



Byron Generating Station

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U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

Byron Station, Unit 2  
Facility Operating License Nos. NPF-66  
NRC Docket No. STN 50-455

Subject: Response to Request for Additional Information Regarding Byron Station, Unit 2,  
Steam Generator Tube Inspection Report for Refueling Outage 18

References: 1) Letter from F. A. Kearney (Exelon Generation Company, LLC) to U. S. Nuclear  
Regulatory Commission, "Byron Station, Unit 2 Steam Generator Tube Inspection  
Report for Refueling Outage 18," dated February 20, 2015 (ADAMS Accession  
No. ML15051A312)

2) E-mail from J. Wiebe (NRC) to D. Spitzer (Exelon Generation Company, LLC),  
Request for Additional Information Regarding Byron Station, Unit 2, Steam  
Generator Tube Inspection Report for Refueling Outage 18, dated June 18, 2015

In Reference 1, Exelon Generation Company, LLC, (EGC) submitted the results of the Steam Generator (SG) inspections that were completed during Byron Station, Unit 2 Refueling Outage 18 (B2R18). This report was submitted in accordance with Byron Technical Specification 5.6.9, "Steam Generator (SG) Tube Inspection Report."

In Reference 2, the U. S. Nuclear Regulatory Commission (NRC) requested additional information related to its review of Reference 1. The additional information requested is included in the Attachment.

Should you have any questions concerning this letter, please contact Mr. Douglas Spitzer, Regulatory Assurance Manager, at (815) 406-2800.

Respectfully,

A handwritten signature in black ink, appearing to read "F. Kearney", written over a horizontal line.

Faber A. Kearney  
Site Vice President  
Byron Generating Station

FAK/GC/sg

Attachment: Response to Request for Additional Information

cc: NRC Regional Administrator, Region III  
NRC Senior Resident Inspector, Byron Station  
NRC Project Manager, NRR – Braidwood and Byron Stations

**ATTACHMENT 1**

**Response to Request for Additional Information**

## **Attachment 1**

### **Response to Request for Additional Information**

By letter dated February 20, 2015, Exelon Generation Company, LLC, (EGC) submitted the results of the Steam Generator (SG) inspections that were completed during the Byron Station, Unit 2 refueling outage in Fall 2014 (B2R18). This report was submitted in accordance with Byron Technical Specification (TS) 5.6.9, "Steam Generator (SG) Tube Inspection Report."

In Reference 2, the U. S. Nuclear Regulatory Commission (NRC) requested additional information (RAI) related to its review of Reference 1. Responses to the questions provided in Reference 2 are provided below.

#### **NRC RAI 1:**

Discuss the results of the "Dent/Ding Special Interest Scope" inspections. Were these inspections related to the denting phenomenon observed during RFO 16? If so, were attempts made to obtain the orientation of the dents? Also discuss whether the condition is progressing.

#### **EGC Response to NRC RAI 1:**

The dent orientation inspection performed during the Byron Station, B2R18 refueling outage was related to the Byron Station, Unit 2 refueling outage in Fall 2011 (B2R16) denting phenomenon.

Four dents on tubes (R25-C97), (R25-C98), (R28-C103), and (R29-C103) from the population of dents found during B2R16 and B2R18 and located on the bottom side of the third support plate (03C) in SG 2B were inspected using an energized bobbin coil in an adjacent tube while performing a +Point™ (Plus Point) inspection in the target dented tube. This examination was performed to find the azimuthal orientation of the indications (dents). Based on the results, all four dents pointed to the divider plate. This indicates that the Tube Support Plate (TSP) moved or shifted sometime prior to B2R16.

All of the new dents identified during B2R18 were also present in B2R16 in the eddy current data, but did not exceed the 2 volts reporting criteria. For the total of 167 new and existing dents; 96 showed an apparent voltage increase, 5 showed no change and 66 showed a voltage decrease. However, none of the voltage changes exceeded 1.4 volts and 162 of the 167 dent signals showed a 1 volt or less change. Therefore, within the repeatability of the eddy current voltage measurement from outage-to-outage, the dents located at 03C TSP in SG 2B are not progressing.

