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February 4, 2022
L-22-018

10 CFR 50.90

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

SUBJECT:

Beaver Valley Power Station, Unit Nos. 1 and 2
Docket No. 50-334, License No. DPR-66
Docket No. 50-412, License No. NPF-73
Supplement to Amendment Request to Adopt TSTF-577-A, Revision 1, "Revised Frequencies for Steam Generator Tube Inspections" (EPID No. L-2021-LLA-0220)

By correspondence dated September 15, 2021 (ADAMS Accession No. ML21258A319), Energy Harbor Nuclear Corp. submitted a license amendment request to adopt TSTF-577-A, Revision 1, "Revised Frequencies for Steam Generator Tube Inspections." Approval of this amendment request would allow steam generator tube inspections and reporting to be revised based on operating history.

The attachment to this letter contains a clean version of the proposed technical specifications. The clean version also incorporates the following editorial changes to the September 15, 2021 submittal:

- Page 5.6-4a of the technical specification page mark-ups is not required due to the space created with the issuance of Amendment Nos. 313 and 203.
- For Technical Specifications 5.6.6.1.c and 5.6.6.2.c, the comma immediately following the letter c is replaced with a period.
- Immediately before the word "For" in TS 5.6.6.1.c.2, the comma is replaced with a period.

The information provided by this submittal does not invalidate the significant hazards consideration analysis provided in the September 15, 2021 letter.

There are no regulatory commitments contained in this submittal. If there are any questions or if additional information is required, please contact Mr. Phil H. Lashley, Manager - Fleet Licensing, at (330) 696-7208.

I declare under penalty of perjury that the foregoing is true and correct. Executed on February 4, 2022.

Sincerely,

A handwritten signature in dark ink, appearing to read 'J. Grabnar', written in a cursive style.

John J. Grabnar

Attachment: Beaver Valley Power Station Proposed Revised Technical Specifications

cc: NRC Region I Administrator
NRC Resident Inspector
NRC Project Manager
Director BRP/DEP
Site BRP/DEP Representative

Attachment
L-22-018

Beaver Valley Power Station
Proposed Revised Technical Specifications

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5.5 Programs and Manuals

5.5.5 Steam Generator (SG) Program

An SG Program for Unit 1 and Unit 2 shall be established and implemented to ensure that SG tube integrity is maintained. In addition, the SG Program for Unit 1 shall include the provisions of Specification 5.5.5.1 and the SG Program for Unit 2 shall include the provisions of Specification 5.5.5.2.

5.5.5.1 Unit 1 SG Program

a. Provisions for Condition Monitoring Assessments

Condition monitoring assessment means an evaluation of the "as found" condition of the tubing with respect to the performance criteria for structural integrity and accident induced leakage. The "as found" condition refers to the condition of the tubing during an SG inspection outage, as determined from the inservice inspection results or by other means, prior to the plugging of tubes. Condition monitoring assessments shall be conducted during each outage during which the SG tubes are inspected or plugged, to confirm that the performance criteria are being met.

b. Provisions for Performance Criteria for SG Tube Integrity

SG tube integrity shall be maintained by meeting the performance criteria for tube structural integrity, accident induced leakage, and operational LEAKAGE.

1. Structural integrity performance criterion: All in-service SG tubes shall retain structural integrity over the full range of normal operating conditions (including startup, operation in the power range, hot standby, and cool down), all anticipated transients included in the design specification, and design basis accidents. This includes retaining a safety factor of 3.0 against burst under normal steady state full power operation primary to secondary pressure differential and a safety factor of 1.4 against burst applied to the design basis accident primary to secondary pressure differentials. Apart from the above requirements, additional loading conditions associated with the design basis accidents, or combination of accidents in accordance with the design and licensing basis, shall also be evaluated to determine if the associated loads contribute significantly to burst or collapse. In the assessment of tube integrity, those loads that do significantly affect burst or collapse shall be determined and assessed in combination with the loads due to pressure with a safety factor of 1.2 on the combined primary loads and 1.0 on axial secondary loads.

