Schroeder, Daniel

From: Tsao, John NRR OE
Sent: Friday, May 07, 2010 10:20 AM
To: Modes, Michael; Ennis, Rick; Conte, Richard
Cc: Lupold, Timothy; Patnaik, Prakash; Taylor, Robert; Chernoff, Harold; Schulten, Carl; Manoly, Kamal; Bowman, Eric; Schroeder, Daniel; Balian, Harry; Cline, Leonard; Hardies, Robert; Alley, David
Subject: RE: Salem Violation Consensus

Rick,

You asked if I agree with your statement that "...It's also not clear if there is a lack of structural integrity on the Salem 2 buried AFW piping...". Your statement and the Salem Unit 2 buried AFW issue caused me to ponder as to what is the definition of structural integrity of a pipe. Below is what I have come up with.

10 CFR 50.55a(a)(1) states that "...Structures, systems, and components must be designed, fabricated, erected, constructed, tested and inspected to quality standards commensurate with the importance of the safety function to be performed..." I suppose that 10 CFR 50.55a(a)(1) establishes the definition of the "structural integrity" of a pipe. Note that the wording "designed, fabricated, erected, constructed" are related to the preservice condition of a pipe. The wording "tested and inspected" probably meant for preservice tests and inspections, but I think that they can be applied to inservice tests and inspections.

In the ASME Section III arena, NB-3600 provides requirements for the piping design. NB-3611 *Acceptability*, provides requirements for acceptability of a piping system. If a piping system satisfies the requirements in NB-3600, then the pipe establishes its structural integrity. The analysis requirements of NB-3200 also apply to the piping design.

But how does a pipe maintain its structural integrity after a plant is placed in service? I do not believe the ASME Code section XI has an explicit definition for the structural integrity of a pipe. The closest I can find is in ASME Section XI IWA-9000, *Glossary*, which includes a "Structural Integrity Test" term, but it is related to the pressure test of the containment building.

However, for Class 2 and 3 piping, ASME Section XI, IWC-3132, *Acceptance*, states that if inspection results (flaws) satisfy the acceptance standards then the component is acceptable for continued service. IWB-3112, *Acceptance,* provides similar requirements for Class 1 piping. I suppose that "acceptable for continued service" implies that the component has maintained the "structural integrity" as defined in 10 CFR 50.55a(a)(1). If a flaw exceeds the acceptance standards, the component can be accepted by analysis of IWB-3600 to show structural integrity.

ASME Section XI, IWA-1310 requires inspection and testing. IWB-5000, IWC-5000, and D-5000 provide requirements for pressure test. The pressure test, I suppose, is one of the measures to satisfy the "test" requirement in 10 CFR 50.55a(a)(1). Inspection is another measure to satisfy the "Inspection" requirement in 10 CFR 50.55a(a)(1).

A pressure test has not been performed for Salem Unit 2 AFW pipe. Therefore the Unit 2 AFW pipe has not satisfied 10 CFR 50.55a or ASME Code Section XI.

The licensee has inspected wall thickness at some locations in Unit 2 AFW pipe. But how many length of the buried unit 2 AFW pipe needs to be examined to demonstrate its structural integrity?

The problem with buried pipe is that operating experience (e.g., buried Unit 1 AFW pipe) shows that wall thinning can occur in any location of the pipe. For an above-ground pipe, say Class 1 pipe, a licensee needs to inspect only 25% (or less) of the welds in that piping system under the ASME Section XI requirement. However, for the buried pipe it seems that any location in the AFW pipe could be degraded with wall thinning.

C/149

Wall thinning at a location of the AFW pipe does not imply that there is no structural integrity because ASME Code Section XI allows acceptance by analysis for a degraded pipe for "continued service" as a way to demonstrate structural integrity of a component. However, if too many locations of the AFW pipe are degraded then the pipe may not satisfy the safety margins of the ASME Code, Section XI.

It seems to me that to satisfy 10 CFR 50.55a(a)(1), the licensee needs to perform a pressure test, NDE, AND stress analysis for the AFW pipe.

