Schroeder, Daniel

From: Schroeder, Daniel RS
Sent: Thursday, April 15, 2010 10:18 AM
To: Conte, Richard; OHara, Timothy
Cc: Burritt, Arthur; Cline, Leonard; Wilson, Peter; Kaufman, Paul
Subject: RE: draft problem summary on SL 1 AFW
Attachments: SL1 AFW Degradation Coating Failure rev1.doc

My comments are attached.

Dan

RS

From: Conte, Richard
Sent: Wednesday, April 14, 2010 4:22 PM
To: OHara, Timothy; Schroeder, Daniel
Cc: Burritt, Arthur; Cline, Leonard; Wilson, Peter; Kaufman, Paul
Subject: draft problem summary on SL 1 AFW

Tim and Dan please review. Send me corrections.

for managers, tentative cc for you use.

C143

Revision 0 – 4/15/10

Problem Summary:

As a result of implementation the PSEG buried pipe program, significant degradation of the No. 14 and 12 Auxiliary Feedwater Piping was identified – certain section may need to be replace based on minimum wall analysis. PSEG is developing a past and future operability review along with a finite element analysis in order to assess the structural integrity of the AFW piping including a potential design change for minimum wall thickness based on a new pressure rating. An apparent cause is little to no coating application of this section of buried piping. An extent of condition is being developed as a part of a root cause report that will not be finalized until after the pending startup of Salem 1 ~4/24/10. Unit 2 is operating and has similar piping but the difference appears to be in the use of a proper coating application based on 1994 information.

Background/Facts:

See attached for more details. The licensee has dug a trench along about one quarter of the southwest wall of the Unit 1 containment between the fuel handling building and the containment outer penetration building. Based on flow path, the AFW piping exits the fuel handling building and enters the outer penetration room to enter containment and feed the No. 14 and 12 Steam Generators. The piping also traverses in the fuel handling building under the fuel transfer canal from the mechanical penetration room and is surrounded by sand fill.

In the trench, PSEG is characterizing the level of degradation of the No. 14 and 12 headers based on UT information that is ASME code compliant. The licensee is also characterizing the level of degradation of piping in the fuel handling building – sand was removing exposing a portion of the AFW piping and other lines having service air and control air which also traverse the above noted trench.

Safety Significance:

AFW is safety related. AFW is also relied upon for normal startup and shutdown. In addition it is used to mitigate all internal initiating events with the exception of large and medium break LOCA's. AFW is also utilized to mitigate external initiators, such as fire and flooding

If the system is capable of performing it's safety function, there is no safety significance. The licensee continues to assess the structural integrity of as-found conditions.

Licensee Next Steps:

Repair:

The licensee is still investigating the level of degradation in the yard/trench area and in the area below grade in the fuel handling building.

Based on UT measurement they need to determine extent of repair based on revised analysis for minimum wall thickness based on a new design pressure rating. They are tentatively looking at replacing 50 feet of pipe below minimum wall of .260 inches (not clear yet reduced rated pressure) without additional UT characterization. The remaining piping will have the 1 inch by 1 inch grid characterization. Where the pipes enter the outer penetration room and the FHB in this trench, the penetrations are also in need of repair.

Some repair/coating or reapplication of coating in the FHB will be needed. They are apparently relying on intact coaling on vertical section of the riser in the FHB and assuming uniform condition for the buried section in the building. A hydrostatic post repair test is to include this section of piping. This area may be a significant challenge since it is an area of wetted sand and the coating can not have any imperfections with respect to above noted assumptions.

I do not understand the highlighted paragraph. A hydrostatic test of the pipe will be performed, but do not believe that PSEG has asserted that the AFW piping buried in the FHB is coated and unblemished. Is this a code requirement?

Output Analysis:

Operability to support startup of Unit 1

Operability determination to support past operations for Unit 1.

Finite Element Analysis on ASME qualified UT information (doing a 1inch by 1 inch template review similar to that done for flow accelerated corrosion measurements.

Root Cause and extent of condition review – final documentation after startup.

Potential design change package for reduced pressure rating of system from 1950 to 1275 psi.

Extent of Conditions:

Unit 1 other headers No. 11 and 13 as well as corresponding headers in Unit 2 – Not buried, no evidence of a problem.

Unit 2 buried headers: 1994 data and records suggestion acceptable coating; and where damage occurred due to digging, it was repaired.

Other Safety Related Piping - Control Air – with one exception in the fuel handling building, the condition of coating was acceptable and appears to have been properly applied. Repair to the exception in the fuel handling building will be made, apparent due to isolated mechanical damage.

Other Safety Related Piping – Service Water Nuclear Headers – different material, concrete inner and outer coating surrounding carbon steel

Notification to State of New Jersey: Inspector was onsite observing conditions as they occurred.

NRC Staff Next Steps:

The Region added an extra week to the ISI inspection in order for the inspector to continue to follow developments.

We continue to interface internal stakeholders on a periodic basis.

An IMC 309 review was being considered. Entry conditions have not been met due to lack of evidence related to structural integrity AFW.

A review of OpE had been started – other buried pipe AFW problems have been identified back to 2000 – draft IN has been in the works since Oyster Creek issue last year.

No inquiries to date from External stakeholders.

Industry Outreach:

PSEG is interfacing with INPO OpE.

Public Outreach:

None to date

Attachment 1 – Factual Development

Week of 4/5/10:

Two of four AFW lines are buried on each Salem Unit. On Unit 1, approximately 150' of piping between the pumps in the Auxiliary building to SG #12 and to SG #14 are buried. Only the buried portions are in question here because they are inaccessible for inspection per the Code. The remainder of the non-buried piping in the AFW system is included in the ISI Program and is inspected via code qualified UT. The 150' is an estimate from several prints and several of the PSEG engineers - 2 runs of 4", schedule 80, carbon steel pipe of about 150' each - total of about 300'.

Licensee was using guided wave technology for initial characterization and need to dig additional pits – turned out they needed to dig the whole area up. The inspector explained agency position that the ASME code does not recognize the Guided Wave readings and they cannot be credited for dimensions as part of a repair. The ISI Program Manager acknowledges this and understands the concern.

Engineers have alluded to visual inspections conducted in 1998 which said the coating was in good shape - however that have not been able to present those reports. Those inspections should be documented or they did not occur.

Regarding the min wall situation, not all of the limited Code UT are below calculated min wall of 0.278" (nominal is .337") for a rated pressure of 1950 psi.

PSEG had ordered replacement pipe.

Example picture