"Cooling Systems Problems"

When Chemistry lab personnel experience troubles with a sampling system, they usually summon an instrument technician. In many cases, they might better call for a plumber! In this cyberspace era, cooling water (CW) problems are still quite common in the power plant and can lead to serious inaccuracies in chemistry results.

Symptoms of CW problems include:

1. The grab sample outlet temperature is too hot for the operators to handle so they reduce sample flow to a trickle. At very low flowrates, the sample is no longer contemporary - it`s ancient history. In addition, some species may plate out on the tube wall and never reach the sample station.

2. Analyzer readings do not agree with lab results.

3. Sample lines become plugged because velocities are too low to keep corrosion products moving through the system.

4. The secondary system chiller kicks out on overload.

5. Stress corrosion or fatigue failures of the sample cooler tube. At low CW flowrates, localized boiling can occur at the tube surface even though the total CW temperature does not approach the boiling point. As the steam bubbles reenter the stream, they are rapidly condensed - promoting shock waves which can cause vibration and eventual failure of the tube. If there are any chlorides in the CW, these are concentrated under the steam bubbles and can cause stress corrosion cracks.

Troubleshooting:

Since secondary coolers are usually served by a dedicated closed loop system, the following comments apply to the primary system even though the effects may first be noticed in the secondary system.

(continued on next page)

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(continued from previous page)

First check sample flow rates. Remember to read the total flow going through the cooler. You may need a stop watch and measuring cup to do this. Normal flows are in the 1000 to 1200 cc/min range. Reduce the flow to that level if necessary.

Some newer systems are specified for higher flow rates than above. In such a case verify with Sentry that the cooler is large enough to handle the measured flow.

If the sample flow rates appear to be in order, check for sufficient CW flow. The overall temperature rise of the CW will normally be about 20 to 25°C (45°F). If the CW temperature rise is excessive, the CW flow is probably too low. A rattling sound from the sample cooler is an indicator of localized boiling and should be immediately investigated. Check with Sentry for possible remedies.

If the cooler is properly sized and flow rates are okay, then the culprit is likely to be poor heat transfer. In other words the sample cooler is fouled or scaled. Verify this by disassembling a cooler for inspection. If the tubing is scaled (hard baked on deposit), or covered with slime, silt, rust etc., a source of clean softened cooling water is needed. If this is not available, contact Sentry regarding a closed loop CW system.

For more information on CW problems and solutions, ask for Bulletin 8.5.1

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