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5.5.5.1 Unit 1 SG Program (continued)

2. Accident induced leakage performance criterion: The primary to secondary accident induced leakage rate for any design basis accident, other than a SG tube rupture, shall not exceed the leakage rate assumed in the accident analysis in terms of total leakage rate for all SGs and leakage rate for an individual SG. Leakage is also not to exceed 1 gpm per SG, except during a SG tube rupture.
3. The operational LEAKAGE performance criterion is specified in LCO 3.4.13, "RCS Operational LEAKAGE."

c. Provisions for SG Tube Plugging Criteria

Tubes found by inservice inspection to contain flaws with a depth equal to or exceeding 40% of the nominal tube wall thickness shall be plugged.

d. Provisions for SG Tube Inspections

Periodic SG tube inspections shall be performed. The number and portions of the tubes inspected and methods of inspection shall be performed with the objective of detecting flaws of any type (e.g., volumetric flaws, axial and circumferential cracks) that may be present along the length of the tube, from the tube-to-tubesheet weld at the tube inlet to the tube-to-tubesheet weld at the tube outlet, and that may satisfy the applicable tube plugging criteria. The tube-to-tubesheet weld is not part of the tube. In addition to meeting the requirements of d.1, d.2, and d.3 below, the inspection scope, inspection methods, and inspection intervals shall be such as to ensure that SG tube integrity is maintained until the next SG inspection. A degradation assessment shall be performed to determine the type and location of flaws to which the tubes may be susceptible and, based on this assessment, to determine which inspection methods need to be employed and at what locations.

1. Inspect 100% of the tubes in each SG during the first refueling outage following SG installation.
2. After the first refueling outage following SG installation, inspect 100% of the tubes in each SG at least every 96 effective full power months, which defines the inspection period.

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5.5.5.1 Unit 1 SG Program (continued)

3. If crack indications are found in any SG tube, then the next inspection for each affected and potentially affected SG for the degradation mechanism that caused the crack indication shall be at the next refueling outage. If definitive information, such as from examination of a pulled tube, diagnostic non-destructive testing, or engineering evaluation indicates that a crack-like indication is not associated with a crack(s), then the indication need not be treated as a crack.
- e. Provisions for monitoring operational primary to secondary LEAKAGE

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5.5.5.2 Unit 2 SG Program

a. Provisions for Condition Monitoring Assessments

Condition monitoring assessment means an evaluation of the "as found" condition of the tubing with respect to the performance criteria for structural integrity and accident induced leakage. The "as found" condition refers to the condition of the tubing during an SG inspection outage, as determined from the inservice inspection results or by other means, prior to the plugging or repair of tubes. Condition monitoring assessments shall be conducted during each outage during which the SG tubes are inspected, plugged, or repaired to confirm that the performance criteria are being met.

b. Provisions for Performance Criteria for SG Tube Integrity

SG tube integrity shall be maintained by meeting the performance criteria for tube structural integrity, accident induced leakage, and operational LEAKAGE.

1. Structural integrity performance criterion: All in-service SG tubes shall retain structural integrity over the full range of normal operating conditions (including startup, operation in the power range, hot standby, and cool down), all anticipated transients included in the design specification, and design basis accidents. This includes retaining a safety factor of 3.0 against burst under normal steady state full power operation primary to secondary pressure differential and, except for flaws addressed through application of the alternate repair criteria discussed in Specification 5.5.5.2.c.4, a safety factor of 1.4 against burst applied to the design basis accident primary to secondary pressure differentials. Apart from the above requirements, additional loading conditions associated with the design basis accidents, or combination of accidents in accordance with the design and licensing basis, shall also be evaluated to determine if the associated loads contribute significantly to burst or collapse. In the assessment of tube integrity, those loads that do significantly affect burst or collapse shall be determined and assessed in combination with the loads due to pressure with a safety factor of 1.2 on the combined primary loads and 1.0 on axial secondary loads.

