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Fax: 724-643-8069August 12, 2013
L-13-258ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001**SUBJECT:**Beaver Valley Power Station, Unit No. 2
Docket No. 50-412, License No. NPF-73
Response to Request for Additional Information Regarding Steam Generator Inspection Reports (TAC Nos. MF0592 and MF1499)

By correspondence dated January 24, 2013 (Accession No. ML130280632) and April 23, 2013 (Accession No. ML13114A050), the FirstEnergy Nuclear Operating Company (FENOC) submitted to the Nuclear Regulatory Commission (NRC) information related to steam generator inspections performed during the Beaver Valley Power Station, Unit No. 2 fall 2012 refueling outage. By correspondence dated July 11, 2013 (Accession No. ML13179A336), the NRC requested additional information regarding the steam generator inspections. The FENOC response to the NRC request is attached.

There are no regulatory commitments contained in this letter. If there are any questions or if additional information is required, please contact Mr. Thomas A. Lentz, Manager – Fleet Licensing, at (330) 315-6810.

Sincerely,



Eric A. Larson

Attachment:
FENOC Response to July 11, 2013 Request for Additional Informationcc: NRC Region I Administrator
NRC Resident Inspector
NRC Project Manager
Director BRP/DEP
Site BRP/DEP RepresentativeADD
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Attachment
L-13-258

FENOC Response to July 11, 2013 Request for
Additional Information
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The Nuclear Regulatory Commission questions are provided below in bold text and are followed by the FENOC response.

- 1. Some plants that have implemented the voltage-based repair criteria have had instances of extreme voltage growth. This has led to additional rotating probe inspections and repair of some tubes based on the nature of the indications at the tube support elevation (e.g., one dominant crack versus a network of cracks). Please discuss whether this operating experience was included in your assessment of the flaws at the tube support elevations.**

Response:

FirstEnergy Nuclear Operating Company (FENOC) is aware of the operating experience regarding extreme voltage growth rates. The occurrence of a distorted support plate signal (DSI) exhibiting extreme voltage growth can be associated with tube support plate (TSP) indications approaching (or at) 100 percent through wall or TSP intersections with multiple deep indications that have been returned to service. Upon achieving a 100 percent through wall condition or length extension of the 100 percent through wall portion of the indication, the bobbin coil DSI voltage would be significantly increased thus producing a large voltage growth rate.

The operating experience mentioned above was determined to be not applicable when assessing flaws at TSP intersections at the Beaver Valley Power Station, Unit No. 2 (BVPS-2) because of the historically low bobbin coil DSI voltage growth rates and the low Plus Point™ (+Point) voltage (typically less than 0.30 volts) of the confirmed DSIs. The low +Point voltage of the confirmed DSIs indicates that a shallow depth of penetration exists for the outside diameter stress corrosion cracking (ODSCC) that is being reported.

Long term trending of the BVPS-2 DSI population has shown a limited growth potential. For Cycle 10 through Cycle 16, the mean DSI voltage growth has been essentially zero. Additionally, the +Point amplitudes for DSI signals confirmed as axial ODSCC have been much less than 1.0 volt, which suggests that a shallow depth of penetration exists. As such, it can be concluded that the character of indications reported to date have been associated with a depth of penetration well below 100 percent through wall. Data obtained from previous operating cycles indicate that DSI voltage growth is expected to remain minimal over the next operating cycle.

During the BVPS-2 fall 2012 refueling outage (2R16), as well as in previous refueling outages, 100 percent of DSI signals, regardless of bobbin coil signal amplitude, were inspected with a +Point coil. The largest +Point signal amplitude of DSIs returned to service for Cycle 17 was 0.18 volt, with an associated depth of 50 percent through wall using EPRI Appendix I sizing techniques. During 2R16, 100 percent of the support plate mix residual (SPR) signals were also inspected with a +Point coil.

Based on the extensive BVPS-2 +Point inspection history of DSIs and SPRs, indications returned to service by application of Generic Letter 95-05, "Voltage Based Repair Criteria for Westinghouse Steam Generator Tubes Affected by Outside Diameter Stress Corrosion Cracking," do not contain 100 percent through wall degradation and would not be susceptible to extreme cases of voltage growth for Cycle 17.

