

Conference Call – Containment Liner Corrosion

Tuesday, August 26, 2009 11:30am

Participants

FENOC

Cliff Custer	Mark Manoleras	Carmen Mancuso	Dave Price
Dave Grabski	Steve Buffington	Tom Westbrook	Ken Frederick
Jack Patterson	Joe Tweddell	Glenn Ritz	Jim Hester
Larry Corr (Westinghouse)			

NRC

Kent Howard	Allen Hiser	Hansraj Ashar	Abdul Sheikh
Kamal Manoly	Rajender Auluck		

Discussion

NRC (KH) The purpose of this phone call is to clarify certain issues as outlined in my recent e-mail in order to prepare for the upcoming ACRS meeting. Issue #1 - The applicant should be able to defend the 75 randomly selected locations. The NRC should be ready to explain why we agree. This is important because of the existing of corrosion discovered in April.

FENOC (CC) Our plan will include 75 random samples plus the non-random samples. The 75 random samples will be done on accessible portions of the liner, limited by the physical limitation of the NDE technology. The selection method will be random, consistent with NUREG-1475 and adequate to provide a 95/95 confidence level regarding the lack of corrosion which is a commonly used standard. The sampling will establish information regarding all areas.

NRC (HA) IWE has a 95/95 confidence standard in it. Are you compliant with ASME?

FENOC (DG) We are not in code space. We used the guidelines of IWE to determine a 95/95 confidence level sample count. We are not doing augmented inspections. We are not in IWE.

NRC (AH) If there is no degradation, 75 samples will give you 95/95. Since you had degradation, how does that affect 95/95? This is a statistical question.

FENOC (DG) We are trying to determine the condition of the unknown areas.

NRC (AH) We're trying to attain feedback for the ACRS. If you already have corrosion why are you sampling? Statistical sampling assumes everything is clean. Does having previous failures increase the likelihood?

FENOC (DG) Our root cause was foreign material. There is no guidance regarding debris. Our sampling plan assumes no corrosion.

FENOC (CC) Our plan will provide information about areas not inspected, complemented with the visual inspection, and complemented with the non-random inspections.

NRC (HA?) The selection of 75 locations does not assume known degradation.

NRC (AH) It would it be appropriate if it was all clean. Would it be 75 of 77 locations?

FENOC (CC) No. 75 addresses areas not looked at. Plus we have the additional plans.

NRC (AH) We know the ACRS will be asking about this.

NRC (HA?) You are going to exclude two locations?

FENOC (CC) Yes. They are not included. The population size and confidence level are based on the unknown areas.

NRC (KH) Issue #2 – Is Kriging analysis applicable? We want to discuss this because Dana Powers specifically mentioned this.

FENOC (CC) Kriging analysis is not applicable. The 75 random locations yields better confidence.

NRC (HA?) It will be Dana Powers' first question. Did you consider Kriging? And if not, why not?

FENOC (CC) Kriging assumes known mean, covariance and other statistical facts that we do not have. It is used for widely spaced samples, such as geographical analyses. It is not applicable for details we are considering.

FENOC (MM) We will provide a slide detailing that NUREG-1475 techniques are better than Kriging.

NRC (RA?) Will Kriging be used once you have all the sampling data, from the 75 plus 8?

FENOC (MM) If we were analyzing general corrosion, Kriging might be ok. We had foreign material induced corrosion. 75 locations is better for our discrete events. We will explain this at the ACRS.

NRC (KH) Issue #3 - Defend the "minimum" of 8 non-randomly selected locations selected.

FENOC (DG) We are addressing the statements made in the SER, plus later commitments. The 8 locations are being done for cause. There is no technical basis for the number.

FENOC (CC) Let me stress that it is a "minimum" of 8. It is based on OE.

NRC (HA?) What if you find a defect?

FENOC (DG) We would expand our sampling to other "like" areas.