When alternate repair criteria discussed in Specification 5.5.5.2.c.4 are applied to axially oriented outside diameter stress corrosion cracking indications at tube support plate locations, the probability that one or more of these indications in a SG will burst under postulated main steam line break conditions shall be less than 1×10^{-2} .

2. Accident induced leakage performance criterion: The primary to secondary accident induced leakage rate for any design basis accident, other than a SG tube rupture, shall not exceed the leakage rate assumed in the accident analysis in terms of total leakage rate for all

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5.5.5.2 Unit 2 SG Program (continued)

SGs and leakage rate for an individual SG. Except during a SG tube rupture, leakage from all sources excluding the leakage attributed to the degradation described in Specification 5.5.5.2.c.4 is also not to exceed 1 gpm per SG.

3. The operational LEAKAGE performance criterion is specified in LCO 3.4.13, "RCS Operational LEAKAGE."

c. Provisions for SG Tube Plugging or Repair Criteria

1. Tubes found by inservice inspection to contain a flaw in a non-sleeved region with a depth equal to or exceeding 40% of the nominal tube wall thickness shall be plugged or repaired except if permitted to remain in service through application of the alternate plugging or repair criteria discussed in Specification 5.5.5.2.c.4 or 5.5.5.2.c.5.
2. Tubes found by inservice inspection to contain a flaw in a sleeve (excluding the sleeve to tube joint) with a depth equal to or exceeding the following percentages of the nominal sleeve wall thickness shall be plugged:

ABB Combustion Engineering TIG welded sleeves	27%
Westinghouse laser welded sleeves	25%
Westinghouse leak limiting Alloy 800 sleeves	Any flaw

3. Tubes with a flaw in a sleeve to tube joint shall be plugged.
4. Tube support plate voltage-based plugging or repair criteria may be applied as an alternative to the 40% depth based criteria of Specification 5.5.5.2.c.1.

Tube Support Plate Plugging Limit is used for the disposition of an Alloy 600 SG tube for continued service that is experiencing predominantly axially oriented outside diameter stress corrosion cracking confined within the thickness of the tube support plates. At tube support plate intersections, the plugging or repair limit is described below:

- a) SG tubes, with degradation attributed to outside diameter stress corrosion cracking within the bounds of the tube support plate with bobbin voltages less than or equal to 2.0 volts will be allowed to remain in service.
- b) SG tubes, with degradation attributed to outside diameter stress corrosion cracking within the bounds of the tube support plate with a bobbin voltage greater than 2.0 volts will be plugged or repaired, except as noted in 5.5.5.2.c.4.c below.

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5.5.5.2 Unit 2 SG Program (continued)

- c) SG tubes, with indications of potential degradation attributed to outside diameter stress corrosion cracking within the bounds of the tube support plate with a bobbin voltage greater than 2.0 volts but less than or equal to the upper voltage repair limit (calculated according to the methodology in Generic Letter 95-05 as supplemented) may remain in service if a rotating pancake coil or acceptable alternative inspection does not detect degradation.
- d) SG tubes, with indications of potential degradation attributed to outside diameter stress corrosion cracking within the bounds of the tube support plate with a bobbin voltage greater than the upper voltage repair limit (calculated according to the methodology in Generic Letter 95-05 as supplemented) will be plugged or repaired.
- e) If an unscheduled mid-cycle inspection is performed, the following mid-cycle repair limits apply instead of the limits specified in 5.5.5.2.c.4.a through 5.5.5.2.c.4.d.

