From:	Ossing, Michael
To:	Lamb, John
Cc:	Kilby, Gary; Nicholson, Larry; Ossing, Michael; Walsh, Kevin; Connolly, James; Collins, Michael; Vehec, Thomas; Dodds, Ralph
Subject:	Seabrook Station Relief Request RA-13-001
Date:	Friday, August 30, 2013 7:26:29 PM
Attachments:	Relief Request RA-13-001.doc

John

Attached is the Seabrook Station relief request RA-13-001 for NRC review. Seabrook Station is requesting verbal authorization of the relief request and will followup with a letter submittal by September 4, 2013.

Seabrook is requesting the verbal authorization on August 30, 2013.

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SEABROOK STATION UNIT 1 10 CFR 50.55a Relief Request RA-13-001
Proposed Alternative in Accordance with 10 CFR 50.55a(a)(3)(i)

1. ASME Code Components Affected

The affected piping is the "B" Train 24-inch diameter service water supply pipe, line number SW-1802-004-153-24", which supplies cooling water to the Primary Component Cooling Water (PCCW) Heat Exchanger CC-E-17-B for the purpose of removing heat from systems and components during normal plant operations and emergency plant evolutions. The Code component associated with this request is a Class 3 piping component in the Service Water (SW) system in which a flaw has been detected. There is one area affected by a localized flaw.

1.1 System Details:

ASME Code Class:	Class 3
System:	Service Water System
Category:	Moderate Energy Piping

1.2 Component Descriptions:

The component in question is 24-inch Nominal Pipe Size (NPS) carbon steel piping with a nominal wall thickness of 0.375-inch. The application of this alternative is to perform a temporary, non-Code repair to the SW piping. This non-Code repair will consist of the addition of a 6-inch nominal diameter weldolet, weld-neck flange, and blind flange over the identified localized flawed area. The general configuration for the repair is shown in Figure 1.

2. Applicable Code Edition and Addenda

Seabrook Station is currently in the third 10-year Inservice Inspection (ISI) interval. The American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) of record for the current 10-year ISI interval is Section XI, 2004 Edition, with no Addenda (Reference 1) for the Repair/Replacement Program.

3. Applicable Code Requirement

The applicable Code Sections for which the relief is requested from is ASME Code Section XI, 2004 Edition, with no Addenda, Sections IWA-4412, IWA-4421, and IWA-4340.

IWA-4412 states: "Defect removal shall be accomplished in accordance with the requirements of IWA-4420."

IWA-4421(d) states: "Defect removal or mitigation by modification shall be in accordance with IWA-4340."

IWA-4340 states in part that: "Modification of items may be performed to contain or isolate a defective area without the removal of the defect...."

Requirements for the use of this Code section are:

1) Defect characterization using NDE;
2) Cause evaluation and projected growth;
3) Component structural integrity without reliance on the defective area including projected growth;
4) An Owner prepared plan for additional examination to detect propagation of the flaw beyond the limits of the modification.

It is understood that the Nuclear Regulatory Commission (NRC) clearly discourages the use of IWA-4340 by licensees. The Code of Federal Regulations currently state in 10 CFR 50.55a(b)(2)(xxv) that "The use of the provisions of IWA-4340, Mitigation of Defects by Modification, Section XI, 2001 Edition through the latest edition and addenda incorporated by reference in paragraph (b)(2) of this section are prohibited."

The proposed alternative being requested is the installation of a repair in accordance with IWA-4340, with the repair being a temporary, non-Code repair.

4. Reason for the Request

On August 7, 2013, with Seabrook Station in operation at 100% power, a through-wall leak was identified in a section of SW system piping. NextEra Energy Seabrook performed Ultrasonic Test examination to characterize the affected area and prepared an evaluation documented in Reference 2. The examination and evaluations concluded that the leakage is a result of wall-thinning due to localized corrosion on the inside of the pipe. On August 28, 2013, the leakage increased as a result of changing the operating line-up to perform a surveillance procedure. A housekeeping patch was installed to stop the leakage. Additional ultrasonic examinations show that the wall thinning area has remained constant, however, due to increased pressure as a result of the alternate piping line-up, the leakage increased.

The remaining wall thickness currently provides sufficient structural integrity to maintain operability of the SW system. The operability evaluation concluded that operability cannot be assured for the remainder of the operating cycle, which ends in the spring of next year, and near-term repair is necessary.

5. Impracticality of Compliance

Section XI of the ASME Code specifies Code-acceptable repair methods for flaws that exceed Code acceptance limits for piping that is in service. A Code repair is required to restore the structural integrity of flawed ASME Code piping, independent of the operational mode of the plant when the flaw is detected. Repairs not in compliance with Section XI of the ASME Code are non-Code repairs. However, the required Code repair may be impractical for a flaw detected during plant operation unless the facility is shut down. Temporary non-Code repairs of

Class 3 piping are unacceptable without specific written relief from the Code by the NRC. The flaw that has been detected is in a section of the SW piping that cannot be isolated to complete a Code-acceptable repair. As it is impractical to complete a Code-acceptable repair to the SW leaks at Seabrook Station without shutting the plant down, relief is requested to use a non-Code repair until the next shutdown, scheduled for April 1st, 2014, of a duration long enough to complete a Code-acceptable repair.