NRC (KH) Based on construction drawings, etc, areas where other wood might have been used?

FENOC (DG) Yes, and other OE. We have the hole as a data point.

NRC (KH) Can you highlight that in a slide?

NRC (?) Be prepared to say what you will do if a defect is found.

FENOC (CC) It would be entered into the Corrective Action Program. Evaluate and repair if required. The location would be marked for future monitoring. Determine the corrosion rate. Monitor it going forward.

NRC (HA?) The sampling would go to the next level, per the calculation, to get to 95/95?

FENOC (MM) Yes, we would consider that.

NRC (KM?) Regarding the 8 non-random samples, what is the industry (or plant) OE used for identifying locations?

FENOC (CC) All industry events involved foreign material.

FENOC (DG) We would look at areas that were recoated, that had intrusion of water, that had any anomalies.

NRC (KM?) Is 8 enough?

FENOC (DG) Yes

NRC (KH) Are the repaired areas included?

FENOC (DG) No.

NRC (KM) Will you include similar elevations?

FENOC (DG) We would look at similar locations, both by elevation and axially.

NRC (HA?) Are you using the IWE 10% loss criteria for evaluation or failure determination? Define what is considered a failure, and what is considered acceptable.

FENOC (DG) No, the IWE 10% is not the criteria. We are dealing with two numbers, repair criteria, and a calculation of corrosion rate through period of extended operation (PEO).

FENOC (CC) Below 10% nominal thickness does not constitute a failure. Engineering evaluation will project to the end of the PEO. Pass/fail would be determined based on whether it reduces the ability of the liner to function.

NRC (AH) It seems that you consider repair vs. determination of ongoing corrosion. Is a test resulting in a calculation a pass or a fail?

- FENOC (MM) Acceptance criteria is location specific and mechanism specific. General corrosion with 20% reduction and pitting corrosion of 20% would be handled differently. It is difficult to answer with specifics not known. We would extrapolate to the end of the PEO. Our focus is on line integrity, now and in the future.
- NRC (HA?) Then a failure would be if you cannot prove the liner is ok through PEO. Then the liner would be non-functional?
- FENOC (MM) We would perform later tests to verify corrosion rate (monitor for change).
- NRC (HA?) What corrosion rate would be used?
- FENOC (MM) Linear, then adjust through verification.
- NRC (AH) I'm not comfortable with that approach. Regarding the 75 sampling, I do not believe that you can extrapolate results to the rest of the liner, nor can the data obtained be used to justify 60 yrs of operation. These cannot be the basis for sampling; random sampling to find defects is not good.
- FENOC (CC) We will need a follow-up call to further discuss this.
- NRC (KH) We believe random sampling gives an indication of general liner condition.
- NRC (KH) Regarding Commitment #33, have you started yet? (It says you'll start prior to the next refueling outage in 2010.)
- FENOC (CC) No. We will determine in which quarter we will be starting and include that in the ACRS presentation.
- NRC (KH) Issue #4 - What "kind" of corrective action is envisioned if corrosion is discovered?
- FENOC (CC) Entered into Corrective Action Program, evaluating any specifics, evaluation of whether more sampling is required, evaluation regarding 95/95, etc.
- FENOC (MM) Monitor, evaluate, repair (if necessary).
- NRC (HA?) You will need to get back to us on the pass/fail question.
- NRC (AS?) If the visual inspection reveals degradation, what then? Would that affect the sampling plan?
- FENOC (MM) Yes, we would have to consider such an occurrence.
- NRC (KH) We should review the seven questions I e-mailed to you earlier.
- Jack Sieber Question #1 - I would like to see a containment leakage calculation which would show whether or not a hole in the containment liner the size of the defect (1/4 square inches) would cause leakage to exceed 10 CFR 100. BVPS uses the alternate source term. Remember that the BVPS containment is slightly sub atmospheric and has containment sprays which are supposed to reduce containment pressure to about atmospheric within approximately 1 hour. The added leakage from the defect hole should be added to the leak rate obtained in the last containment pressure test to determine whether the containment was functional, or not, during the most recent period of operation with the defect. The answer to this question would address the "defense in depth" question.
- FENOC (KF) We performed a calculation based on North Anna data on a through-wall defect there. We scaled up the leakage rate by a factor of 8 based upon our hole size being larger. We added that to our Type A, and we were less than L_a . We were also bounded by offsite dose calculation.
- As stated, our spray reduces accident pressure within several hours. We have margin based on LOCA pressure profile. The assumptions in dose calculation are a factor of 8 greater than the calculated leak rate. We use Alternate Source Term vs. 50.67. Since concrete slows flow the defect size almost not applicable. North Anna is similar to BV in design. We do not expect a defect to challenge our conclusions that we are ok.
- NRC (?) Does your calculation account for the liner being pressed against the concrete?

