published in the BOA Magazine, January 1997