March 5, 2008

Mr. Mark B. Bezilla
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SUBJECT: DAVIS BESSE NUCLEAR POWER STATION, UNIT NO. 1 - SUMMARY OF CONFERENCE TELEPHONE CALL REGARDING THE 2008 STEAM GENERATOR TUBE INSPECTIONS (TAC NO. MD7455)

Dear Mr. Bezilla:

On January 12, 2008, the Nuclear Regulatory Commission (NRC) staff participated in a conference call with Davis-Besse Nuclear Power Station, Unit No. 1 representatives regarding the ongoing steam generator (SG) tube inspection activities conducted during their 2008 outage. The NRC follows the results of the industry's SG inspections in order to maintain an awareness of the condition of the SGs and the types of tube degradation mechanisms that are active.

The enclosed documentation of the phone call is provided to FirstEnergy Nuclear Operating Company (FENOC) for information. Also, included is a copy of the information provided by FENOC in support of the conference call. If there are any questions, please contact me at 301-415-4037.

Sincerely,

/RA/

Thomas J. Wengert, Project Manager
Plant Licensing Branch III-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-346

Enclosure: Conference Call Summary

cc w/encls: See next page

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SUMMARY OF CONFERENCE CALL WITH
DAVIS-BESSE NUCLEAR POWER STATION, UNIT NO. 1
REGARDING THE 2008 STEAM GENERATOR TUBE INSPECTION RESULTS

On January 12, 2008, U.S. Nuclear Regulatory Commission (NRC) staff participated in a conference call with Davis-Besse Nuclear Power Station, Unit No. 1 (DBNPS) representatives regarding the 2008 steam generator (SG) tube inspection activities. Prior to the conference call, the licensee provided several slides to facilitate the discussion. These slides are attached.

DBNPS has two Babcock and Wilcox (B&W) once-through SGs designated SG "1B" and SG "2A." Each SG has approximately 15,500 Alloy 600 tubes in the mill-annealed condition. The tubes have a nominal outside diameter of 0.625 inches and a nominal wall thickness of 0.037 inches. Both SG "1B" and "2A" contain tubes with sleeves.

Additional clarifying information or information not included in the document provided by the licensee is summarized below.

At the time of the call, DBNPS SGs had operated for 19.2 effective full power years. In the recently completed cycle, they operated for 594 effective full power days. SG 2A has 3.8 percent (or 579) tubes plugged and SG 1B has 1.6 percent (or 244) tubes plugged. These two SGs are scheduled to be replaced in 2014 during refueling outage (RFO) 18.

The primary-to-secondary leakage rate during the recently completed cycle was below the threshold of detection of 0.02 gallons per day (based on the condenser off gas radiation monitor). Since there was no primary-to-secondary leakage, no secondary side pressure tests were performed.

No exceptions were taken to the industry Pressurized Water Reactor Steam Generator Examination Guidelines.

In the Table, "Davis-Besse 15 RFO Eddy Current Exam Scope":

The +Point™ examination of the sleeves included the parent tube at the uppermost sleeve joint. No indications were found at this location.

All dents below the fourteenth tube support (14S) were inspected with a +Point™ coil. The table has a typographical error and lists "B10" instead of "14S".

The "gross mean distortions" are the result of scoring of the inside diameter of the tube. The scoring occurred when a tool used for sleeving the tubes was removed from the tubes.

The "magnetic stain indications" are from ferrous deposits staining the interior of approximately 23 tubes. These tubes were stained in 2000 when a wire bristle brush came apart in the upper channel head. The bristles were approximately 2 inches long and 0.014 inches in diameter. When the plant went into operation, the bristles oxidized and dissolved, staining the interior of some tubes.

Enclosure

In the sludge pile, a 20 percent sample of the tubes was inspected from above the sludge pile to 3 inches below the top of the tubesheet with a +Point™ coil. There was no degradation found. In determining the axial extent of the inspection, the licensee considered past operating experience and also studied the probability of detection and its effect on leakage.

In the table entitled "Axial Indications," the licensee listed three indications attributed to groove intergranular attack (IGA). Just prior to the call, the licensee identified a fourth indication attributed to groove IGA. From the +Point™ probe, the new indication was estimated to be 1 percent through wall, 0.76 inches long, and 0.31V. The maximum depth of these four indications was estimated to be 20 percent through wall. None of these indications were scheduled to be in-situ pressure tested since they did not pass the screening criteria based on +Point™ voltage or depth. The +Point™ coil is calibrated on axial electric discharge machined notches.

The indications listed as "roll transition PWSCC [primary water stress corrosion cracking]" is in the actual expansion transition and not in the base roll. The "reroll transition PWSCC" indications are in the heel of the re-roll (i.e., not in the pressure boundary portion of the tube). The tubes with these indications will most likely be plugged since they are considered to be in tubes susceptible to cracking.