In lieu of the NDE, I suppose the licensee can perform a stress analysis of the AFW pipe to demonstrate its structural integrity. The licensee could perform a bounding stress analysis using the minimum required wall thickness and perform some sort of PRA or statistical analysis to show that the probability of a wall thickness that is lower than the minimum required thickness is not likely.

So, Rick, to answer your question, I would say that it is not clear if there is or there is not a lack of structural integrity on the Salem 2 buried AFW piping without the licensee performing a pressure test, NDE AND stress analysis.

Thanks.

John

From: Modes, Michael
Sent: Friday, May 07, 2010 7:35 AM
To: Ennis, Rick; Conte, Richard
Cc: Lupold, Timothy; Patnaik, Prakash; Taylor, Robert; Chernoff, Harold; Schulten, Carl; Tsao, John; Manoly, Kamal; Bowman, Eric; Schroeder, Daniel; Balian, Harry; Cline, Leonard
Subject: RE: Salem Violation Consensus

Rich I responded to your original email. I have repeated my response here since you have expanded the audience in this email. My apologies to anyone getting the email twice.

Disclaimer. My response addresses the need to cite the licensee's egregious failure to implement a Code requirement. I still have no reasonable technical basis to question the integrity of the U2 AFW piping. I am not suggesting, in any way, the U2 should be shut down and the piping tested. I am only addressing our regulatory response to the licensee's omission.

I vote Nah. In sum, I am not sure the Aye votes fully appreciate the ramifications of being beyond the structural integrity LCO when we all agreed it is ok to wait for them to do the test next outage.

On what technical basis is it okay to wait for them to do the test next outage? The only thing I have heard is we "think" it is okay.

Using the NOED process which will be forced on the licensee since they do not plan to shutdown sounds like bureaucratic response to this issue as unnecessary.

We obviated the need for a NOED by citing the violation and demanding a response. However a NOED is not an un-necessary bureaucratic response. It is a necessary , orderly, process to force the licensee to address the likelihood the AFW piping at Unit 2 may have no structural integrity. In this case it seems the licensee has prejudged the U2 AFW piping to be okay, that they don't need a relief request, and they are now doing a root cause to prove their case.

I am guided by 50.55a and the code not the TS with all of its nuisances for which there is a TS amendment to fix it.

Fixing the TS does not fix the U2 AFW pipe nor does it prove the pipe has integrity.

The operability guidance presumes operability and gives examples of not meeting code as examples of degraded, not being beyond the limits of the LCO.

TI9900, which I helped write, does not, like the constitution, presume innocent until proven guilty. The TIA was originally written to give guidance to an inspector in the gray area between the technical specifications and the ASME. That is ... when you fail the design requirements of ASME the system may still be able to perform its function, and within the more general constraints of the regulations you may still be able to run the plant. In the absence of any valid test of the U2 AFW I have no choice but to assume it fails the pressure test, that in turns means it fails its design requirements, which then gets me into TI9900. Although I may be able to use the guidance in TI9900 to justify continued operation (and we have) I can not use it as a basis to over look a violation of Code and Tech Spec requirements.

We have a TIA that confirms ISI is not a surveillance requirement. The pressure drop test is clearly an NDE or ISI process.

Agreed.

Structural integrity is determined by meeting design, doing preservice NDE and testing, and maintaining it by Inservice. A failure to meet one test does not necessarily invalidate structural integrity.

It does, indeed, invalidate the structural integrity when it is the only test to determine the structural integrity in ASME Section XI. Using the same logic I can say: "The reactor nozzle that just failed ultrasonic testing, under the authority of Section XI, does not necessarily loose its structural integrity because I did preservice NDE, etc.". ASME assumes if you fail the acceptance criteria in Section XI then you do not meet the design. In the case of the AFW U2 piping, in the absence of any testing at all, we have to conservatively assume the pressure test fails, and the piping no longer meets its design.

As Harold said, even a failure of the test as noted by leak does not necessarily imply a loss of structural integrity, thus the IWA 4160 to evaluate for suitability in this case structural integrity which we told the license at the outbrief.

