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L-08-072

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

SUBJECT:  
Beaver Valley Power Station, Unit No. 1  
Docket No. 50-334, License No. DPR-66  
Technical Specification 5.6.6.1 - Steam Generator Inspection Report

In accordance with Beaver Valley Power Station Unit No. 1 Technical Specification (TS) 5.6.6.1, information related to steam generator inspections is provided in Attachment 1.

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 – FENOC Fleet Licensing, at 330-761-6071.

Sincerely,



Peter P. Sena III

Attachments:

1. Technical Specification 5.6.6.1 – Unit 1 SG Tube Inspection Report

cc: Mr. S. J. Collins, NRC Region I Administrator  
Mr. D. L. Werkheiser, NRC Senior Resident Inspector  
Ms. N. S. Morgan, NRR Project Manager  
Mr. D. J. Allard, Director BRP/DEP  
Mr. L. E. Ryan (BRP/DEP)

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ATTACHMENT 1  
L-08-072

Beaver Valley Power Station Unit No. 1  
Technical Specification 5.6.6.1 – Unit 1 SG Tube Inspection Report  
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The following information satisfies the reporting requirement of Beaver Valley Power Station Technical Specification (TS) 5.6.6.1. Refer to the tables on Page 7 of this attachment which define abbreviations, codes and other terms used throughout this report.

**Information required by Technical Specification 5.6.6.1**

Technical Specification 5.6.6.1 requires reporting within 180 days after the initial entry into MODE 4 following completion of an inspection performed in accordance with Specification 5.5.5.1, Unit 1 Steam Generator (SG) Program. Information required by TS 5.6.6.1, Items a through h is provided below for the maintenance and refueling outage in the fall of 2007 (1R18).

**a. The scope of inspections performed on each SG**

Primary side inspection scope involved the following:

- 100% full length bobbin coil probe examination (Row 3 through Row 47)
- 100% bobbin coil probe examination of the hot and cold leg straight sections in Row 1 and 2 up to and including the top support plate
- 100% Plus Point probe inspection of the Row 1 and 2 U-bends from the top support plate on the hot leg to the top support plate on the cold leg
- 100% Plus Point probe inspection of over-expansions and bulges contained within or just above the hot leg tubesheet (These were previously reported during the preservice examination and are located 10.0" or higher from the hot leg tube end)
- 100% Plus Point probe inspection of bobbin coil indications that could possibly represent degradation (I-codes)
- Plus Point probe inspection of the top-of-tubesheet periphery (3 tubes deep in any row or column) and the blowdown pipe region (2 tubes deep on either side of the blowdown pipe)
- Plus Point probe inspection of any ambiguous bobbin coil signals
- "As- left" video inspection of the hot and cold leg channel heads

Secondary side inspection scope involved the following:

- Secondary side visual inspections of the top-of-tubesheet annulus, blowdown pipe region and random in-bundle locations
- In-bundle visual inspections of possible loose part locations identified from the analysis of the eddy current data

**b. Active degradation mechanisms found**

No active degradation mechanisms were reported during the 1R18 SG tube examinations.

**c. Nondestructive examination techniques utilized for each degradation mechanism**

For 1R18, bobbin coil probes were used as the primary method of degradation detection except in those areas of the tube (e.g. at or below TTS, low row U-bends) where bobbin probes are not qualified. In those areas of the tube, Plus Point probes were employed. Plus Point probes were also used to re-examine any ambiguous bobbin coil signals.

All examination techniques utilized during the 1R18 SG tube inspections were qualified for detection of the relevant and potential degradation mechanisms listed in the 1R18 degradation assessment. This qualification is in accordance with Appendix H of the EPRI SG Examination Guidelines, Revision 6. Examination techniques used for detection of degradation are tabulated below.