- 2. On page 2-1 it was indicated that no circumferential or axial indication extending outside the "top support plate" (TSP) were identified by +Point inspection at the TSP distorted signal indication locations. Please clarify. Was it the intent of this sentence to indicate "tube support plates"?**

Response:

Yes, on page 2-1, "top support plate (TSP)" should read "tube support plate (TSP)."

- 3. In your assessment of accident induced leakage in the F* report, you compare the leakage from the sleeves to the acceptance limit. Please confirm that you combined all sources of accident induced leakage (from sleeves, plugs, and other degradation mechanisms) and then compared the total leakage to the accident induced leakage limit.**

Response:

The leakage value provided in the F* report only included leakage attributed to the installation of Alloy 800 sleeves. When comparing the leakage from all sources of accident induced leakage (sleeves, plugs, indications left in service under Generic Letter 95-05, and other degradation within the tube bundle), the combined leakage value for each steam generator is less than the technical specification limit of 2.2 gallons per minute.

- 4. The F* report does not appear to report the cumulative number of indications detected in the tubesheet region as a function of elevation within the tubesheet, as required by TS 5.6.6.2.4.(b). Please discuss.**

Response:

The F* report lists the elevation within the tubesheet of each indication observed during 2R16. The F* report does not contain the cumulative number of indications within the tubesheet from the beginning of plant life. The tables on the following page provide the BVPS-2 cumulative number of indications detected in the tubesheet region from the beginning of plant life as a function of elevation within the tubesheet.

SG A	COUNT
Hot Leg Tubesheet	
0.00"	7
- 0.01"	7
- 0.02"	6
- 0.03"	16
- 0.04"	14
- 0.05"	13
- 0.06"	11
- 0.07"	15
- 0.08"	11
- 0.09"	9
- 0.10"	11
- 0.11"	20
- 0.12"	5
- 0.13"	14
- 0.14"	7
- 0.15"	2
- 0.16"	6
- 0.17"	4
- 0.18"	
- 0.19"	1
- 0.20"	1

SG A	COUNT
Cold Leg Tubesheet	
0.00"	
- 0.01"	
- 0.02"	
- 0.03"	
- 0.04"	
- 0.05**	1
- 0.06"	
- 0.07"	
- 0.08"	
- 0.09"	
- 0.10"	
- 0.11"	
- 0.12"	
- 0.13"	
- 0.14"	
- 0.15"	
- 0.16**	1
- 0.17"	
- 0.18"	
- 0.19"	
- 0.20"	

SG B	COUNT
Hot Leg Tubesheet	
0.00"	6
- 0.01"	5
- 0.02"	
- 0.03"	11
- 0.04"	10
- 0.05"	11
- 0.06"	6
- 0.07"	12
- 0.08"	21
- 0.09"	19
- 0.10"	11
- 0.11"	9
- 0.12"	8
- 0.13"	
- 0.14"	2
- 0.15"	3
- 0.16"	2
- 0.17"	2
- 0.18"	2
- 0.19"	
- 0.20"	
- 0.27"	1
- 0.31"	1

SG B	COUNT
Cold Leg Tubesheet	
0.00"	
- 0.01"	
- 0.02"	
- 0.03"	
- 0.04"	
- 0.05"	
- 0.06"	
- 0.07"	
- 0.08"	
- 0.09"	
- 0.10"	
- 0.11"	
- 0.12"	
- 0.13"	
- 0.14"	
- 0.15"	
- 0.16"	
- 0.17"	
- 0.18"	
- 0.19"	
- 0.20"	
- 16.39**	1

SG C	COUNT
Hot Leg Tubesheet	
0.00"	4
- 0.01"	1
- 0.02"	3
- 0.03"	2
- 0.04"	4
- 0.05"	10
- 0.06"	8
- 0.07"	6
- 0.08"	12
- 0.09"	10
- 0.10"	8
- 0.11"	8
- 0.12"	8
- 0.13"	3
- 0.14"	3
- 0.15"	1
- 0.16"	2
- 0.17"	1
- 0.18"	1
- 0.19"	1
- 0.20"	
- 0.22"	1
- 0.36"	1
- 0.40"	1
- 0.41"	1
- 0.50"	1
- 1.22"	1
- 1.49"	1
- 3.16"	1
- 18.36**	1

