



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

September 22, 2011

Mr. Michael J. Pacilio  
President and Chief Nuclear Officer  
Exelon Nuclear  
4300 Winfield Road  
Warrenville, IL 60555

SUBJECT: BRAIDWOOD STATION, UNIT 2 - SUMMARY OF CONFERENCE CALL  
REGARDING 2011 STEAM GENERATOR TUBE INSPECTIONS (TAC NO.  
ME6106)

Dear Mr. Pacilio:

On April 27, 2011, the Nuclear Regulatory Commission (NRC) staff participated in a conference call with Exelon Generation Company, LLC (the licensee) regarding their ongoing steam generator (SG) tube inspection activities at Braidwood Station Unit 2. Enclosed is a summary of the conference call. This completes the NRC staff efforts for TAC No. ME6106.

If you have any questions regarding this matter, please contact me at (301) 415-1115.

Sincerely,

A handwritten signature in black ink, appearing to read "Nicholas J. DiFrancesco", is written over a horizontal line.

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

Docket No. STN 50-457

Enclosure:  
Conference call summary

cc w/encl: Distribution via Listserv

## SUMMARY OF CONFERENCE CALL

### BRAIDWOOD STATION UNIT 2

#### REGARDING THE 2011 STEAM GENERATOR TUBE INSPECTION RESULTS

##### DOCKET NO. 50-457

On April 27, 2011, the staff of the Steam Generator Tube Integrity and Chemical Engineering Branch of the Division of Component Integrity participated in a conference call with representatives of Exelon Generation Company, LLC (the licensee) regarding their ongoing steam generator (SG) tube inspection activities at Braidwood Station, Unit 2.

Braidwood, Unit 2, has four Westinghouse Model D5 SGs, each containing 4,570 thermally treated Alloy 600 tubes. The tubes have a nominal outside diameter of 0.750 inches and a nominal wall thickness of 0.043 inches. The tubes were hydraulically expanded at both ends for the full length of the tubesheet and are supported by a number of stainless steel tube supports with quatrefoil-shaped holes. The U-bend region of the tubes in rows 1 through 9 was thermally stress relieved after bending.

Information provided by the licensee during the phone call is summarized below.

The SGs have been in service for 19.85 effective full power years and the current inspection is the first inspection performed in the first 60 effective full power month sequential inspection period. The hot-leg operating temperature is 611 °F. (Note: After the conference call, the licensee clarified that while Braidwood Unit 2 is licensed for a  $T_{\text{hot}}$  of 618.4 °F, it has undergone a  $T_{\text{hot}}$  reduction program (UFSAR Section 5.4.2.1.3) to minimize the potential of temperature related SG tube degradation).

There was no primary-to-secondary leakage in the operating cycle preceding the 2011 inspection.

The following primary side inspections were scheduled to be performed:

- 100 percent of tubes in all four SGs with a bobbin probe. At the time of the conference call, the inspections were approximately 95 percent complete. Five tubes were identified with wear at the anti-vibration bars that exceeded the 40 percent through wall (TW) repair criteria and were scheduled to be plugged. Inspection of tubes at support plates in the preheater region showed six tubes with wear ranging from 4 – 41 percent TW, and two tubes that met the repair criteria and were scheduled to be plugged.
- 25 percent of the hot-leg tubes were to be inspected from four inches above the top of the tubesheet (TTS) to 18 inches below the TTS with a +Point probe. This included 25 percent of the expansion transitions, bulges, and overexpansions in all four SGs.
- The U-bend region of 25 percent of the tubes in rows 1 and 2 were to be inspected with a +Point probe.

