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U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555-0001

Braidwood Station, Unit 2
Facility Operating License No. NPF-77
NRC Docket No. STN 50-457

Subject: Braidwood Station, Unit 2 Ninth Refueling Outage Steam Generator Tube Inspection Report, Additional Information Pertaining to Steam Generator Secondary Side Inspections

Reference: Letter from J. D. von Suskil to U.S. NRC, "Braidwood Station, Unit 2 Ninth Refueling Outage Steam Generator Tube Inspection Report," date April 09, 2003.

In the referenced letter, Exelon Generation Company, LLC, submitted the Braidwood Station, Unit 2 Steam Generator Ninth Refueling Outage Steam Generator Tube Inspection report in accordance with the requirements of Technical Specification 5.6.9, "Steam Generator (SG) Tube Inspection Reports." The NRC Staff has requested Exelon provide a description of the SG secondary side visual inspection scope, results and disposition of any secondary side foreign objects including any tube integrity implications.

The attached report provides the requested information, as well as background information and current planned inspection scope for the next Braidwood Station, Unit 2 SG inspection that is scheduled to be performed in November 2003.

A047

Please direct any questions regarding this submittal to Kelly Root, Regulatory Assurance Manager, at (815) 417-2800.

Respectfully,

A handwritten signature in black ink, appearing to read "M. J. Pacilio", written in a cursive style.

Michael J. Pacilio
Site Vice President
Braidwood Station

Attachment: Exelon Braidwood Station, Unit 2 Ninth Refueling Outage Steam Generator
Secondary Side Inspection Report

Cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Braidwood Station
Office of Nuclear Facility Safety – Illinois Department of Nuclear Safety

Exelon Corporation

Braidwood Station Unit 2

Ninth Refueling Outage

Steam Generator

Secondary Side Inspection Report

1.0 Background

Braidwood Station, Unit 2 is a four loop Pressurized Water Reactor (PWR) with Westinghouse Model D-5 recirculating steam generators. Each steam generator contains 4,570 thermally treated Inconel-600 U-tubes that have a nominal outside diameter of 0.750 inches and a nominal thickness of 0.043 inches. Braidwood Station, Unit 2 operates at a nominal hot leg primary side temperature of 610°F. At the time of the Braidwood Station, Unit 2 ninth refueling outage (A2R09) the unit had operated 11.23 Effective Full Power Years.

The Braidwood Station, Unit 2 ninth refueling outage SG inspections were conducted April 22, 2002 through April 25, 2002. The details of the eddy current inspection results, including tubes plugged during ninth refueling outage and tubes plugged to date are included in the referenced letter. In summary, during the Braidwood Station, Unit 2 ninth refueling outage primary side SG inspections included:

- 100% full length bobbin coil eddy current of SG 2A
- 100% visual inspection of tube plugs in SG 2A

The only indications that required tube plugging were two anti-vibration bar (AVB) wear indications that were 40% through wall. To date there have been a total of 122 tubes removed from service by tube plugging in Braidwood Station, Unit 2.

The following discusses the secondary side inspections performed during the Braidwood Station, Unit 2 ninth refueling outage (A2R09). Included are the results of the inspections, whether the objects were successfully retrieved from the SGs, potential sources of the foreign objects and potential affects on the tubes including tube integrity implications.

2.0 Steam Generator Secondary Side Visual Inspection Scope

During the Braidwood Station, Unit 2 ninth refueling outage the following secondary side visual inspection scope was performed:

- Post sludge lance cleanliness visual inspection and Foreign Object Search and Retrieval (FOSAR) of all 4 SGs
 - o Inspections included top of tubesheet region in the area of the tube bundle periphery, including open tube lane and T-Slot regions
 - o Limited in-bundle tube bundle inspections down two hot leg and cold leg tube columns
- Upper bundle visual inspection and FOSAR at the 8th and 11th tube support plate access opening in the 2A and 2C SGs
 - o Inspections included the open tube lane area and limited in bundle inspection to assess deposit loading.

Refer to Figures A.1 and A.2 for tubesheet map and cross sectional view of the SGs.