The mid-cycle repair limits are determined from the following equations:

$$V_{MURL} = \frac{V_{SL}}{1.0 + NDE + Gr \left(\frac{CL - \Delta t}{CL} \right)}$$

$$V_{MLRL} = V_{MURL} - (V_{URL} - V_{LRL}) \left(\frac{CL - \Delta t}{CL} \right)$$

where:

V_{URL} = upper voltage repair limit

V_{LRL} = lower voltage repair limit

V_{MURL} = mid-cycle upper voltage repair limit based on time into cycle

V_{MLRL} = mid-cycle lower voltage repair limit based on V_{MURL} and time into cycle

Δt = length of time since last scheduled inspection during which V_{URL} and V_{LRL} were implemented

CL = cycle length (the time between two scheduled SG inspections)

V_{SL} = structural limit voltage

Gr = average growth rate per cycle length

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5.5.5.2 Unit 2 SG Program (continued)

1. Inspect 100% of the tubes in each SG during the first refueling outage following SG installation.
2. After the first refueling outage following SG installation, inspect 100% of the tubes in each SG at least every 24 effective full power months, which defines the inspection period.
3. Indications left in service as a result of application of the tube support plate voltage-based plugging or repair criteria (Specification 5.5.5.2.c.4) shall be inspected by bobbin coil probe during all future refueling outages.

Implementation of the SG tube-to-tube support plate plugging or repair criteria requires a 100-percent bobbin coil inspection for hot-leg and cold-leg tube support plate intersections down to the lowest cold-leg tube support plate with known outside diameter stress corrosion cracking (ODSCC) indications. The determination of the lowest cold-leg tube support plate intersections having ODSCC indications shall be based on the performance of at least a 20-percent random sampling of tubes inspected over their full length.

4. When the F* methodology has been implemented, inspect 100% of the inservice tubes in the hot-leg tubesheet region with the objective of detecting flaws that may satisfy the applicable tube plugging or repair criteria of Specification 5.5.5.2.c.5 every 24 effective full power months or one interval between refueling outages (whichever is less).

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5.5.5.2 Unit 2 SG Program (continued)

5. For Alloy 800 sleeves: The parent tube, in the area where the sleeve-to-tube hard roll joint and the sleeve-to-tube hydraulic expansion joint will be established, shall be inspected prior to installation of the sleeve. Sleeve installation may proceed only if the inspection finds these regions free from service induced indications.

- e. Provisions for monitoring operational primary to secondary LEAKAGE
- f. Provisions for SG Tube Repair Methods

SG tube repair methods shall provide the means to reestablish the RCS pressure boundary integrity of SG tubes without removing the tube from service. For the purposes of these Specifications, tube plugging is not a repair. All acceptable tube repair methods are listed below.

1. ABB Combustion Engineering TIG welded sleeves, CEN-629-P, Revision 02 and CEN-629-P Addendum 1.
2. Westinghouse laser welded sleeves, WCAP-13483, Revision 2.
3. Westinghouse leak-limiting Alloy 800 sleeves, WCAP-15919-P, Revision 2.

5.6 Reporting Requirements

5.6.4 Reactor Coolant System (RCS) PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR) (continued)

WCAP-18124-NPA, Revision 0, "Fluence Determination with RAPTOR-M3G and FERRET," July 2012, may be used as an alternative to Section 2.2 of WCAP-14040-A, Revision 4.

- c. The PTLR shall be provided to the NRC upon issuance for each reactor vessel fluence period and for any revision or supplement thereto.

5.6.5 Post Accident Monitoring Report

When a report is required by Condition B or F of LCO 3.3.3, "Post Accident Monitoring (PAM) Instrumentation," a report shall be submitted within the following 14 days. The report shall outline the preplanned alternate method of monitoring, the cause of the inoperability, and the plans and schedule for restoring the instrumentation channels of the Function to OPERABLE status.