**Examination Techniques Used for Detection of Degradation**

Degradation Mode	Tube Location	Probe	EPRI ETSS*
General Degradation	Free Span Area of Tubing	Bobbin	96008.1
		3 Coil Plus Point	21409.1
PWSCC	Tubesheet Region	3 Coil Plus Point	20511.1
Tube Wear	AVB Locations	Bobbin	96004.1
		1 Coil Plus Point	21409.1
Tube Wear	TSP Intersections	Bobbin	96001.1
		3 Coil Plus Point	21998.1
Tube Wear	Periphery/Blowdown lane	Bobbin	96008.1
		3 Coil Plus Point	21998.1
MBM's	Free Span Area of Tubing	Bobbin	96010.1
		3 Coil Plus Point	21409.1
Volumetric	Full Length	Bobbin	96008.1
		3 Coil Plus Point	21998.1

\* - The applicable EPRI Examination Technique Specification Sheets (ETSS) are listed for reference only. Site-specific examination technique sheets are developed prior to each SG inspection in accordance with Appendix H of the EPRI SG Examination Guidelines (Revision 6).

**d. Location, orientation (if linear), and measured sizes (if available) of service-induced indications**

The following tables provide examination results for tubes with service-induced indications in each SG. All indications listed with I-codes (e.g., distorted support plate signals with indications (DSIs), non-quantifiable indications (NQIs), dents with indications (DNIs), etc.) were re-inspected with the Plus Point Probe. If the Plus Point probe indicated that no degradation/flaws were present, the tube remained in service. If degradation/flaws were reported from the Plus Point examination the tube was removed from service via plugging.

**SG 1RC-E-1A**

Row	Col	Ind	Volts	Phase	%TW	Chan	Loc	Inch	Length	Angle	From	To
2	61	NQI	2.11	70		6	06C	47.43			07C	TEC
2	61	NDF				6	06C	47.43			06C	07C
8	30	NQI	1.56	39		6	06H	47.00			TEC	TEH
8	30	NDF				6	06H	47.00			06H	07H
8	31	NQI	1.71	40		6	07H	-1.66			TEC	TEH
8	31	NDF				6	07H	-1.66			06H	07H
8	32	NQI	1.5	58		6	07H	1.90			TEC	TEH
8	32	NDF				2	07H	1.90			07H	07H
12	47	DNI	0.38	150		5	TSC	25.03			TEC	TEH
12	47	NDF				6	TSC	25.03			TSC	01C
26	29	DNI	0.61	165		P1	06H	-0.02			TEC	TEH
26	29	NDF				6	06H	-0.02			06H	06H
32	26	DNI	0.28	146		5	02H	28.80			TEC	TEH
32	26	NDF				6	02H	28.80			02H	03H
33	25	FSI	0.42	48		3	06C	8.08			TEC	TEH
33	25	NDF				6	06C	8.08			05C	07C
33	25	FSI	0.27	29		3	06C	14.92			TEC	TEH
33	25	NDF				6	06C	14.92			05C	07C
33	25	FSI	0.11	44		3	06C	22.82			TEC	TEH
33	25	NDF				6	06C	22.82			05C	07C
33	25	FSI	0.44	37		3	05C	47.14			TEC	TEH
33	25	NDF				6	05C	47.14			05C	07C

**SG 1RC-E-1B**

Row	Col	Ind	Volts	Phase	%TW	Chan	Loc	Inch	Length	Angle	From	To
39	52	DNI	0.28	156		P1	AV3	0			TEC	TEH
39	52	NDF				2	AV3	0			AV3	AV3

SG 1RC-E-1C

Row	Col	Ind	Volts	Phase	%TW	Chan	Loc	Inch	Length	Angle	From	To
11*	2	DSI	0.23	114		P1	04H	0.34			TEC	TEH
11*	2	PCT	0.22	114	29	P4	04H	0.39	0.21	26	04H	04H
43	44	NQI	2.11	65		6	02H	14.99			TEC	TEH
43	44	NDF				6	02H	14.99			02H	03H
44	36	DNI	0.31	169		P1	TSC	18.62			TEC	TEH
44	36	NDF				6	TSC	18.62			TSH	FBC

\* Row 11, Column 2 was administratively removed from service.

