

NRR-PMDAPEm Resource

From: Lingam, Siva
Sent: Friday, August 16, 2013 7:17 AM
To: Frehafer, Ken (Ken.Frehafer@fpl.com)
Cc: Broaddus, Doug; Lupold, Timothy; Tsao, John; Rodriguez, Rafael; Katzman, Eric (Eric.Katzman@fpl.com)
Subject: St Lucie Unit 1--Relief Request 7 Regarding Alternate Repair of Intake Cooling Water Piping (TAC No. MF2529) - Request for Additional Information (RAI)

Please respond to the following official RAIs on the subject relief request. If you need our approval (verbal) on this request by September 27, 2013, we request you to provide the RAI responses by September 13, 2013. If you were to deliver an acceptable response by September 13, 2013, verbal authorization could then be considered by September 27, 2013.

REQUEST FOR ADDITIONAL INFORMATION
RELIEF REQUEST NUMBER 7
ALTERNATE REPAIR OF INTAKE COOLING WATER PIPE
ST LUCIE UNIT 1
FLORIDA POWER & LIGHT COMPANY
DOCKET NUMBER 50-335

By letter dated August 5, 2013 (Agencywide Documents and Access Management System Accession No. ML13220A029), Florida Power & Light Company (the licensee) requested relief from certain requirements of American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, IWA-4000 regarding the repair of intake cooling water piping at St Lucie Unit 1. The licensee proposed an alternative repair for the intake cooling water piping as documented in Relief Request Number 7, Revision 0. To complete its review, the Nuclear Regulatory Commission (NRC) staff requests the following additional information.

1. The proposed repair includes the use of a gasket and epoxy. (a) Discuss the gasket and epoxy material, how many years are the gasket and epoxy qualified for in the seawater environment, and the industry standards to which the gasket and epoxy are qualified. (b) Section 4 of the relief request states that the inside of the subject pipe is lined with 1/8-inch thick epoxy or cement. Provide the thickness of epoxy covering the bolted plate. (c) Confirm that the epoxy applied on the bolted plate will cover the studs, nuts, plate edges and gasket.
2. Discuss the design life of the bolted plate assembly and how the design life is derived. Discuss the criteria or conditions that would require the in-service bolted plate to be removed.
3. On page 4 of the relief request, the licensee states that a typical corrosion rate for the carbon steel in the seawater environment is 30 mils per year. The licensee further states that should the epoxy coating and gasket be breached to allow access to the original defect area the maximum extent of corrosion would be 0.09 inches, assuming a 3-year inspection interval. Based on this discussion, it appears that the licensee did not apply any safety factor to the corrosion rate of 30 mils to cover uncertainties in the corrosion rate. ASME Code Cases (e.g., Code Case N-821) require a factor of 2 to 4 applying to the corrosion rate to consider uncertainties. (a) Discuss whether the corrosion rate of 30 mils is used in the design of the repair. If yes, discuss whether a factor is used on the corrosion rate in the bolted plate repair method. If a safety factor is not used, provide justification.
4. (a) Discuss whether the bolted plate provides structural support to the pipe wall underneath or it simply isolates the defect area from seawater without performing any structural support. (b) On page 4 of the relief request, the licensee stated that the bolt hole drilled into the pipe wall will not exceed 1/4 inch deep to preserve the pipe minimum wall thickness requirement. Discuss the tolerance on the bolt hole depth. (c) On page 2 of

the relief request, the licensee stated that the repair performed in 2012 for intake cooling water pipe 1-30"-CW-29 (Train B) includes three plate sizes--3.5" x 3.5", 7.5" x 11.5" and 10" x 11". The licensee previously installed on intake cooling water pipe 1-30"-CW-30 (Train A) plate sizes of 3.5" x 3.5", 8" x 8", 10" x 11" and 11" x 11". The licensee presented stress analyses for plate sizes 3.5" x 3.5", 7.5" x 11.5", and 10" x 11", but not 8" x 8" and 11" x 11" as shown in Attachment 2 to the August 5, 2013 submittal. Discuss whether plate sizes, 8"x 8" and 11" x 11" were analyzed. If yes, submit the analysis. If not, provide justification. (c) Discuss the maximum plate size that is qualified to be used in the repair. The NRC staff notes that the plate size should maintain a certain margin with respect to the defect area that it covers. See the following question.

5. Attachment 2 (pages 5 to 8) to the August 5, 2013 submittal provides calculations to demonstrate that reinforcement is not needed if the repair is applied from a minimum assumed hole size of 0.25 inch to a maximum assumed hole size of 30 inches. The NRC staff would have reservations if the repair would apply to a 30-inch hole. The NRC staff notes that the plate size should exceed the hole size by some minimum margin with respect to the hole size to allow for potential corrosion growth. (a) Discuss the maximum hole size and defect area that is allowed by the relief request. (b) Discuss the minimum margin between the plate size and the defect area and/or holes size that is permitted by the relief request. The minimum margin would be the minimum plate size divided by the maximum allowable defect area or hole size (use the larger of the defect area or the hole size). The NRC staff notes that in general corrosion the defect area is usually larger than the hole size.

6. Section 5 of the relief request appears to state that the bolted plate design will be used to repair a 100 percent through wall defect. Pages 26 and 28 in Attachment 2 to the August 5, 2013 letter identify two holes at two locations on pipe 1-30"-CW-29 and they appear to be part of the repair performed in 2012. After a hole is filled with epoxy and the bolted plate is installed on the inside surface of the pipe, the corrosion could continue to grow laterally from the outside diameter surface if the pipe is in contact with ground water. (a) Discuss how the bolted plate repair can eliminate corrosion from the outside diameter surface if the repair is performed on a 100 percent through wall defect. (b) Discuss the defects (e.g., planar cracks) and/or degradation mechanisms (e.g., stress corrosion cracking) for which the bolted plate repair will not be applicable.

7. Discuss pressure and temperature during normal operation, considering seasonal changes.

8. The relief request stated that the subject pipe is fabricated with A-155 KC-65 (equivalent to SA-106 Grade B carbon steel) and the plate is made of SA-106. The bolt is made of alloy steel, SA-193 Grade B7 and the nut is made of SA-194 Grade 2H. Confirm that galvanic corrosion is not a concern for the bolted plate assembly and it has not been observed in the repaired locations since 2005.

Siva P. Lingam
U.S. Nuclear Regulatory Commission
Project Manager (NRR/DORL/LPL2-2)
Sequoyah Nuclear Plant
St. Lucie Plant
Robinson Steam Electric plant
Location: O8-D5; Mail Stop: O8-G9a
Telephone: 301-415-1564; Fax: 301-415-1222
E-mail address: siva.lingam@nrc.gov

Hearing Identifier: NRR_PMDA
Email Number: 808

Mail Envelope Properties (Siva.Lingam@nrc.gov20130816071700)

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From: Lingam, Siva

Created By: Siva.Lingam@nrc.gov

Recipients:

"Broaddus, Doug" <Doug.Broaddus@nrc.gov>

Tracking Status: None

"Lupold, Timothy" <Timothy.Lupold@nrc.gov>

Tracking Status: None

"Tsao, John" <John.Tsao@nrc.gov>

Tracking Status: None

"Rodriguez, Rafael" <Rafael.Rodriguez@nrc.gov>

Tracking Status: None

"Katzman, Eric (Eric.Katzman@fpl.com)" <Eric.Katzman@fpl.com>

Tracking Status: None

"Frehafer, Ken (Ken.Frehafer@fpl.com)" <Ken.Frehafer@fpl.com>

Tracking Status: None

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