



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

May 23, 2011

Vice President, Operations
Entergy Operations, Inc.
Waterford Steam Electric Station, Unit 3
17265 River Road
Killona, LA 70057-3093

SUBJECT: WATERFORD STEAM ELECTRIC STATION, UNIT 3 – SUMMARY OF
FEBRUARY 7 AND APRIL 18, 2011, CONFERENCE CALLS ON STEAM
GENERATOR TUBE INSPECTIONS (TAC NO. ME6039)

Dear Sir or Madam:

On February 7 and April 18, 2011, the U.S. Nuclear Regulatory Commission (NRC) staff participated in conference calls with representatives of Entergy Operations, Inc. (the licensee), R. Williams, J. Pollock, R. Murillo, R. Putnam, R. O'Quinn, S. Brown, J. Hoss, J. Hagar, et al., regarding the spring 2011 steam generator (SG) tube inspections at Waterford Steam Electric Station, Unit 3. A summary of the conference calls is enclosed. Information provided by the licensee in support of the April 18, 2011, conference call, as well as additional information provided subsequent to the call, are available in the Agencywide Documents Access and Management System (ADAMS) under Accession No. ML11137A201. The NRC staff did not identify any issues that would warrant preventing the plant from starting up following its 17th refueling outage (RFO).

Entergy had planned to replace the SGs during the spring 2011 refueling outage. However, the licensee decided to postpone the replacement until the fall 2012 refueling outage. The licensee, therefore, conducted the required inspections for the current SGs during the RFO 17.

If you have any questions, please call me at (301) 415-1480.

Sincerely,

A handwritten signature in cursive script, appearing to read "N. Kalyanam".

N. Kalyanam, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-382

Enclosure:
As stated

cc w/encl: Distribution via Listserv

SUMMARY OF FEBRUARY 7 AND APRIL 18, 2011, CONFERENCE CALLS
WITH ENTERGY OPERATIONS, INC., REGARDING THE SPRING 2011
STEAM GENERATOR TUBE INSPECTIONS AT
WATERFORD STEAM ELECTRIC STATION, UNIT 3
DOCKET NO. 50-382

On February 7, 2011, the U.S. Nuclear Regulatory Commission (NRC) staff participated in a conference call with representatives of Entergy Operations, Inc. (Entergy, the licensee), regarding the upcoming steam generator (SG) tube inspection activities at Waterford Steam Electric Station, Unit 3 (Waterford 3) during the spring 2011 refueling outage.

Waterford, Unit 3 has two Model 3410 SGs. Each SG contains 9,350 mill annealed Alloy 600 tubes. Each tube has a diameter of 0.750 inches and a nominal wall thickness of 0.048 inches. The tubes were explosively expanded at both ends for the full length of the tubesheet and are supported by a number of carbon steel lattice grid tube supports, diagonal bars, and vertical straps.

Entergy had planned to replace the SGs during the spring 2011 refueling outage. However, the licensee decided to postpone the replacement until the fall 2012 refueling outage. The licensee, therefore, conducted the required inspections for the current SGs during the RFO 17.

Secondary-side inspections would most likely include:

- A batwing-to-wrap-around-bar weld inspection
- A diagonal 45-degree inspection that looks at the batwing and stay cavity region
- A bottom-up examination of the stay cavity region that generates a composite photograph of the batwing condition
- Foreign Object Search and Retrieval (FOSAR)

Primary-side inspections would most likely include, but not be limited to:

- 100 percent full-length bobbin coil examination
- 100 percent hot-leg (HL) top of the tubesheet (TTS) +Point™ inspection in each SG from 3 inches above to 13 inches below the TTS
- 100 percent low row small radius U-bend +Point™ inspection in each SG
- 100 percent +Point™ inspection of all eggcrate distorted signal indication signals

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- 100 percent +Point™ inspection of all newly reported indications at diagonal bar and vertical straps
- 100 percent +Point™ inspection of historical indications at diagonal bar and vertical straps
- 20 percent +Point™ inspection at dented diagonal bar and vertical strap locations

There are no plans to deplug tubes to further validate the current wear model.

The gross tube damage acceptance criteria previously used was based on double-sided gross wear. The licensee indicated it would be developing a model for single-sided gross wear as well, but this was the only new acceptance criteria being developed for this outage. All acceptance criteria are being reviewed to ensure they remain valid.

