

Stamm, Eric

From: Tsao, John - NVR
Sent: Monday, August 31, 2009 12:52 PM
To: Michel, Eric
Subject: RE: Oconee--comments on ASW pipe leak PDO

Eric,
you are welcome. you raised a lot of good questions regarding the use of GL 90-05.

Thanks.

John

From: Michel, Eric
Sent: Monday, August 31, 2009 12:49 PM
To: Tsao, John
Subject: RE: Oconee--comments on ASW pipe leak PDO

John,

Thanks for taking a look at this. I'll discuss with my branch chief (Mark Franke).

Eric

From: Tsao, John
Sent: Monday, August 31, 2009 11:07 AM
To: Michel, Eric
Subject: Oconee--comments on ASW pipe leak PDO

Eric,

My comments on the Oconee's PDO are contained in the attached writeup.

Thanks.

John

B/15

Hi Eric

Whenever there is a pipe leak and the licensee does not repair the degraded pipe, I would put more faith on the licensee's proposed augmented inspections and corrective actions than their stress analyses and/or flaw evaluations because inspections provide information on real flaw growth whereas analyses provide only estimations. As for Oconee, I find that the licensee's proposed daily UT of the pipe and monitoring coolant in the pipe to avoid water hammer is excellent because the daily monitoring provides surveillance on the leak rate and pin hole size. I did not perform an independent analysis to verify the licensee's flaw evaluation or water hammer calculations.

In any event, here are my comments on the licensee's prompt determination of operability (PDO).

1. The licensee did not analyze flaw growth in its flaw evaluation. It is not clear when the modification will be performed. The flaw growth should be calculated from the time of the detection to the time of modification completion to ensure that the final pin hole size will still be within the allowable leakage size and the final leak rate will still be within the allowable leak rate of 9 gpm. However, I do not think that the pin hole size will grow much in the next 6 to 12 months (this is just my gut feeling) because there will be no pressure in the pipe to open up the pin hole and the system is not needed for normal operation. The water in the pipe is stagnant. The only force exerting on the pin hole is a static head of 25 psi. The corrosion rate is not aggressive to open up the pin hole.

2. The water hammer calculation looks okay. However, the calculation contains too many assumptions that I cannot verify. Also, the licensee assumed many valve alignments as shown on pages 5 and 6 that I do not understand. Nevertheless, the impact of water hammer probably will not cause pipe rupture. In addition, the probability is low that the ASW system will be used between now and the modification is complete because the licensee stated that the ASW has never been used. The water hammer loads (13.3 lbs and 53.1 lbs) seem to be on the ball park and are small for a 6 inch pipe. Even if the loads are 10 times more than the licensee's calculation, I think that the pipe can still take the loads.

The concern about water hammer is that the thrust of the slug of water may damage the pipe supports which may be torn from the base anchor plates at the wall. The pipe may fall from the supports and the system becomes inoperable. Most of the subject pipe is buried underground and is penetrated through concrete wall with a solid anchor. The buried pipe is restrained sufficiently by backfill; therefore, it should be able to support the water hammer.

3. From the functionality of the system viewpoint, the allowable leak rate is 9 gpm. The estimated leak rate from the pin hole is 0.3 gpm at 825 lbs of pressure and 0.4 gpm at 1150 lbs of pressure. Assuming when the ASW pump starts and pressure reached to 1150 lbs, the leak rate (0.4 gpm) is still one order of magnitude less than the allowable. There is a lot of safety margin.

The allowable flaw size is 1.35 inch diameter hole. The detected hole diameter is 0.02 inches. There is almost two order of magnitude margin in the pin hole size.

4. The degradation mechanism evaluation seems to be okay. Originally I thought the pin hole may be caused by microbiological influenced corrosion because I thought the pipe contains raw water from the lake and water in the pipe is stagnant. However, the licensee stated that the subject pipe contains demineralized water (see the middle of page 12), not raw water from the lake. If it is demineralized water the potential for MIC should be small. Based on the licensee's UT, the licensee sees the pin hole as originated from outside surface. I agree with the licensee's conclusion based on its UT.