6. Burden Caused by Compliance

It is impractical to complete a Code-acceptable repair to the identified SW leak at Seabrook Station without shutting the plant down. Shutting the plant down in mid-cycle creates undue and unnecessary stress on plant systems, structures, and components.

7. Proposed Alternative and Basis for Use

NextEra Energy proposes the encapsulation of the identified pipe wall flaw by the addition of a 6-inch NPS weldolet, weld neck flange, and blind flange as depicted on Figure 1.

The following are responses to the requirements of IWA-4340:

7.1 Flaw Sizing and Characterization

On August 7, 2013 an Ultrasonic Test (UT) examination was performed at an identified through wall leak on line SW-1802-004-153-24". The area was identified by discovery of a slow (several drops per minute) leak. The examination revealed that the through wall leak at this location was the result of a single isolated flaw that appears to be related to corrosion. Encoded UT data was collected at this location and was used to evaluate the through wall leakage area. A 3-inch by 6-inch area surrounding the flaw was selected for the encoded examination. This encoded area encompassed the entire flawed area. Normal intermittent responses could not be received in an area specifically bounded by where the inside surface response was initially lost. This resulted in a conservative bounded flaw area of 2.327-inches circumferentially by 1.500-inches axially. Wall thickness readings could not be obtained within this region. However, it was identified that there is an abrupt increase in thickness to nominal wall (0.375 inch) and above outside this region.

During the angle beam exam, the flaw could be seen in all four directions which is not typical for planar flaws. For structural evaluation purposes the flaw was considered non-planar. At the time of the August 7, 2013 examination no visible through wall hole was identified. On August 20, 2013 an increase in through wall flow was identified. A subsequent UT examination was performed. It concluded that the bounding area of 2.327-inches by 1.500-inches remained the same with no reportable thickness recorded in this area. However, a visible through wall hole estimated to be 0.250-inches in diameter was identified. In accordance with ASME Code Case

N-513-3, the entire circumference of the piping at the through wall leak location was also examined with no other defects identified.

7.2 Degradation Mechanism

As discussed in Section 7.1 above, based upon the Non-Destructive Examination (NDE), the localized flaw appears to be seawater corrosion related. See further discussion on this in Section 7.4.

7.3 Flaw Evaluation

A flaw evaluation, in accordance with ASME Code Case N-513-3, was performed with the through wall flaw size assumed to be the bounding area of 2.327-inches by 1.500-inches. The evaluation concluded that structural integrity is maintained. This evaluation is provided in Reference 2, a copy of which is attached. In accordance with Code Case N-513-3, augmented inspections were scheduled to be performed to determine the extent of condition.

7.4 Flaw Growth Rate

As previously stated in Section 7.2, the cause of the degradation is from localized corrosion. The typical corrosion rate used in Seabrook Station Service Water piping evaluations is 30 mils per year (mpy). However, the current identified wall defect resides in piping which was recently replaced during Refueling Outage 14 during April 2011, concluding that an accelerated (presently unknown) mechanism exists within the bounding area. The NDE identified nominal (and above) pipe wall thickness around the bounding area. Based upon this, it is assumed that while further degradation will occur within the bounding area, the surrounding area wall loss will be such that the ASME Code required minimum pipe wall thickness, calculated to be 0.105-inch in Reference 2, will not be violated during the duration of the proposed temporary non-Code repair. To provide further assurance, a 6-inch weldolet has been selected for use. As identified in Figure 1, the pipe wall area encapsulated by the weldolet is a 6.688-inch diameter circle, providing sufficient metal area around the bounding area of 2.327-inches by 1.500-inches. It is because of the localized nature of the identified flaw that, while structural integrity is ensured, a temporary non-Code repair is being requested.

8. Duration of Proposed Alternative

The temporary non-Code repair to the Seabrook Station SW system will remain in place until the next Refueling Outage (OR16) scheduled for April 1, 2014. Should the plant enter a shutdown of sufficient duration prior to OR16, the temporary non-Code repair will be replaced by a Code-acceptable repair.

9. Post Repair Monitoring

As discussed in Section 7.1, nominal pipe wall exists around the bounding area of 2.327-inches by 1.500-inches. The proposed temporary non-Code repair will be installed on this nominal pipe

wall. Periodic UT inspections of no more than 30 day intervals around the installed weldolet will be performed to identify wall loss propagating outside the encompassed area.

10. Precedents

1) NRC letter from N. Salgado to M. J. Ajluni of Southern Nuclear Operating Company, Inc., "Edwin I. Hatch Nuclear Plant, Unit 1, Safety Evaluation of Relief Request HNP-ISI-ALT-14, Version 2, for the Fourth 10-Year Inservice Inspection Interval, Temporary Non-Code Repair of Service Water Piping" (TAC No. ME7366)((ML12058A413)
2) NRC letter from D. A. Broaddus to C. Burton of Shearon Harris, "Shearon Harris Nuclear Power Plant, Unit 1 – Relief Request 13R-08, Temporary Non-Code Repair of Service Water Supply System Piping" (TAC No. ME4750) (ML110601120)

11. References

1) American Society of Mechanical Engineers (ASME) Boiler & Pressure Vessel Code, Section XI, 2004 Edition, no Addenda.
2) Seabrook Station Calculation C-S-1-45893-CALC Rev. 000 "Code Case N-513-3 Pipe Wall Flaw Evaluation for: SW-1802-004-153-24"

Figure 1: Proposed 6-inch NPS Weldolet, Weld Neck Flange, and Blind Flange