#### **NRC RAI 2:**

Was any degradation or leakage observed during the plug visual inspections? If so, please describe.

#### **EGC Response to NRC RAI 2:**

No degradation or leakage was observed during the plug visual inspections conducted during B2R18.

## **Attachment 1**

### **Response to Request for Additional Information**

#### **NRC RAI 3:**

Note 1 to the anti-vibration bar (AVB) wear summary table on page 7 indicates that there is a 15 percent through-wall (TW) reporting criteria for AVB wear. Provide clarification of the 15 percent TW reporting criteria. For example, is the 15 percent TW criteria the level at which an eddy current analyst will report/record an indication or is this the depth at which indications are reported to the NRC? If the latter, confirm that all service induced indications, regardless of depth, have been reported to the NRC per TS 5.6.9.d.

#### **EGC Response to NRC RAI 3:**

The  $\geq 15\%$  TW reporting threshold for AVB wear is the level at which an indication is required to be recorded by the eddy current data analysis process. All indications that were recorded by the eddy current data analysis process were provided to the NRC in accordance with TS 5.6.9.d.

Note, if a wear indication was reported in a previous inspection at  $\geq 15\%$  TW depth and the current inspection sizing result is  $< 15\%$ , it was reported nevertheless to track the indication during future outages. Consequently, there are AVB wear indications with an indicated depth  $< 15\%$  TW in the report provided to the NRC.

#### **NRC RAI 4:**

There is a similar Note 1 in the tube support plate (TSP) wear summary table on page 7. Provide clarification as requested in 3, above.

#### **EGC Response to NRC RAI 4:**

The  $\geq 6\%$  TW reporting threshold for support wear in the drilled-hole style tube support in the pre-heater section of the SG is the level at which an indication is required to be recorded by the eddy current data analysis process. All flaw indications that were recorded by the eddy current data analysis process were provided to the NRC in accordance with TS 5.6.9.d.

Note, if a TSP wear indication was reported in a prior inspection that met or exceeded the reporting threshold, the indication was reported during the current inspection, even if it was  $< 6\%$ , to track the indication during future outages. Consequently, there are TSP wear indications with an indicated depth  $< 6\%$  TW in the report provided to the NRC.

#### **NRC RAI 5:**

At the 07C TSP, both flat and tapered wear have been reported. Confirm that the shape of the wear is confirmed by a rotating probe or array probe. Also, discuss why there is a difference in the shape of wear at the 07C TSP. Do all the quatrefoil openings of the 07C TSP have the same shape?

**Attachment 1**  
**Response to Request for Additional Information**

**EGC Response to NRC RAI 5:**

The shape of the flat and tapered wear indications at 07C TSP were characterized by a rotating (+point™) probe. Wear is typically brought about by mechanical interactions (relative motion) between SG tubes and the land contacts of broached TSP holes. Slight differences in radial clearances between the tube and TSP over the width of the support typically are a result of construction or develop during operation due to slight, local differences in cross flow velocity. This means the shape of the resulting wear scar can be tapered from top-to-bottom, tapered from bottom-to-top, or flat (no taper). In SGs with larger populations of TSP wear scars there tends to be all three types present. All quatrefoil openings at 07C TSP were designed with the same shape/geometry.

**REFERENCES:**

1. Letter from F. A. Kearney (Exelon Generation Company, LLC) to U. S. Nuclear Regulatory Commission, "Byron Station, Unit 2 Steam Generator Tube Inspection Report for Refueling Outage 18," dated February 20, 2015 (ADAMS Accession No. ML15051A312)
2. Email from J. Wiebe (NRC) to D. Spitzer (Exelon Generation Company, LLC), "Request for Additional Information Regarding Byron Station, Unit 2, Steam Generator Tube Inspection Report for Refueling Outage 18," dated June 18, 2015