February 25, 2003

Mr. Ronald A. Jones
Vice President, Oconee Site
Duke Energy Corporation
P. O. Box 1439
Seneca, South Carolina 29672

SUBJECT: SUMMARY OF CONFERENCE CALL WITH DUKE ENERGY REGARDING THE 2002 STEAM GENERATOR INSPECTIONS AT OCONEE NUCLEAR STATION, UNIT 2 (TAC NO. MB6299)

Dear Mr. Jones:

On October 24, October 30, and November 1, 2002, your staff and our staff participated in conference calls regarding the ongoing steam generator tube inspection activities at Oconee Nuclear Station, Unit 2. Enclosure 1 is a summary of the conference calls. Enclosures 2, 3, and 4 are material that was provided by your staff in preparation for the calls.

Sincerely,

/***RA***/

Leonard N. Olshan, Project Manager, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-270

Enclosures:
1. Summary of Conference Calls With Duke Energy Regarding Fall 2002 Steam Generator Inspection Results at Oconee, Unit 2
2. Telefax entitled, “NRC Conf Call for ONS 2 EOC-19,” dated 10/24/02
3. E-mail entitled, “Duke Energy Corporation ONS 2 EOC-19 Preliminary Report,” dated 10/30/02
4. E-mail entitled, “Duke Energy Corporation ONS-2 EOC-19 Preliminary Information,” 11/1/02

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SUMMARY OF CONFERENCE CALLS

WITH

DUKE ENERGY

REGARDING FALL 2002

STEAM GENERATOR INSPECTION RESULTS

AT OCONEE NUCLEAR STATION, UNIT 2

On October 24, October 30 and November 1, 2002, the NRC staff participated in conference calls with Duke Energy (the licensee) representatives regarding the ongoing steam generator tube inspection activities at Oconee Nuclear Station, Unit 2. The issues discussed included those listed in the enclosure to the letter documenting the arrangement of these conference calls. This letter was sent to Duke Energy on September 13, 2002 (ML022470003). The licensee provided written material in support of these calls (Enclosures 2, 3, and 4).

October 24, 2002, Conference Call

At the time of the call, inspections with the bobbin coil probe were ongoing and special interest inspections with a motorized rotating pancake coil (MRPC) were approximately 10 percent complete. Details of the licensee's response to the staff's 16 questions are contained in Enclosure 2. Clarification on some of the responses was provided during the conference call and is documented below.

- In response to the question on initial inspection scope (Attachment A to Enclosure 2), the licensee stated that the "MRPC Lower Tubesheet Rolls" were original 1-inch expansions that were previously stress-relieved and subsequently rerolled. In addition, the licensee stated that the kidney region (sludge pile) covers the area just above the lower tubesheet (i.e., cold leg).

- In response to question 4, the licensee described its response to Framatome's notification of the effect of tubesheet hole dilation on the service life of Babcock and Wilcox welded plugs. The licensee verified that it had not, and will not, exceed the allowable heatup and cooldown cycles for each plug type prior to steam generator replacement, which is scheduled for the next refueling outage.

- In response to question 5, the licensee described the Oconee, Unit 2, inspection and plugging plans with respect to the industry-identified severed tube issue. During the conference call, the licensee stated that all deplugged tubes were inspected for swelling. The licensee also said that the response that states, "All plugged tubes that met the following criteria with rolled plugs in the inlet, were removed....," was not meant to imply that only the plugs in the upper tubesheet (i.e., inlet) were inspected. The plugs in the lower tubesheet that met the criteria were also inspected. In addition, the licensee stated that the four tubes in the B once-through steam generator that had a volume of water less than 70 percent were only replugged, not stabilized. Tube B32-8, which had a volume of water

greater than 87 percent, did not have a throughwall defect; the only flaw identified was the original flaw that caused the tube to be plugged.

At the conclusion of this call, staff requested an additional phone call to discuss the inspection results when approximately 70 percent of the MRPC data analysis would be completed.

October 30, 2002, Conference Call

On October 30, 2002, the staff participated in a second conference call with the licensee. Approximately 70 percent of the MRPC data analysis had been completed. The purpose of this call was to update the staff on the results of the steam generator inspections. Written material was provided in support of this call (Enclosure 3). Clarification on some of these responses was provided during the conference call and is documented below.

- At the time of the call, the licensee had identified 380 axial freespan stress corrosion crack/ intergranular attack (IGA) indications in the A steam generator. The licensee indicated that this was a larger number than had been identified during the previous inspection. However, this was not unexpected and was one of the degradation modes that led to the decision to replace the steam generators during the next refueling outage. Typically, these indications are located above the 14th tube support plate and are short and shallow.

- The licensee had identified seven IGA indications. The IGA indications were volumetric in nature, initiated from the outside diameter and were located very close to the lower tubesheet (inside or just above the top of the lower tubesheet).