That is assuming the piping has enough integrity to only leak at one location. You have no basis to assume the pipe will do that nor do you have a single measurement of the pipe wall in U2 to make any determination about integrity. These are arguments that apply to an immediate safety concern. We are taking about a violation of ASME Section XI and tech specs.
Salem TS is confusing in the above point; so how can we say it is violated.

You are correct it is confusing. That, however, is not a basis to avoid it. We cite it because we are the ultimate interpreter of the tech spec and in concert witht the TS branch we have decided what it says.

We all anticipate this test when done is going to pass. It would have passed at Unit 1 with the known external degradation.

We have no basis, none, to predetermine the state of the pipe they have not examined. NONE.

From: Ennis, Rick
Sent: Friday, May 07, 2010 7:02 AM
To: Conte, Richard; OHara, Timothy; Modes, Michael
Cc: Burritt, Arthur; DeFrancisco, Anne; Farrar, Karl; Lupold, Timothy; Patnaik, Prakash; Taylor, Robert; Chernoff, Harold; Schulten, Carl; Tsao, John; Manoly, Kamal; Bowman, Eric; Schroeder, Daniel; Balian, Harry; Cline, Leonard
Subject: RE: Salem Violation Consensus

I've copied Pat Patnaik and Rob Taylor on this email since, if a relief is submitted, I believe Pat would likely be the reviewer. Pat - based on our discussions last week, please confirm that you think a relief request is needed to justify not performing the IWA-5244 pressure test on the Salem 2 buried AFW piping until the next outage.

Rich – I agree with your assessment that it's not clear that there is a TS violation. Carl/Eric – do you agree?

ok

It's also not clear if there is a lack of structural integrity on the Salem 2 buried AFW piping. John/Kamal – do you agree?

Thanks,

Rick

From: Conte, Richard
Sent: Friday, May 07, 2010 6:13 AM
To: OHara, Timothy; Modes, Michael
Cc: Ennis, Rick; Burritt, Arthur; DeFrancisco, Anne; Farrar, Karl; Lupold, Timothy
Subject: RE: Salem Violation Consensus

RI

I vote Nah. In sum, I am not sure the Aye votes fully appreciate the ramifications of being beyond the structural integrity LCO when we all agreed it is ok to wait for them to do the test next outage. Using the NOED process which will be forced on the licensee since they do not plan to shutdown sounds like bureacratic response to this issue as unnecessary.

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As Harold said, even a failure of the test as noted by leak does not necessarily imply a loss of structural integrity, thus the IWA 4160 to evaluate for suitability in this case structural integrity which we told the license at the outbrief.

Salem TS is confusing in the above point; so how can we say it is violated.

We all anticipate this test when done is going to pass. It would have passed at Unit 1 with the known external degradation.

I do agree they need a code relief to cover the situation from now to the next outage - this appears to be the main issue in all of this as a reasonable next step.

That is the relief is not to cover the failure to do the test in the first two periods of the interval, that would condone the violation and turn it into acceptable status should the relief be approved on those grounds..

Since I have the alternate view and Darrell loves listening to alternate views I will try to set up something today with Darrell. Harold and Tim it sounds like you will be available to to discuss with him so I don't prejudice any view.

I will let you know what time. How is this; Darrell is acting RA.

I do agree with Rick Ennis; this is all as clear as mud; but thanks for your help.

In an open collaborative work environment I would propose we get guidance form the Acting RA and bring the views to Lupold and company on Monday. I would not set up anything with PSEG just yet.

I plan to call Len Rajkowski today to better understand what they view are the degraded LCOs

Art Burritt if you are in the office today, you are welcome to join us.

I still don't have an immediate safety issue; nothing indicates otherwise in these emails.

I added Tim Lupold as a heads up.

From: OHara, Timothy
Sent: Thursday, May 06, 2010 9:42 PM
To: Modes, Michael; Conte, Richard
Cc: Ennis, Rick; Burritt, Arthur; DeFrancisco, Anne; Farrar, Karl
Subject: RE: Salem Violation Consensus

Rich,

I think this is the best way to handle the situation and address all the possibilities.