Verification that the defense-in-depth principle (which included stabilizing tubes, using sentinel plugs, and plugging tubes up through the 40-year wear point) remains valid is being performed. The licensee indicated that previous stabilization of sentinel tubes around the stay-cavity region had been based on a 20-year setpoint, and that during the upcoming outage, additional tubes would be plugged and stabilized based on the 40-year setpoint.

The licensee predicted that the degradation assessment would most likely be consistent with the prior degradation assessment. The feedwater distribution box, J-tubes, and T-vents would again be inspected. The licensee has asked Westinghouse for revised inspection acceptance criteria. Based on the previous condition of these components, the licensee does not expect to have to take any mitigative actions, but nonetheless will be prepared for unexpected inspection results.

The licensee indicated that it would use the same communication plan as in recent outages to pass information to the NRC, including the Office of Nuclear Reactor Regulation.

On April 18, 2011, the NRC staff participated in a conference call with representatives of Entergy regarding the ongoing SG tube inspections activities at Waterford, Unit 3. Additional clarifying information or information not included in the material provided by the licensee in support of the April 18, 2011, conference call (available in the Agencywide Documents Access and Management System (ADAMS) under Accession No. ML111310337) is summarized below:

- The licensee clarified that the +Point™ hot-leg (HL) TTS inspections were from 3 inches above to 12 inches below the TTS.
- The licensee clarified that the +Point™ cold-leg (CL) TTS inspections were from 3 inches above to 3 inches below the TTS.
- The tube located at row 9, column 125 in SG 31 contained a flaw with an actual length of 7.18 inches, a structural equivalent length of 1.47 inches, and a structural equivalent depth of 65.7 percent through-wall (TW). This flaw was identified as a crack located at a distorted freespan historical (DFH) location between the 01H and 02H eggcrate supports. The licensee stated that it had not

previously seen a crack-like indication at a DFH location similar to this indication. As a result, the licensee expanded the +Point™ scope to include all DFH indications in SG 31, in accordance with the Electric Power Research Institute guidelines. The original +Point™ scope for DFH locations was a 20 percent sample in both SGs. The DFH indication at row 9, column 125 location was first identified in 1994. There are 1,111 DFH locations in SG 31 and 960 DFH locations in SG 32. This tube was planned to be in-situ pressure tested.

- The tube located at row 74, column 88 in SG 31 contained a flaw with an actual length of 1.44 inches, a structural equivalent length of 0.65 inches, and a structural equivalent depth of 62.1 percent TW. The flaw was located at a batwing location (BW1). This tube was planned to be in-situ pressure tested.
- The tube located at row 95, column 55 in SG 31 contained a flaw with an actual length of 0.68 inches, a structural equivalent length of 0.60 inches, and a structural equivalent depth of 73.6 percent TW. The flaw was located between the 01H and 02H eggcrate supports. The licensee stated that the size of this flaw may be “inflated,” because a ding and a flaw were identified at the same location. This tube was planned to be in-situ pressure tested.
- During the 45-degree batwing through bundle inspections of SG 31, wear was identified in the stay-cavity region on the tube located at row 35, column 79.
- The following abbreviations were used by the licensee in the material provided in support of the April 18, 2011, conference call
 - BW – Batwing
 - DFH – Distorted Freespan Historical
 - EPRI – Electric Power Research Institute
 - FOSAR – Foreign Object Search and Retrieval
 - xxH – Tube support plate number, hot-leg side
 - kHz - Kilohertz
 - MRPC – Motorized Rotating Pancake Coil
 - ODSCC – Outside Diameter Stress Corrosion Cracking
 - PLP – Possible Loose Part
 - PWSCC – Primary Water Stress Corrosion Cracking
 - TEC – Tube End Cold
 - TEH – Tube End Hot
 - TSH – Tubesheet Hot
 - TTS – Top of Tubesheet
 - V – Volts

The NRC staff did not identify any issues that required follow-up action at this time, however, the staff asked to be notified in the event that any unusual conditions were detected during the remainder of the outage.

Subsequent to the April 18, 2011 call, the licensee provided additional information regarding the results of the in-situ pressure testing. The three tubes that were in-situ pressure tested were subjected to pressures up to and including 3-times normal operating pressure. All three tubes satisfactorily met the acceptance criteria of the in-situ pressure test and were subsequently plugged.

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/RA/
N. Kalyanam, Project Manager
Plant Licensing Branch IV
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ADAMS Accession No. ML111380641

*Memo dated

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