5.6.6 Steam Generator (SG) Tube Inspection Report

5.6.6.1 Unit 1 SG Tube Inspection Report

A report shall be submitted within 180 days after the initial entry into MODE 4 following completion of an inspection performed in accordance with the Specification 5.5.5.1, "Unit 1 SG Program." The report shall include:

- a. The scope of inspections performed on each SG;
- b. The nondestructive examination techniques utilized for tubes with increased degradation susceptibility;
- c. For each degradation mechanism found:
 - 1. The nondestructive examination techniques utilized;
 - 2. The location, orientation (if linear), measured size (if available), and voltage response for each indication. For tube wear at support structures less than 20 percent through-wall, only the total number of indications needs to be reported;
 - 3. A description of the condition monitoring assessment and results, including the margin to the tube integrity performance criteria and comparison with the margin predicted to exist at the inspection by the previous forward-looking tube integrity assessment; and
 - 4. The number of tubes plugged during the inspection outage.
- d. An analysis summary of the tube integrity conditions predicted to exist at the next scheduled inspection (the forward-looking tube integrity assessment) relative to the applicable performance criteria, including the analysis methodology, inputs, and results;

5.6 Reporting Requirements

5.6.6. Steam Generator (SG) Tube Inspection Report (continued)

5.6.6.1 Unit 1 SG Tube Inspection Report (continued)

- e. The number and percentage of tubes plugged to date, and the effective plugging percentage in each SG; and
- f. The results of any SG secondary side inspections.

5.6.6.2 Unit 2 SG Tube Inspection Report

1. A report shall be submitted within 180 days after the initial entry into MODE 4 following completion of an inspection performed in accordance with the Specification 5.5.5.2, "Unit 2 SG Program." The report shall include:
 - a. The scope of inspections performed on each SG;
 - b. The nondestructive examination techniques utilized for tubes with increased degradation susceptibility;
 - c. For each degradation mechanism found:
 1. The nondestructive examination techniques utilized;
 2. The location, orientation (if linear), measured size (if available), and voltage response for each indication. For tube wear at support structures less than 20 percent through-wall, only the total number of indications needs to be reported;
 3. A description of the condition monitoring assessment and results, including the margin to the tube integrity performance criteria and comparison with the margin predicted to exist at the inspection by the previous forward-looking tube integrity assessment;
 4. The number of tubes plugged or repaired during the inspection outage; and
 5. The repair methods utilized and the number of tubes repaired by each repair method.
 - d. An analysis summary of the tube integrity conditions predicted to exist at the next scheduled inspection (the forward-looking tube integrity assessment) relative to the applicable performance criteria, including the analysis methodology, inputs, and results;

5.6 Reporting Requirements

5.6.6 Steam Generator (SG) Tube Inspection Report (continued)

5.6.6.2 Unit 2 SG Tube Inspection Report (continued)

- e. The number and percentage of tubes plugged or repaired to date, and the effective plugging percentage in each SG; and
 - f. The results of any SG secondary side inspections.
- 2. A report shall be submitted within 90 days after the initial entry into MODE 4 following completion of an inspection performed in accordance with the Specification 5.5.5.2, "Unit 2 SG Program," when voltage-based alternate repair criteria have been applied. The report shall include information described in Section 6.b of Attachment 1 to Generic Letter 95-05, "Voltage-Based Repair Criteria for Westinghouse Steam Generator Tubes Affected by Outside Diameter Stress Corrosion Cracking."
- 3. For implementation of the voltage-based plugging or repair criteria to tube support plate intersections, notify the Commission prior to returning the SG to service (MODE 4) should any of the following conditions arise:
 - a. If circumferential crack-like indications are detected at the tube support plate intersections.
 - b. If indications are identified that extend beyond the confines of the tube support plate.
 - c. If indications are identified at the tube support plate elevations that are attributable to primary water stress corrosion cracking.
- 4. A report shall be submitted within 90 days after the initial entry into MODE 4 following an outage in which the F* methodology was applied. As applicable, the report shall include the following hot-leg and cold-leg tubesheet region inspection results associated with the application of F*:
 - a. Total number of indications, location of each indication, orientation of each indication, severity of each indication, and whether the indications initiated from the inside or outside surface.
 - b. The cumulative number of indications detected in the tubesheet region as a function of elevation within the tubesheet.
 - c. The projected end-of-cycle accident-induced leakage from tubesheet indications.