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'Providing Tribological Solutions'

Technical Note

Siemens Westinghouse Steam Turbine Controls Systems
Fluid Sample Locations

Background: Most turbine OEM's provide a sample point for fluid condition monitoring samples. However, the actual location and the suitability can vary considerably. In the case of many Siemens Westinghouse units the sample is the fluid returning to the reservoir but the specifics can be quite different. The best location is on a flowing line and where the fluid is turbulent. Laminar is not as good because there might be some particle segregation. At an elbow can be good location but it should not be on the inside or outside where there will be centrifugal force affects. On a dead headed line to a pressure gauge is also considered to be a poor location and considerably increases the amount of fluid that would have be flushed to get some representative samples. Rules of thumb are that 3-5 times the volume of the upstream lines and static components must be flushed. Even a sample valve on a flowing line should be flushed first.

Sampling Basics

1. Verify the sample point and procedure by taking a consecutive series of samples for particle counting to see how sensitive the location is to touching the valve and how much fluid must be flushed. The counts should be higher at first and then level out followed by a spike when the valve is closed.

2. Have at least two containers or a sample bottle and a pail to flush the line. Do not adjust or even touch or bump the sample bottle against the sample valve while it is being filled. Note: Do not touch the sample valve during filling and only close the sample valve after the sample bottle has been moved out of the fluid stream.

3. Use sample bottles that are known to be consistently clean. Flush it out 3 times with the fluid if in doubt.

4. Only fill the samples bottles 3/4 full to allow for expansion and later agitation prior to sample splitting at the test lab.

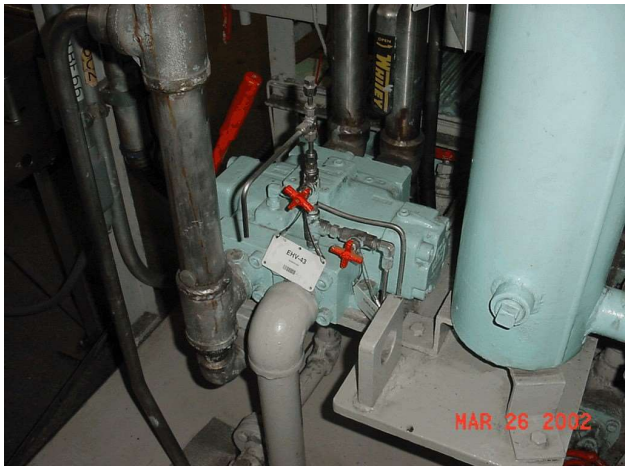
5. Have an approved and suitably reviewed sampling procedure.

6. Have the person taking the sample identified in some manner on the sample bottle information.

7. Have some form of feedback for the person taking the samples.

8. Take action when you get high counts. Doing nothing is a decision.

Showing sample valve on return line. While off the side of a vertical portion of the main line and after an elbow it is actually on a deadheaded line to a pressure gauge and is taken off of the bottom of the sample line. Not good.



Showing sample valve on the return line.
Valve is at the inlet to the directional valve in the top of the housing shortly after an elbow. Better location.

Showing sample valve on return line. Location is on a long dead headed line to a pressure gauge and after a long vertical down leg of the main line. Not good.

Showing sample valve on return line. Valve is at the top of an elbow on the supply to the directional valve and it has a long goose neck. This goose neck should not be inserted into the sample bottle.