SG C	COUNT
Cold Leg Tubesheet	
0.00"	
- 0.01"	
- 0.02"	
- 0.03"	
- 0.04"	
- 0.05"	
- 0.06"	
- 0.07"	
- 0.08"	
- 0.09"	
- 0.10"	
- 0.11"	
- 0.12"	
- 0.13"	
- 0.14"	
- 0.15"	
- 0.16"	
- 0.17"	
- 0.18"	
- 0.19"	
- 0.20"	
- 5.29**	1

TOTAL 180

TOTAL 2

TOTAL 142

TOTAL 1

TOTAL 105

TOTAL 1

Notes:

1) 0.00" = Secondary face of tubesheet.

2) A negative measurement is the distance into the tubesheet from the secondary face.

3) The five tubes shown with an asterisk were reported as (bobbin coil) distorted tubesheet signals. Rotating pancake coil did not confirm these as real indications.

- 5. Regarding Note 4 of Table 2RCS-SG21A, please confirm that the 6 tubes being referred to only have indications at the tube support plate elevations and that one other tube with an axial outside diameter stress-corrosion cracking indication also had a circumferential primary water stress-corrosion crack.**

Response:

The six tubes referred to in Note 4 of Table 2RCS-SG21A contain only axial ODSCC indications at TSP elevations. These six tubes are accounted for under the Hot Leg TSP (Axial ODSCC) column of the table. One additional tube exhibited an axial ODSCC indication at a TSP elevation and also contained a circumferential primary water stress corrosion cracking (PWSCC) indication just above the hot leg top of tubesheet. This tube is accounted for under the Hot Leg Exp Trans (Circ PWSCC) column and the Hot Leg TSP (Axial ODSCC) column.

- 6. In the section related to the reporting requirements of TS 5.6.6.2.1.a (scope of inspections performed on each SG [steam generator]) a visual inspection of the SG A steam drum region is described. In the paragraph titled "SG A Feedwater Header," the report states that "no anomalies were reported." Please clarify or expand upon what is meant by "no anomalies".**

Response:

A visual inspection was conducted of the SG A steam drum region to assess the general condition of the internal components, such as accessible portions of the primary and secondary moisture separation equipment, risers, drain lines, welds, integrity of surrounding structures, feedwater header, and J-nozzles. The general condition of the steam drum was determined to be acceptable for continued operation.

A visual inspection was also performed on the repair of the SG A feedwater header that occurred during the BVPS-2 spring 2008 refueling outage (2R13). During a visual inspection of the SG A steam drum region in 2R13, a hole was discovered in the feedwater header. A patch plate was welded over the hole, and the engineering evaluation, which supported the repair, recommended the patch plate be examined in 2R16. The 2R16 external surface condition of the patch plate was consistent with the as-left condition at 2R13. No evidence of erosion or corrosion of the patch plate was observed. Additionally, ultrasonic thickness measurements taken in 2R16 indicated no wall loss of the patch plate. No adverse conditions were noted during the visual inspection of the patch plate performed from the inside of the feedwater header.

As a result of the inspections described above, no adverse conditions were reported for either the SG A steam drum region or the SG A feedwater header repair.

- 7. In the section related to the reporting requirements of TS 5.6.6.2.1.a (scope of inspections performed on each SG) a divider plate weld (steam generator channel head) inspection is mentioned. Please provide the results of this inspection.**

Response:

During 2R16, to meet the requirements of Westinghouse Nuclear Safety Advisory Letter 12-1, "Steam Generator Channel Head Degradation," a remote visual inspection of the area around the channel head drain line was performed in each hot and cold leg channel head. Also included in the inspection was the divider plate to stub runner weld, the tubesheet to stub runner weld, and the divider plate to channel head weld. This inspection was performed to find evidence of gross defects such as indications in welds, missing weld filler material, a breach in the weld metal, unusual discoloration of the weld metal and cladding imperfections. No adverse conditions were observed during the inspection.