I propose we arrange a call with PSEG on Monday to communicate the following:

(1) "clarify" the preliminary violation we informed them about at the Debrief on Wednesday with the details (below), i.e. add that they are in violation of the structural integrity tech. spec. and,

(2) inform PSEG that a relief request explaining the missed "inservice inspections (pressure tests)" will be needed to eventually restore compliance (when approved by NRR).

I'll be working at home on Monday and I'll be available to lead the call or participate. I can call Howard Berrick on Friday to ask him to coordinate the PSEG people for a Monday call if you want. Please keep me involved in what happens on this so that I get the violation and report correct.

Tim OHara

From: Modes, Michael
Sent: Thursday, May 06, 2010 4:15 PM
To: Conte, Richard
Cc: OHara, Timothy; Ennis, Rick; Burritt, Arthur; DeFrancisco, Anne; Farrar, Karl
Subject: Salem Violation Consensus

We are going to site the regulation 50.55a

In turn the ASME requirement they did not comply with.

This will then result in a failure to show structural integrity.

We will cover the absence of a NOED by also citing, concurrently, the tech spec violation as a subtier of the violation.

We will issue an NOV (with 30 day reply) if they have not submitted the relief request by the time we issue the report in order to faciliate the correct behavior.

If NRR has the request in hand we will issue this as non-cited.

As a secondary benefit we establish a precident for pressure testing and structural integrity for buried piping that will stand in the absence of the tech spec requirement. This tech spec requirement does not exist in Standard Tech Specs, nor will it last long in the Salem tech specs.

All in favor say "Aye".

The ayes have it ... the motion carries.

OK

PART 9900: TECHNICAL GUIDANCE

OPERATIONS - NOTICES OF ENFORCEMENT DISCRETION

The staff should ensure that the licensee's oral and written requests for an NOED address the following:

1. The TS or other license conditions that will be violated.

2. The circumstances surrounding the situation: including likely causes; the need for prompt action; action taken in an attempt to avoid the need for an NOED; and identification of any relevant historical events.

3. Information to show that the cause and proposed path to resolve the situation are understood by the licensee, such that there is a high likelihood that planned actions to resolve the situation can be completed within the proposed NOED time frame increase the likelihood of success in manually aligning or starting equipment in response to an initiating event (e.g., stationing operators locally at equipment, "just-in-time training", and/or additional contingency plans).

4. The safety basis for the request, including an evaluation of the safety significance and potential consequences of the proposed course of action. The following information should be provided in support of this evaluation. To the extent practicable, the licensee should address the quantitative and qualitative aspects noted below. The numerical guidance for acceptance was established to augment qualitative arguments that the continued operation of the plant during the period of enforcement discretion will not cause risk to exceed the level determined acceptable during normal work controls and, therefore, there is no net increase in radiological risk to the public.

a. Use the zero maintenance PRA model to establish the plant's baseline risk and the estimated risk increase associated with the period of enforcement discretion. For the plant-specific configuration the plant intends to operate in during the period of enforcement discretion, the incremental conditional core damage probability (ICCDP) and incremental conditional large early release probability (ICLERP) should be quantified and compared with guidance thresholds of less than or equal to an ICCDP of 5E-7 and an ICLERP of 5E-8. These numerical guidance values are not pass-fail criteria.

b. Discuss the dominant risk contributors (cut sets/sequences) and summarize the risk insights for the plant-specific configuration the plant intends to operate in during the period of enforcement discretion. This discussion should focus primarily on risk contributors that have changed (increased or decreased) from the baseline model as a result of the degraded condition and resultant compensatory measures, if any.

c. Explain compensatory measures that will be taken to reduce the risk

associated with the specified configuration. Compensatory measures to reduce plant vulnerabilities should focus on both event mitigation and initiating event likelihood. The objectives are to:

i.reduce the likelihood of initiating events;

ii. reduce the likelihood of unavailability of trains redundant to the equipment that is out-of-service during the period of enforcement discretion;

iii. increase the likelihood of successful operator recovery actions in response to initiating events.

