

August 28, 2008

Mr. Gene St. Pierre, Site Vice President
c/o Michael O'Keefe
Seabrook Station
FPL Energy Seabrook, LLC
PO Box 300
Seabrook, NH 03874

SUBJECT: REVIEW OF STEAM GENERATOR TUBE INSPECTION REPORT FOR FALL
2006 - SEABROOK STATION, UNIT NO. 1 (TAC NO. MD5947)

Dear Mr. St. Pierre:

By letter dated October 26, 2006 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML063040324), and May 23, 2007 (ADAMS Accession No. ML071510197) FPL Energy Seabrook, LLC (FPLE) submitted information summarizing the steam generator (SG) tube inspections performed at Seabrook Station, Unit No. 1 (Seabrook) during the fall 2006 refueling outage (OR11). FPLE provided additional information regarding the SG inspections in letters dated June 18, 2008 (ADAMS Accession No. ML081750527), and August 8, 2008 (ADAMS Accession No. ML082260306).

The Nuclear Regulatory Commission staff has completed its review of your submittals as documented in the enclosed evaluation. The staff concludes that FPLE has provided the information required by the Technical Specifications and that no additional follow-up is required at this time. This completes the NRC staff efforts for TAC No. MD5947.

If you have any questions regarding this matter, I may be reached at 301-415-2481.

Sincerely,

/ra/

G. Edward Miller, Project Manager
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-443

Enclosure: As stated

cc w/encl: See next page

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EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

STEAM GENERATOR TUBE INSPECTION REPORT FOR FALL 2006

SEABROOK STATION, UNIT NO. 1

DOCKET NO. 50-443

1.0 INTRODUCTION

By letter dated October 26, 2006 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML063040324), and May 23, 2007 (ADAMS Accession No. ML071510197) FPL Energy Seabrook, LLC (FPLE) submitted information summarizing the steam generator (SG) tube inspections performed at Seabrook Station, Unit No. 1 (Seabrook) during the fall 2006 refueling outage (OR11). FPLE provided additional information regarding the SG inspections in letters dated June 18, 2008 (ADAMS Accession No. ML081750527), and August 8, 2008 (ADAMS Accession No. ML082260306).

2.0 BACKGROUND

Seabrook has four Westinghouse Model F SGs, each of which contain 5,626 thermally treated Alloy 600 tubes. Each tube has a nominal outside diameter of 0.688 inches and a nominal wall thickness of 0.040 inches. During SG fabrication, the tubes were hydraulically expanded, at both ends, over the full length of the tubesheet. Type 405 stainless steel support plates, which have broached quatrefoil holes, support the vertical section of the tubes, and anti-vibration bars support the U-bend section of the tubes.

FPLE provided the scope, extent, methods, and results of their SG tube inspections in the documents referenced above. The licensee also described corrective actions in the form of tube plugging and tube stabilization taken in response to the inspection findings.

At the time of inspection, the SGs had accumulated approximately 165.6 Effective Full Power Months (EFPM) of operation. At the time of the inspection, the SGs had experienced approximately 34.7 EFPM of operation in the second sequential period, which is 90 EFPM in duration.

3.0 EVALUATION

Based on the Nuclear Regulatory Commission (NRC) staff's review of the information submitted by FPLE, the NRC staff has the following observations and comments:

- No crack-like indications were detected during this outage (OR11);
- Inspections of the tube support plate quatrefoils were performed in previous outages and

they showed insignificant blockage in the tube support plate quatrefoil area. Seabrook has started Advanced Scale Conditioning Agent (ASCA) treatment to reduce the total scale loading in the SGs. In OR12 (2008), a full bundle copper ASCA was performed.

- Pressure Pulse Cleaning was performed on the Seabrook SGs during OR04 and OR05. This cleaning process resulted in wear indications in several tubes. These indications have been tracked since that time with no change in the depth of the indications.
- In SG-C, 14 tubes were preventatively plugged (but not stabilized) in an area where a loose part could not be retrieved. Because the loose part had caused wear in two tubes, FPLE plugged 14 tubes around the two tubes that showed wear, in order to "box in" the tubes affected by the wear. FPLE indicated that tube severance from the object is extremely unlikely and that a postulated severed tube is constrained from further propagation by the surrounding tubes that were plugged. The NRC staff notes that, at another plant, a cascading failure of plugged tubes has led to a tube rupture in the past, and, depending on the nature of the loose part and the thermal hydraulic conditions in the region where the loose part is located, continued wear of a plugged tube can lead to its failure (severance) and this type of failure can continue unnoticed on other plugged tubes. In addition, new loose parts in this region would also potentially go unnoticed. This sequence may be mitigated through periodic inspection of the region (e.g., through visual or eddy current inspection of the plugged tubes) or stabilizing the tubes surrounding the loose part.
- The licensee performed upper-bundle in-bundle tube support plate inspections of the SGs as a part of foreign object search and retrieval (FOSAR) in 2000 (during OR07) and in 2002 (during OR08).

4.0 CONCLUSION

The NRC staff concludes that the licensee provided the information required by the Seabrook Technical Specifications and that no additional follow-up is required at this time. The inspections appear to be consistent with the objective of detecting potential tube degradation and the inspection results appear to be consistent with industry operating experience at similarly designed and operated units.

Principal Contributor: A. B. Johnson

Date: August 28, 2008