All inspections were performed by Westinghouse Electric Co. Ltd. under the direction of Exelon.

3.0 Secondary Side Visual Inspection Results and Disposition

Steam Generator 2A

No foreign objects or indication of tube wear were identified during the secondary side visual inspections of the 2A SG top of tubesheet or upper bundle regions. In addition, the 100% full-length bobbin eddy current inspection of the 2A SG did not identify any foreign objects, or tube wear associated with foreign objects.

Steam Generator 2B

During the top of tubesheet visual inspection of the 2B SG two foreign objects were identified.

Object 1:

A piece of weld slag approximately 1.4" H x 1" L x 0.25" W was identified at cold leg tube location approximately Row 21 Column 79 / 80. The object was successfully retrieved from the SG. The surrounding tube locations were visually inspected and no degradation was identified. Review of eddy current data and video inspection tapes from the previous outage indicates that the object was not present in this location or surrounding locations. An analysis was performed by Westinghouse SG Engineering that showed that potential wear that the object could have induced over the previous cycle would not have exceeded the minimum allowable tube wall thickness, even if there had been a 20% pre-existing wear scar in the area of tube contact.

Object 2:

A piece of weld slag approximately 1.125" H x 1" L x 0.35" W was identified at cold leg tube location approximately Row 22 Column 79/80. The object was solidly wedged between tubes and could not be removed after repeated retrieval attempts. Video inspection of the tubes in contact with the object and surrounding tubes showed no signs of degradation. Review of eddy current data and video inspection tapes from the previous outage indicates that the object was not present in this location or surrounding locations. An analysis was performed by Westinghouse SG Engineering that showed that potential wear that the object could have induced over the previous cycle would not have exceeded the minimum allowable tube wall thickness, even if there had been a 20% pre-existing wear scar in the area of tube contact.

The analysis also took into account the potential for tube wear over the next operating cycle. Braidwood Station, Unit 2 tenth refueling outage (A2R10) is scheduled for early November 2003. Conservatively assuming that the tube has any existing 20% wear scar and the object remains fixed no measurable tube wear would be expected to occur. Assuming the object becomes loose, and either stays in the same vicinity or migrates to a limiting location and then contacts a tube with an existing 20% wear scar, minimum allowable tube wall thickness would not be reached over the next operating cycle.

A condition report was generated to document the foreign objects described above. Review of work activities performed during the previous operating cycle, including the previous refueling outage, did not indicate any activities that could have introduced weld slag into the secondary system. Eddy current inspection and secondary side visual of Object 2 will occur during the Braidwood Station, Unit 2 tenth refueling outage.

No other foreign objects or indication of tube wear were identified during the secondary side visual inspections of the 2B SG.

Steam Generator 2C

A wire bristle approximately 0.125" L x 0.016 W was discovered at hot leg location Row 49 Column 62. The object was successfully retrieved from the SG and surrounding tube locations visually inspected and no degradation was identified. The object was judged not to have the potential of having caused significant tube wear over the previous operating period based on its size and weight. Visual inspection of the upper bundle regions did not identify any foreign objects.

Steam Generator 2D

During the top of tubesheet visual inspection of the 2D SG three foreign objects were identified.

Object 1:

A piece of duct tape approximately 2.25" H x 0.375" L x 0.0625" W was identified at tube lane location approximately Row 1 Column 30 / 32. The object was successfully retrieved from the SG and surrounding tube locations were visually inspected and no degradation was identified. The object was judged not to have the potential of having caused significant tube wear over the previous operating period based on its size and weight.

Object 2:

A small round piece of slag approximately 0.25 inches in diameter was identified at hot leg location Row 49 Column 79. The object was successfully retrieved from the SG and surrounding tube locations visually inspected and no degradation was identified. Review of work activities performed during the previous operating cycle, including the previous refueling outage, did not indicate any activities that could have introduced weld slag into the secondary system. The object was judged not to have the potential of having caused significant tube wear over the previous operating period based on its size and weight.