An example is a situation where a motor-driven auxiliary feedwater (MDAFW) pump has failed and risk insights have established that plant transient initiators may be risk-significant events because the plant has no primary feed-and-bleed capability and only limited secondary feed capability is available. As a compensatory measure during the period of enforcement discretion, the licensee may defer non-essential surveillances or other maintenance activities where human error contributes to the likelihood of a plant scram and subsequent demand on the remaining AFW pumps. Another example of appropriate compensatory measures would be actions that increase the likelihood of success in manually aligning or starting equipment in response to an initiating event (e.g., stationing operators locally at equipment, "just-in-time training", and/or additional contingency plans).

d. Discuss how the proposed compensatory measures are accounted for in the PRA. These modeled compensatory measures should be correlated, as applicable, to the dominant PRA sequences identified in item b. above. In addition, other measures not directly related to the equipment out-of-service may also be implemented to reduce overall plant risk and, as such, should be explained. Compensatory measures that cannot be modeled in the PRA should be assessed qualitatively.

e. Discuss the extent of condition of the failed or unavailable component(s) to other trains/divisions of equipment and what adjustments, if any, to the related PRA common cause factors have been made to account for potential increases in their failure probabilities. The method used to determine the extent of condition should be discussed. It is recognized that a formal root cause or apparent cause is not required given the limited time available in determining acceptability of a proposed NOED. However, a discussion of the likely cause should be provided with an associated discussion of the potential for common cause failure.

f. Discuss external event risk for the specified plant configuration. An example of external event risk is a situation where a reactor core isolation cooling

(RCIC) pump has failed and a review of the licensee's Individual Plant Examination of External Events or full-scope PRA model identifies that the RCIC pump is used to mitigate certain fire scenarios. Action may be taken to reduce fire ignition frequency in the affected areas or reduce human error associated with time-critical operator actions in response to such scenarios.

g. Discuss forecasted weather conditions for the NOED period and any plant vulnerabilities related to weather conditions.

5. The justification for the duration of the noncompliance.

6. The condition and operational status of the plant (including safety-related equipment out of service or otherwise inoperable).

7. The status and potential challenges to off-site and on-site power sources.

8. The basis for the licensee's conclusion that the noncompliance will not be of potential detriment to the public health and safety.

9. The basis for the licensee's conclusion that the noncompliance will not involve adverse consequences to the environment.

10. A statement that the request has been approved by the facility organization that normally reviews safety issues (Plant On-site Review Committee, or its equivalent).

11. The request must specifically address which of the NOED criteria for appropriate plant conditions specified in Section B is satisfied and how it is satisfied.

12. Unless otherwise agreed as discussed in Section B, a commitment is required from the licensee that the written NOED request will be submitted within 2 working days and the follow-up amendment will be submitted within 4 working days of verbally granting the NOED. The licensee's amendment request must describe and justify the exigent circumstances (see 10 CFR 50.91(a)(6)). The licensee should state if staff has agreed during the teleconference that a follow-up amendment is not needed. If the licensee intends to propose a temporary amendment, the licensee's amendment request shall include justification for the temporary nature of the requested amendment.

13. In addition to items 1-12 above, for a severe-weather NOED request the licensee must provide the following information:

a. The name, organization and telephone number of the official in the government or independent entity who made the emergency situation determination. If deemed necessary, the staff may contact the appropriate official to independently verify the information provided by the licensee prior to making an NOED determination.

b. Details of the basis and nature of the emergency situation including, but not limited to, its effect on:

i. on-site and off-site emergency preparedness;
ii. plant and site ingress and egress;
iii. off-site and on-site power sources;
iv. grid stability; and
v. actions taken to avert and/or alleviate the emergency situation (e.g., coordinating with other utilities and the load dispatcher organization for buying additional power or for cycling load, or shedding interruptible industrial or non-emergency loads).

c. Potential consequences of compliance with existing license requirements (e.g., plant trip, controlled shutdown).

d. The impact of the emergency situation on plant safety including the capability of the ultimate heat sink.

e. Potential adverse effects on public health and safety from enforcing compliance with specific license requirements during the emergency situation.