FENOC (KF) No. There are two schools of thought on that. As pressure increases, the gap decreases, and flow decreases. As pressure increases, cracks increase in size.

NRC (?) Was the leakage amount added to your ILRT test results?

FENOC (KF) Yes

NRC (?) Did you fail the ILRT?

FENOC (KF) No

NRC (?) Therefore the concrete, not the line, reduces leakage?

FENOC (KF) Yes

NRC (KH) Jack Sieber Question #2 – What is the likelihood that BVPS QC inspectors will find all additional existing liner defects equal to, or greater than the size hole recently found using FENOC's proposed inspection plan?

FENOC (CC) Containment construction practices for Beaver Valley Containment are not unique to industry. Use of our inspection plans provide reasonable assurance that we will find such degradation prior to challenging the integrity of liner. Internal OE and Industry OE indicates corrosion is driven by foreign material. Known industry OE indicates that defects are all small localized. Concrete adds margin. We intend to follow commitments to Amendment 39, we'll follow regulatory guidance if issued, and more restrictive

NRC (KH) Jack Sieber Question #3 – I would also like to hear the staff's opinion as to whether this is a generic issue for large dry containments. These defects have occurred in several plants in the past.

NRC (KH) That is ours to answer – we are working on that.

NRC (KH) Ed Hacket Question #1 – Is the BV containment impaired to the extent that it could not adequately fulfill its intended function with a liner defect of the dimensions previously discovered?

FENOC (CC) Re the Ken Frederick response earlier, we demonstrate adequate margin.

NRC (KH) Ed Hacket Question #2 – What is the likelihood of other such perforations occurring in the future? Is the mechanism aided by ongoing moisture intrusion through the concrete?

FENOC (TW) a) finding additional defects – see the response to Jack Sieber Question #2, above.
b) moisture is not applicable. At Beaver Valley it was due to foreign material

NRC (HA?) Is the corrosion continuing?

FENOC (TW) It is oxygen limited, The Type A test may replenish oxygen , but that oxygen is used and the corrosion stops.

NRC (KH) Ed Hacket Question #3 – Is the proposed inspection plan adequate to detect and characterize such flaws. Is the proposed timing for the inspections acceptable?

NRC (KH) That was asked and answered.

NRC (KH) Ed Hacket Question #4 – What are generic implications? Is NRR considering issuance of a generic communication on the issue?

NRC (KH) That is the same as Jack Sieber Question #3, with the same answer, that is ours to answer and we are working on it, and the answer, basically is “yes.”

FENOC (MM) Just for your information, we have FENOC representatives on the MRP committees and we will have them drive the issue.

NRC (KH) Please add to your presentation a “reminder” that your containment is now only slightly sub-atmospheric.

FENOC (CC) Is our presentation time at the ACRS still going to be limited to 10-15 minutes?

NRC (KH) Yes, you'll need to go fast, remove all fluff from the presentation.

End of Call

Action items – Need follow-up call on pass/fail discussion of random samples.