December 29, 2003

Mr. Mark E. Warner, Site Vice President
c/o James M. Peschel
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PO Box 300
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SUBJECT: SEABROOK STATION, UNIT NO. 1 - SUMMARY OF CONFERENCE CALL WITH FPL ENERGY SEABROOK, LLC REGARDING THE 2003 STEAM GENERATOR INSPECTIONS (TAC NO. MC0721)

Dear Mr. Warner:

On October 13, 2003, the Nuclear Regulatory Commission (NRC) staff participated in a conference call with FPL Energy Seabrook, LLC (the licensee), regarding the steam generator (SG) tube inspection activities at Seabrook Station, Unit No. 1, during the October 2003 refueling outage. The conference call occurred after a number of the tubes had been inspected, but before the SG inspection activities were completed. A summary of the conference call is enclosed.

This completes the NRC staff's efforts under TAC No. MC0721.

If you have any questions regarding this matter, please contact me at (301) 415-1484.

Sincerely,

/RA/

Victor Nerses, Senior Project Manager, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-443

Enclosure: Summary of Conference Call

cc w/encl: See next page

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SUMMARY OF NUCLEAR REGULATORY COMMISSION STAFF CONFERENCE CALL WITH

FPL ENERGY SEABROOK, LLC

REGARDING STEAM GENERATOR INSPECTION RESULTS AT

SEABROOK STATION, UNIT NO. 1

On October 13, 2003, members of the Nuclear Regulatory Commission (NRC) staff held a conference call with representatives of FPL Energy Seabrook, LLC (the licensee) to discuss their steam generator (SG) tube inspection activities at Seabrook Station, Unit No. 1 during their October 2003 refueling outage (RFO). At the time of the call, the licensee had completed approximately 48% of the bobbin coil data acquisition and 22% of the bobbin coil data analysis. In addition, the licensee had completed approximately 48% of the rotating probe data acquisition and analysis. A summary of the conference call is as follows:

The licensee reported that primary-to-secondary leakage in the cycle prior to this RFO was below their reporting level of 1 gallon per day (gpd). This reporting level is consistent with the sensitivity of the leakage monitoring techniques used at the plant. The only measurable leakage was in SG B where the leak rate typically fluctuated between 0.2 and 0.5 gpd, with spikes up to 0.7 gpd. This leakage was consistent with that observed in previous cycles and the cause has not been determined. The leakage has been attributed to the leak-minimizing plugs used in the SG. Given the low levels of leakage, the licensee was not going to conduct any secondary side pressure tests.

The licensee's initial inspection scope, as of October 13, 2003, was as follows:

- Full length bobbin examination of 100% of the in-service/active tubes with the exception of the U-bend region of tubes in rows 1 and 2 in all four SGs.

- Rotating probe examination of 20% of the tubes from three inches above to three inches below the top of the hot leg tubesheet in all four SGs. The licensee specified that if the sludge pile is greater than three inches above, then they will inspect to the top of the sludge pile, but the sludge pile usually stays less than three inches.

- Rotating probe examination of 20% of the tubes in U-bend region of the tubes in rows 1 and 2 in all four SGs.

- Rotating probe examination of 20% of dents and dings greater than five volts in the hot leg tubes in all four SGs.

- Rotating probe examination of 100% of the indications identified as "I Codes" in all four SGs based on examination with a bobbin probe.

The scope of this initial examination differs from that summarized in the NRC's letter dated July 23, 2003, which can be accessed electronically at the NRC's website in the Agencywide Documents Access and Management System (ADAMS) under accession number

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ML031970605. The licensee indicated their plans had changed, but were consistent with industry guidance contained within Electric Power Research Institute (EPRI) “Pressurized Water Reactor Steam Generator Examination Guidelines: Revision 6."

The licensee also discussed their plans to expand this initial inspection if degradation was found (i.e., in cases where the initial sample size was less than 100%, the licensee would expand the inspection to include more tubes if degradation was identified). For example, the licensee indicated that if they found cracking in the sludge pile region, they would expand the inspection to include 100% of the tubes in the sludge pile region. In addition, they indicated that they would expand the axial extent of the inspection (on a per-tube basis) if the sludge height exceeded three inches above the top of the tubesheet. The licensee also indicated they would expand the dent and ding inspection to include 100% of the dents and dings greater than five volts if a crack was found during the initial sample inspection, and they would also inspect 20% of the dents and dings less than five volts.

At the time of the conference call, the licensee had identified a number of indications of wear at the anti-vibration bars, an expected degradation mechanism that has been observed in past inspections. Three of these indications were greater than 40% through-wall, 17 tubes were between 30-39%, 60 tubes were between 20-29%, and 145 tubes were less than 20%. The largest indication was 43% through-wall. The licensee indicated that their structural limit was 75% through-wall (i.e., wear degradation below 75% through-wall would not challenge the structural integrity limits of the tube).