Object 3

A metal object approximately 0.375" H x 0.25" L x 0.25" W was identified at hot leg location Row 6 Column 2, Row 7 Column 2. The object was first identified during the Braidwood Station, sixth refueling outage and can be traced through back through to the third refueling outage (1993) based on review of eddy current tapes. The object has not changed location based on video inspection and is adjacent to tubes Row 6 Column 2 and Row 7 Column 2. Eddy current results for the previous 6 outages shows that, first, this object has not caused any tube wear, and second, that this object has not moved.

Visual inspections performed during the ninth refueling outage confirmed that the object has not moved and that no wear is occurring on surrounding tubes.

4.0 Upcoming Braidwood Station, Unit 2 Refueling Outage Inspections

The Braidwood Station, Unit 2 tenth refueling outage is scheduled to begin early November 2003. The current inspection scope calls for eddy current inspection of all four SGs including 100% bobbin and 50% hot leg top of tubesheet Plus Point. Secondary side visual inspection and FOSAR is planned for all four SGs. Currently a visual inspection and FOSAR is planned for the high flow preheater regions of all four SGs.

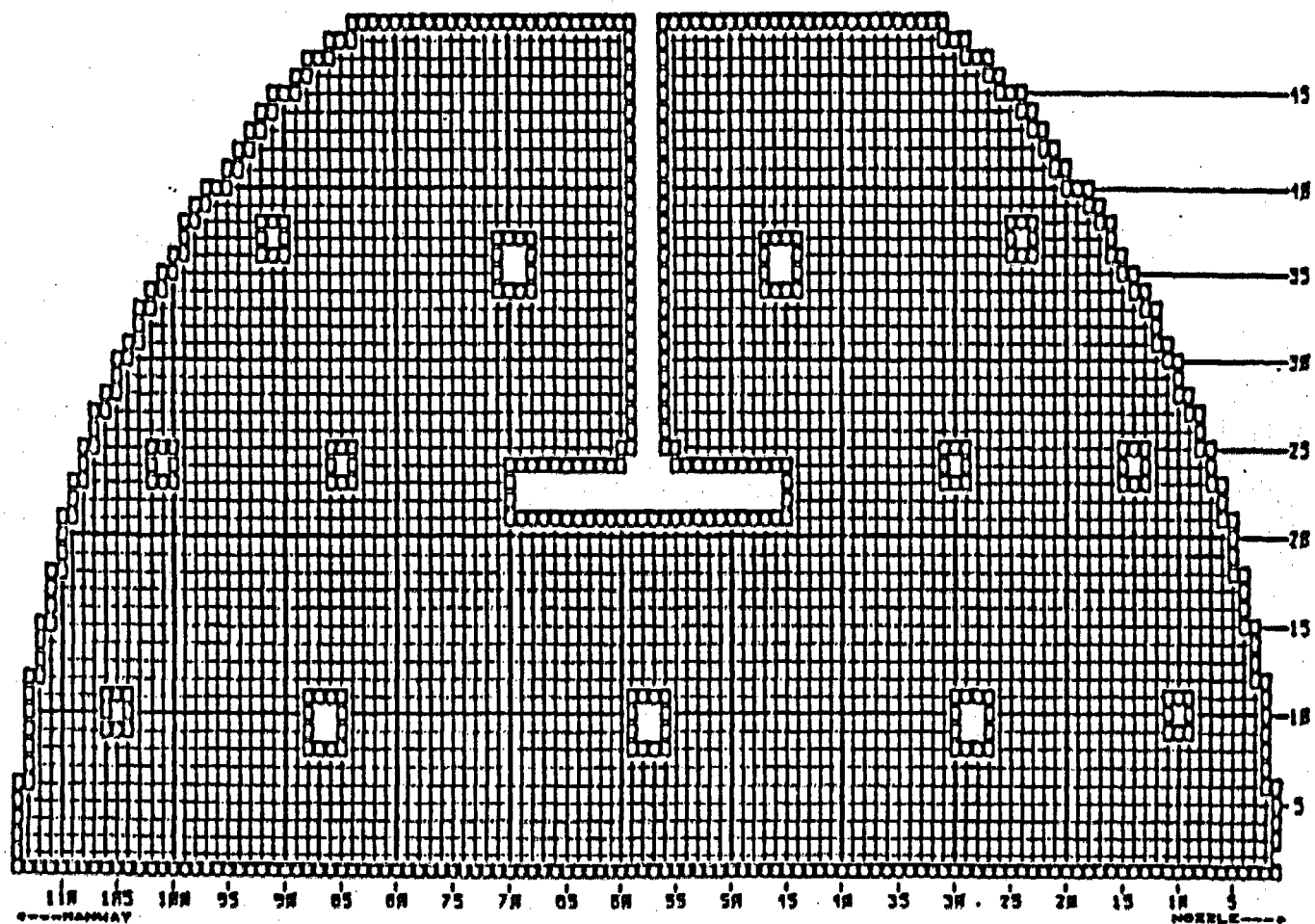
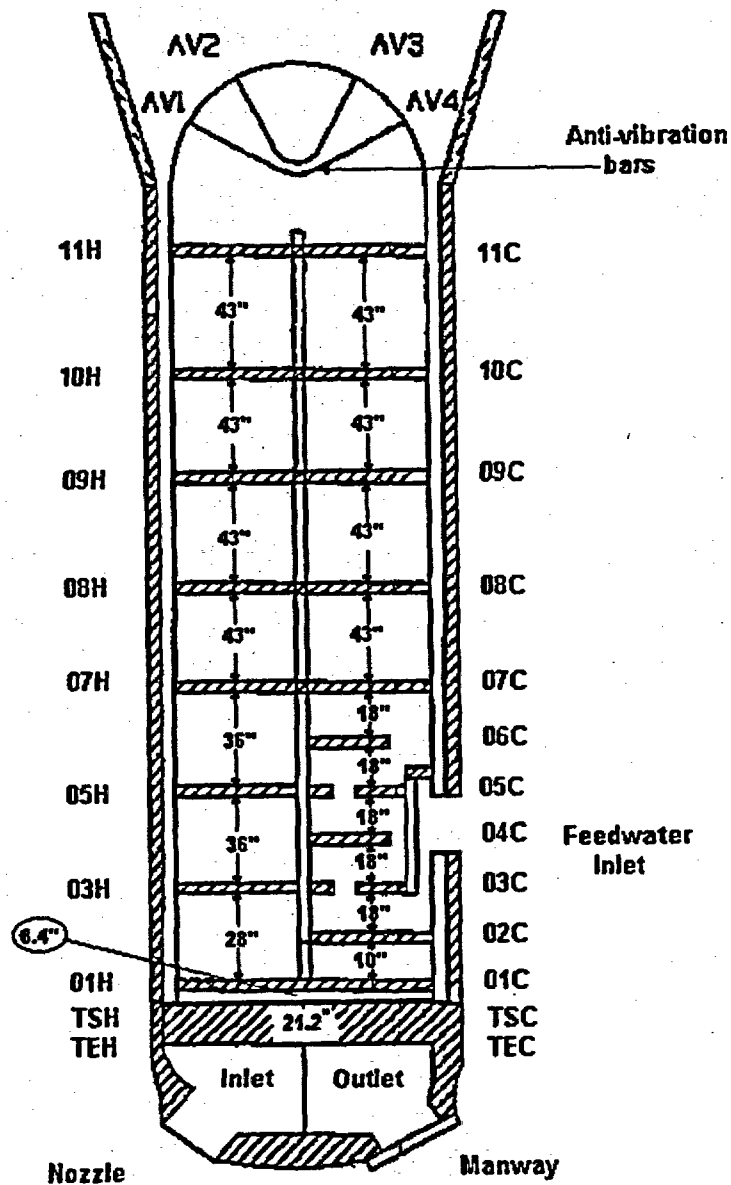


FIGURE A.1
Tubeshheet Map (Typical)

FIGURE A.2
D-5 Support Plate Locations



Note: Tube Support Plate dimensions
are centerline to centerline.