The Importance of Routine Onsite Monitoring

Water treatment is critical preventative maintenance for steam boiler systems. Failure to maintain the water treatment program within the specified ranges will reduce boiler life, efficiency, reliability, and safety and can result in unexpected failure. Regardless of how much the water treatment program is automated or how often the water treatment company representative services your facility, an in-plant monitoring program is necessary to prevent minor concerns from developing into major problems. Below are general monitoring and control guidelines.

1. **Flush and test Low Water Cut Off (LWCO) devices**
   - LWCO devices shut off fuel to the burner in the event of a low water condition and are a very important safety feature. For safe boiler operation, all LWCO devices must be maintained and tested per the manufacturer’s recommendations and any regulatory guidelines that may apply.

2. **Check softener(s) daily to ensure proper operation**
   - Check to make sure the proper salt level is maintained in brine tank. Add additional salt as necessary to keep enough solid salt for a least one regeneration.
   - Check Total Hardness of softener effluent to make sure it is soft (<1 ppm). If it is not soft (hard), regenerate the softener immediately and then retest to verify that soft water is being produced. Determine why softener tested hard. If necessary, increase regeneration frequency.
   - Do not ignore softener problems even for a short period of time. Hard makeup water causes energy-robbing scale deposits and increases chemical requirements. Call your softener and/or water treatment service company for assistance if the cause of the hard water cannot be readily corrected.

3. **The importance of good boiler blowdown control**
   - Blowdown is used to keep dissolved and suspended solids in the boiler water from over-concentrating and causing problems. Too much blowdown is bad because it increases fuel, water, and chemical requirements. Too little blowdown is bad because it causes scale formation and wet steam. The ideal (target) blowdown rate for a particular boiler system is a function of the makeup water quality, boiler design and operating conditions, feed/control equipment, treatment chemicals, and degree of onsite monitoring. Your water treatment representative will evaluate these factors and provide site specific guidelines.
   - Always consult the boiler manufacturer’s guidelines regarding exact blowdown points and procedures.

4. **Bottom blowdown boiler(s) daily**
   - Operating boilers require at least one daily bottom blowdown to purge suspended solids, even if automatic blowdown control is used. More frequent bottom blowdowns may be specified. The bottom blowdown rate should be at least doubled if experiencing softener problems.

5. **Check and adjust boiler blowdown rate to maintain the target cycles control test range**
   - The blowdown rate is monitored via a water test that reflects the “cycles of concentration” in the boiler. Your water treatment consultant will determine the blowdown test parameter (typically conductivity, chlorides, silica, or alkalinity) and the test control range that is appropriate for your system. By comparing the boiler test result with the target cycles test control range, you can determine whether the blowdown rate is within range or needs to be decreased or increased.
   - Increasing the blowdown rate will lower the cycles test result, while decreasing the blowdown rate will increase the cycles test result.
   - The guidelines for adjusting the boiler blowdown rate in response to test results varies based on the blowdown control method used for cycle control.
     - If bottom blowdowns are used exclusively for cycle control, the frequency and duration of the bottom blowdowns should be adjusted to maintain the cycles in target test control range.
       - To lower the cycles into the target control range, increase the bottom blowdown frequency.
       - To increase the cycles into the target control range, reduce the bottom blowdown frequency.
       - Avoid less frequent, long bottom blowdowns in favor of more frequent, shorter bottom blowdowns.
b. If continuous surface blowdown is used for cycle control, check to make sure the graduated needle valve or orifice is not plugged.
   i. To lower the cycles into the target control range, increase the needle valve setting or orifice size.
   ii. To increase the cycles into the target control range, reduce the needle valve setting or orifice size.

c. If automatic surface blowdown is used for conductivity (cycle) control, check bleed controller readout for high/low conductivity reading.
   i. If boiler conductivity is significantly below set point (low), check for leaking bottom or surface blowdown valves.
   ii. If boiler conductivity is significantly above set point (high), check for blocked surface blowdown valve.
   iii. If controller operation is suspect, compare controller conductivity reading to hand-held meter reading. If appreciably different, clean conductivity probe and recalibrate controller.
   iv. Check blowdown controller for any other alarm conditions and respond appropriately.

6. **Check operation of chemical feed and control equipment**
   A. Check chemical pumps for prime and operation. Re-prime or repair as needed.
   B. Inspect chemical feed system for leakage. Repair as needed.
   C. Check inventory in chemical feed/storage containers. Verify chemical levels in container are dropping as expected. Change out chemical containers as necessary to ensure uninterrupted feed. Place orders for replacement product on a timely basis.

7. **Onsite water testing**
   A. An onsite testing program helps verify the proper blowdown and chemical levels are consistently maintained. All test results and corrective measures should be logged for review by your water treatment representative.
   B. A site-specific testing program should be provided based on the makeup water quality, boiler design and operating conditions, feed/control equipment, and treatment chemicals being used.

8. **It is very important to promptly communicate any problems, questions as to procedures, and system inspections to your water treatment representative.**