- The licensee had identified one wear indication located at a tube-to-tube support plate intersection that required plugging. The wear mark was located at the tube support plate land and the indication depth was tapered, as would be expected with these type of wear marks.

  The staff questioned how the licensee determined whether the volumetric degradation was IGA or wear, because IGA is typically plugged on detection and wear is plugged based on its depth. The licensee stated that all indications identified by the bobbin probe are inspected with a MRPC probe for further characterization. In addition, a tube was previously pulled with wear marks, which provides additional basis for the licensee's dispositioning strategy.

- The licensee had identified eight tubes to be plugged due to "miscellaneous" reasons. The licensee gave examples of the possible reasons that these tubes were selected for plugging: permeability, which may mask an indication; and multiple dents, which may mask an indication.

- The licensee indicated that all eddy current analysis is performed manually (i.e., computer data screening techniques are not utilized).

- Based on an issue that was identified at another pressurized water reactor during its Fall 2002 outage, the staff questioned whether Oconee procedures prevented analysts from identifying a signal as a potential indication if the change in phase angle or voltage did not meet certain criteria. The licensee stated that the analysts were allowed to identify a signal

as a potential indication without consideration of the change in phase angle or voltage, since plant-specific experience in 1992 had shown this practice to be prudent.

- Ten tubes with axial outside diameter stress corrosion cracking (ODSCC) indications in steam generator 2A had been in situ pressure tested at the time the call took place. These tubes were tested up to three times the normal operating pressure differential with no leakage. Out of the 10 tubes tested, 3 contained flaws that required that the tubes be in situ tested, due to structural integrity concerns, in accordance with the Electric Power Research Institute Steam Generator Insitu Pressure Test Guidelines. The remaining seven were selected for testing because their eddy current parameters were outliers (e.g., voltage, length, etc.). The maximum flaw length tested was 4 inches (most axial indications in the Oconee, Unit 2, steam generators range from 0.25 - 0.4 inches). The maximum flaw voltage tested was 1.1 volts. The maximum flaw depth tested was 84 percent throughwall as measured by eddy current.

  The axial ODSCC indications in the 2B steam generator appear to be similar to the indications identified and tested in steam generator 2A.

The staff did not identify any issues requiring followup, but requested that the licensee contact the staff if the remaining inspections identified any significant degradation, a degradation mode or location other than that discussed during the conference call, a failure of an in situ pressure test, or an incomplete in situ pressure test.

November 1, 2002, Conference Call

The licensee requested a followup conference call with the staff on November 1, 2002, because of an incomplete in situ pressure test. Tube 37-27 in steam generator 2B, which contained an axial flaw, failed to reach the full test pressure of 4300 psig during the in situ pressure test. The licensee pressurized the tube to 3900 psig, which was a temporary hold pressure. The hold period was just beginning when the leakage rate exceeded the capacity of the test system and the system pressure dropped to close to zero. The in situ test was a full length (i.e., tube end to tube end) water pressure test. The axial indication was located 4.41 inches above the 15th tube support plate. The deepest point in the indication was measured to be 95 percent throughwall and the flaw was estimated to be 3 inches long. The axial flaw was located coincident with a dent and a volumetric (manufacturing burnish mark) signal. The dent was approximately 6 volts, which is equivalent to a 2-volt dent according to industry standard calibrations (i.e., the licensee for Oconee 2 uses a different calibration standard for measuring dent voltages than that commonly used in industry).

This location in tube 37-27 was inspected during the 1999 and 2001 outages with a rotating probe. At that time, an axial flaw was not identified. As a result of identifying the axial flaw during the 2002 steam generator inspection, the licensee reassessed the 1999 and 2001 inspection data and determined the flaw was actually present during those inspections as well. The licensee believed it was the combination of the dent and volumetric signal that proved challenging for the analyst. From the 2002 inspection data, the licensee identified 28 additional locations that contained a dent and a volumetric signal at the same location. Although the licensee did not identify the presence of a flaw at any of these locations, the licensee chose to preventively plug all the affected tubes. In addition, the licensee reviewed the steam generator inspection data from the previous Unit 1 and Unit 3 inspections. In Unit 1, the licensee

identified 13 tubes that contained a dent and a volumetric signal at the same location. However, the licensee did not identify the presence of a flaw at any of these locations. In Unit 3, the licensee did not identify any tubes that contained a dent and a volumetric signal at the same location.

At this time, the licensee had completed its in situ pressure tests. Ten tubes were in situ pressure tested in steam generator 2A and 11 tubes were tested in steam generator 2B. All tubes passed the in situ pressure test, except for tube 37-27 discussed above.

The staff determined that additional followup on this issue was warranted. This followup was performed as part of an ongoing NRC inspection. Additional details on this issue can be found in NRC Integrated Inspection Report 50-269/02-05, 50-270/02-05, and 50-287/02-05, dated February 3, 2003 (ML030350221).

February 25, 2003

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