Subsequent to the 2002 RFO, the licensee identified six tubes in SG D displaying an eddy current signal offset similar to that observed in the tubes with axial outside-diameter stress corrosion cracking (ODSCC) (refer to ADAMS accession number ML023170187 for additional information regarding the eddy current signal offse). All six tubes had been examined with a bobbin coil during the 2003 outage and two of six tubes had bobbin coil indications similar to the bobbin indications detected in 15 other tubes during the 2002 outage. A total of seven tube support plate intersections in the two tubes had bobbin coil indications. Five of these indications were in one tube (at hot-leg tube supports 2, 3, and 4 and cold-leg supports 2 and 5) and two were in another tube (at hot-leg tube supports 3 and 5). The bobbin coil voltage for the largest indication was 0.48 volts, which is less than the largest voltage of 1.3 volts observed during the 2002 outage. Rotating probe examinations of these indications had not been completed at the time of the call, but the licensee was planning to perform these inspections. All six tubes with the eddy current offset signal will be plugged. In addition, the licensee indicated that they would plug all crack like indications and all indications of wear that exceed the tube plugging limit (i.e., 40% through-wall).

To assist in assessing the nature of a bobbin coil indication, the licensee indicated that they will perform a review of previous inspection data (i.e., look backs) using eddy current data from RFOs five and six as their baseline. If bobbin indications detected in 2003 differ from the “baseline” data by 15° in phase angle or 0.5 volts, the licensee will further inspect the location with a rotating probe to determine if there is service-induced degradation at this location. When distorted support plate signal indications (DSIs) are identified in the bobbin data, the licensee performs a rotating probe examination at this location unless it has been previously been inspected with a rotating probe in a prior inspection and the indication has not changed (by 15° in phase angle or 0.5 volts). The staff questioned the basis for this practice given the finding of OSSCC at the tube support plate elevations. The licensee indicated that the DSIs included in

this population of indications are more indicative of deposits or manufacturing burnishing marks (based on evaluation of the low frequency bobbin data) and are not similar to the bobbin indications at supports that were attributed to ODSCC. In addition, the licensee indicated that they allow the production analysts to identify these distorted indications as having exhibited "change" if the signal looks different even if they do not meet the criteria provided above. At the time of the call, the licensee estimated that they planned on potentially examining approximately 50 to 100 of such indications with a rotating probe.

At the time of the call, no new degradation mechanisms were identified in any of the four SGs. In addition, the licensee did not plan on using any other probes during the inspection other than the bobbin coil or rotating probe (unless the results of the inspection indicated a need for further diagnostic examination of an indication). At the time of the call, the licensee had not identified any tubes for in-situ pressure testing; however, the licensee indicated they would follow the EPRI in-situ pressure test guidelines to determine whether any indications needed to be tested. At the time of the call, the licensee had not completed their eddy current data acquisition and analysis and had not completed their tube plugging.

The licensee performs foreign object search and retrieval (FOSAR) to detect loose parts. FOSAR is performed in the tube lane and the tubesheet annulus. After sludge lancing is complete, a visual inspection on portions of the secondary side of the SG is also performed. At the time of the conference call, the licensee had completed their inspection for loose parts in SGs A, B, and C. In SG D, sludge lancing operations were still underway.

In SG A, the licensee detected a 3 ½ inch-long double-headed carpenter's nail, which was believed to have been used during construction of the plant. No tube degradation associated with this part had been observed at the time of the call, although all eddy current examinations were not complete (e.g., rotating probe inspections). The nail was removed from the SG.

In SG B, the licensee detected a piece of an eyeglass temple and two pieces of flexitallic gasket. All of these parts were removed from the SG during this outage. The eyeglass temple had been identified during RFO 7 and engineering analysis concluded that it was acceptable to leave the part in the SG until RFO 9. The eyeglass temple was removed from the SG. The licensee speculated the eyeglass temple had been in the SG since construction, since the other half of an eyeglass temple had been removed during RFO 1. The licensee was still performing eddy current testing on the tubes in the vicinity of this part. The pieces of flexitallic gasket were most likely introduced into the SG as a result of a condensate pump strainer failure in 1997. The pieces were approximately 1/4 inch long and were found in the tubesheet annulus (i.e., the portion of the tube sheet between the peripheral tubes and the SG wrapper).

In SG C, rotating probe eddy current testing revealed a possible loose part indication in one tube and a single volumetric indication in an adjacent tube. A visual inspection in the region of these indications revealed a nail. At the time of the call, the licensee was making arrangements to retrieve the loose part. If the licensee is not successful in retrieving the nail, then the tube will be plugged. The licensee speculated that the nail could have come from wood scaffolding used in construction. The single volumetric indication had not been sized at the time of the call since the licensee needed to re-acquire the eddy current data using a calibration standard suitable for sizing loose part wear indications.

The licensee also indicated that they performed examination of all installed plugs on the hot-leg side of the SG with no evidence of leakage from the plugs. Examinations of the plugs on the cold-leg side of the SG were planned for later in the outage.

The NRC did not identify any issues with the scope or results of the examinations as a result of the information provided during the call. The NRC asked to be informed if the licensee detects any more crack-like indications or any new degradation mechanisms during the remainder of the inspections.

Subsequent to the phone call, the staff was informed that upon additional review of the six tubes with an eddy current offset signal, one additional tube was classified as having an axial crack-like indication. As a result, a total of three tubes had axial crack-like indications and three had no detectable degradation. All six tubes were to be plugged. The indication in this additional tube was found with a bobbin coil and had a very low voltage (0.04 volts).

In addition, the staff was informed that the nail in SG C, which was discussed above, was removed from the SG. As a result, there is only one known foreign object remaining in any of the four SGs. This foreign object was identified in SG C during the first RFO and remains steadfastly stuck between two tubes in its original location.