Enclosure

- 25 percent of the hot-leg tubes with dents and dings that were greater than 3.0 volts (as determined from the bobbin coil) were to be inspected with a +Point probe.
- 100 percent of the “-2 sigma” tubes were inspected from four inches above the TTS to 18 inches below the TTS with a +Point probe.
- Eight legacy foreign object wear indications were inspected and found to have not changed in size. As the foreign objects that created the wear were previously removed, the licensee was planning on leaving the tubes with these indications in service.
- 17 new wear indications attributed to foreign objects were identified in the four SGs during the current outage that ranged from 10 – 40 percent TW. Because these indications are located in tube locations that are inaccessible from the secondary side of the SGs, visual inspection is not possible. As a result, the licensee planned to plug and stabilize 20 tubes.
- Three hot-leg single axial indications (SAIs) attributed to outside diameter stress corrosion cracking were found in the tube located in row 2 column 35 of SG D. Initially, an indication was found at the 9<sup>th</sup> TSP with a bobbin coil voltage of 0.22 volts. Upon inspection with a +Point probe, the indication had a voltage of 0.25 volts, a length of 0.87 inches, and a depth of 31 percent TW. The indication was located at a quatrefoil land contact point. Further +Point inspection of the same tube revealed SAIs at the 3<sup>rd</sup> TSP (0.22 volts, length of 0.84 inches, depth of 19 percent TW), and 7<sup>th</sup> TSP (0.25 volts, length 0.26 inches, depth of 42 percent TW). The +Point indications were confirmed with a Ghent probe. The straight-leg portion of this tube did not exhibit an absolute signal offset with respect to the u-bend. Outside diameter stress corrosion cracking signals at TSPs observed previously at similar units (e.g., Seabrook) did exhibit such an offset.

Sludge lancing was scheduled to be performed in all four SGs. At the time of the call, sludge lancing was complete in SGs A, C, and D, and in-progress in SG B. Sludge lancing had resulted in removal of 54, 39.5, and 46.5 pounds of sludge from SGs A, C, and D, respectively.

The SG post sludge lancing foreign object search and retrieval (FOSAR) was scheduled to be performed in all four SGs. At the time of the call, FOSAR was complete in SGs A, C and D. In SGs A, the inspection revealed no loose parts. In SG D, five foreign objects were located and four of them were retrieved (wire brush bristles). The fifth object was a legacy foreign object (metal object) that has been in SG D since refueling outage 6 and is adhered to the tubesheet. This object is monitored every outage. There was no wear associated with this object. The FOSAR inspection in SG C was in-progress at the time of the call.

Visual inspections were performed in the preheater region of SG A. This inspection included the waterbox cap plate. Five wire bristles were found and removed, one deposit that looked like a machine turning broke up when removal was attempted, and one legacy object (a bushing) was found in the preheater region of SG A.

Visual inspections of the SG B steam drum were scheduled to be performed, but had not been performed at the time of the call.

At the time of the call, the licensee had indentified 28 tubes in the four SGs that would need plugging. This plugging list included 11 tubes in SG A, 8 tubes in SG B, 2 tubes in SG C, and 7 tubes in SG D.

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

September 22, 2011

Mr. Michael J. Pacilio  
President and Chief Nuclear Officer  
Exelon Nuclear  
4300 Winfield Road  
Warrenville, IL 60555

SUBJECT: BRAIDWOOD STATION, UNIT 2 - SUMMARY OF CONFERENCE CALL  
REGARDING 2011 STEAM GENERATOR TUBE INSPECTIONS (TAC NO.  
ME6106)

Dear Mr. Pacilio:

On April 27, 2011, the Nuclear Regulatory Commission (NRC) staff participated in a conference call with Exelon Generation Company, LLC (the licensee) regarding their ongoing steam generator (SG) tube inspection activities at Braidwood Station Unit 2. Enclosed is a summary of the conference call. This completes the NRC staff efforts for TAC No. ME6106.

If you have any questions regarding this matter, please contact me at (301) 415-1115.

Sincerely,

*/RA/*

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

Docket No. STN 50-457

Enclosure:  
Conference call summary

cc w/encl: Distribution via Listserv

DISTRIBUTION:

|                               |            |                            |
|-------------------------------|------------|----------------------------|
| PUBLIC                        | LPL3-2 R/F | RidsNrrDorlLpl3-2 Resource |
| RidsNrrPMBraidwood Resource   |            | RidsNrrLASRohrer Resource  |
| RidsAcrsAcnw_MailCTR Resource |            | RidsOgcRp Resource         |
| RidsRgn3MailCenter Resource   |            | RidsNrrDorlDpr Resource    |
| KKarwoski                     | AJohnson   | RTaylor                    |

ADAMS Accession No. ML112590225 NRC-001

| OFFICE | LPL3-2/PM    | LPL3-2/LA | DCI/CSGB/BC          | LPL3-2/ BC |
|--------|--------------|-----------|----------------------|------------|
| NAME   | NDiFrancesco | SRohrer   | RTaylor (MYoder for) | JZimmerman |
| DATE   | 9/15/11      | 9/20/11   | 5/16/11              | 9/22/11    |

OFFICIAL RECORD COPY