Description of Column Headings and Data Abbreviations  
Used in Tables in Item d

**Report Header Definitions**

<b>Term</b>	<b>Definition</b>
Row/Col	Row & Column of tube location
Ind	Type of indication (See data analysis acronyms below)
Volts	Voltage amplitude of an indication
Phase	Angular rotation of indication
%TW	Percent through wall of indication
Chan	Frequency channel from which indication was recorded
Loc	Location of nearest support structure
Inch	Indication distance from nearest support structure
Length	Field measured crack length
Angle	Field measured crack phase angle
From	Starting point of examination
To	End point of examination

**Examination Extent Definitions (From – To)**

<b>Term</b>	<b>Definition</b>
FBC	Flow Distribution Baffle - Cold Leg Side
TEH	Tube End - Hot Leg
TSH	Hot Leg Tubesheet
TEC	Tube End Cold Leg
TSC	Cold Leg Tubesheet
01H	1 <sup>st</sup> Tube Support Plate on Hot Leg Side
01C	1 <sup>st</sup> Tube Support Plate on Cold Leg Side
AV1	1 <sup>st</sup> Anti-Vibration Bar (Numbered hot leg to cold leg)

**e. Number of tubes plugged during the inspection outage for each active degradation mechanism**

As stated above, no active degradation mechanisms were reported during 1R18. However, one tube (R11 C2 in SG "C") was administratively removed from service due to a wear indication. The indication was located at the upper edge of the 4<sup>th</sup> hot leg support plate and is believed to be caused by a burr remaining from the broaching process used during fabrication of the support plate.

**f. Total number and percentage of tubes plugged to date**

The total number of tubes plugged post 1R18 is 1 tube (0.01%). To date, no tubes have been repaired (sleeved).

**g. The results of condition monitoring, including the results of tube pulls and in-situ testing**

During the 1R18 SG tube inspections, no indications were observed that exceeded the structural integrity limits for either axial or circumferential degradation (i.e., burst integrity > 3 times normal operating primary to secondary pressure differential). No tubes were found to contain indications that could potentially challenge the tube integrity requirements of NEI 97-06, Revision 2, "Steam Generator Program Guidelines."

Based on the 1R18 inspection results, the SG tubing is expected to meet all operational, structural and leakage integrity requirements at the end of Cycle 19. No indications were reported during 1R18 that could possibly represent a leakage potential at postulated main steam line break conditions. As such, in-situ proof or leakage testing was not required during 1R18 and no tubes or tube sections were removed (pulled).

**h. The effective plugging percentage for all plugging in each SG**

Listed below are the plugging percentages for each SG post 1R18. Since no sleeves have been installed to date, the effective plugging percentage is not applicable.

<b>SG</b>	<b>Tubes Plugged</b>	<b>% Plugged</b>
1RC-E-1A	0	0.00
1RC-E-1B	0	0.00
1RC-E-1C	1	0.01

## Definitions of Abbreviations, Codes and Reporting Terminology

### 3 Letter Code Definitions

<b>Term</b>	<b>Bobbin Coil Definitions</b>
DNI	Dent/Ding with a Possible Indication
DSI	Distorted Support Signal with Possible Indication
FSI	Free Span Indication
MBM	Manufacture's Burnish Mark
NQI	Non-Quantifiable Indication

<b>Term</b>	<b>Plus Point Definitions</b>
NDF	No Degradation Found

### Additional Definitions

<b>Term</b>	<b>Definition</b>
AVB	Anti-Vibration Bar
DENT	Indentation Observed within Tube Support Plate
DING	Indentation Observed in Free-Span Region
EPRI	Electric Power Research Institute
NEI	Nuclear Energy Institute
PCT	Percent Through Wall
PWSCC	Primary Water Stress Corrosion Cracking
TSP	Tube Support Plate
TTS	Top of Tubesheet