The number of new tube end indications is consistent with previous outages. The indications are confined to the weld heat affected zone of the tube-to-tubesheet weld. A number of the new tube end indications are candidates for repair by re-rolling. If the tube can not be repaired by re-rolling, then it will be plugged. Tube end cracks are assumed to leak if their voltage is greater than 2 volts. In addition, for condition monitoring, the tube end cracking alternate repair criteria methodology for assessing leakage is followed (even though the plant is not licensed to leave these indications in service).

One circumferential indication attributed to PWSCC at the tube end was detected. The indication is in the heat affected zone and is not expected to leak.

In accordance with technical specification 2.C(7), the licensee informed the NRC staff that the best estimate primary-to-secondary leak rate during a large break loss of coolant accident is approximately 0.3 gallons per minute which results in radiological consequences below the limits of Title 10 of the *Code of Federal Regulations* (10CFR) Part 100. The postulated leakage comes from approximately three circumferential indications in several tubes repaired by re-rolling in the periphery of the tube bundle. The indications are above the repair rolls. The methodology for assessing the leakage considers the dilation of the tube/tubesheet hole during the large break loss of coolant accident. This information will be summarized in a report to be submitted within 3 months following completion of the SG tube inspections.

In the table entitled “Volumetric Indications (not in Previously Rerolled Tubes)”:

> At the time of the call, evaluations were still on-going about whether all the volumetric indications on the table were flaws.
>
> The indication in the tube in row 143, column 12 has an estimated depth of 87 percent through wall. This indication is attributed to a foreign object. This foreign object (suspected to be a fuel assembly grid scrap or other material from the reactor coolant system) was predicted to have entered through the hot leg. No loose part was found. Upon visual inspection, this tube end is curled outward (i.e., away from the inside of the tube). There is no IGA, and this tube is a candidate for re-rolling.
>
> The tube in row 85, column 7 does not have an indication attributed to volumetric IGA in the roll transition. This tube has a region that was mechanically expanded (plastically deformed) below the shop roll. This mechanical expansion was attributed to an anchor pin used in the robot that was used to perform tube sleeving in 1993. The indication can be seen in the 1993 bobbin coil data. The tube will be plugged.
>
> Other than the 2 tubes mentioned above, the rest of the tubes have small indications. Some of these may be reclassified by the analysts. All of the indications are in the periphery in the upper portion of the bundle. The indications are near drilled holes in the tube support plate. There is some sludge build up in this region which can increase the susceptibility of the tube to outer diameter initiated IGA. Any indications attributed to IGA will be plugged.
>
> Tubes with indications will either be repaired by re-rolling (for upper tubesheet indications) or plugged with mechanical rolled plugs.

There were no indications of loose part wear or possible loose parts. There are no indications that currently need to be in-situ pressure tested, and no tubes will be pulled.

SG primary side maintenance activities were scheduled to be complete by January 19, 2008.

Given past experience with re-rolling tubes in the lower tubesheet, tubes with indications in the lower tubesheet are normally plugged rather than being repaired by re-rolling.

There were no SG secondary side inspections performed during this outage.

The licensee stated that when compared to last outage, the results were consistent with their expectations (with the possible exception of the volumetric IGA indications). Also the postulated primary-to-secondary leakage was lower than predicted.

The quality of the data in this outage may have been slightly better than in past outages, since a new eddy current tester was being used. With this new tester,

there was no degradation in signal quality observed. Two tubes were identified with excessive noise. These tubes were scheduled to be re-inspected.

There was no degradation observed in dents, dings, lower tubesheet rolls, sleeves, or the parent tubes associated with the sleeve joints.

There is a program for monitoring the fatigue life of welded plugs.

In 2002, two welded plugs were found to be cracked. These plugs were put in by the SG manufacturer. After removing the cracked plugs, bobbin examinations were performed resulting in the identification of a ¼ -inch hole in the tubes just below the upper tubesheet secondary face. In response to these findings, all 18 tubes with welded plugs installed by the manufacturer were caged (i.e., surrounded by plugged tubes). The repair of the welded plugs eliminated the low levels of primary-to-secondary leakage that had existed since the early 1990s. A visual inspection of the welded plugs during the 2008 outage did not identify any degradation.

For this outage, it was estimated by the licensee that in SG 2A 50 tubes would be plugged and in SG 1B 35 tubes would be plugged. In SG 2A, it was estimated that 39 tubes would be re-rolled and in SG 1B 15 tubes would be re-rolled.

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

In a subsequent phone call on January 25, 2008, the licensee corrected a tube location from the January 12, 2008, phone call. On January 12, 2008, the tube in row 85, column 7 was discussed to have an indication due to plastic deformation; on January 25, 2008, the licensee corrected the tube location to row 65, column 52. The licensee's final report will reflect this change.

ATTACHMENT 1

DAVIS BESSE NUCLEAR POWER STATION STEAM GENERATOR INSPECTIONS DATA

JANUARY 12, 2008