Enclosure 2

Braidwood Station, Unit 2 Steam Generator Tube Inspection Report

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Introduction

In Reference 1, Constellation Energy Generation (CEG) submitted a request for an amendment to Renewed Facility Operating License No. NPF-77 for the Braidwood Station (Braidwood), Unit 2 to adopt Technical Specifications Task Force (TSTF)-577, "Revised Frequencies for Steam Generator Tube Inspections" and Reference 2, Supplement to Application to Revise Technical Specifications to Adopt TSTF-577, "Revised Frequencies for Steam Generator Tube Inspections". Reference 1 and 2 were approved by the Nuclear Regulatory Commission (NRC) in Reference 3. As noted in Reference 2, "CEG will submit SG Tube Inspection Reports meeting the revised TS 5.6.9 requirements within 60 days after implementation of the license amendment at Braidwood." Based on NRC approval (Reference 3) TSTF-577 was implemented at Braidwood Station on September 13, 2023.

Braidwood Unit 2 Technical Specification (TS) 5.6.9, "Steam Generator Tube Inspection Report," states "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 5.5.9, 'Steam Generator (SG) Program'." This enclosure provides the 180-day report with the revised Braidwood Unit 2 TS 5.6.9 reporting requirements in accordance with References 3. Each Braidwood Unit 2 TS 5.6.9 reporting requirement is listed below along with the associated information based on the inspection performed during the Braidwood Unit 2 Cycle 23 April 2023 refueling outage (A2R23), which was the last inspection of the Braidwood Unit 2 steam generators (SGs). The 180-Day report will follow the template provided in Appendix G to the Electric Power Research Institute (EPRI) Steam Generator Management Program: Steam Generator Integrity Assessment Guidelines, Revision 5 (Reference 4), which provides additional information beyond the Braidwood Unit 2 TS 5.6.9 reporting requirements.

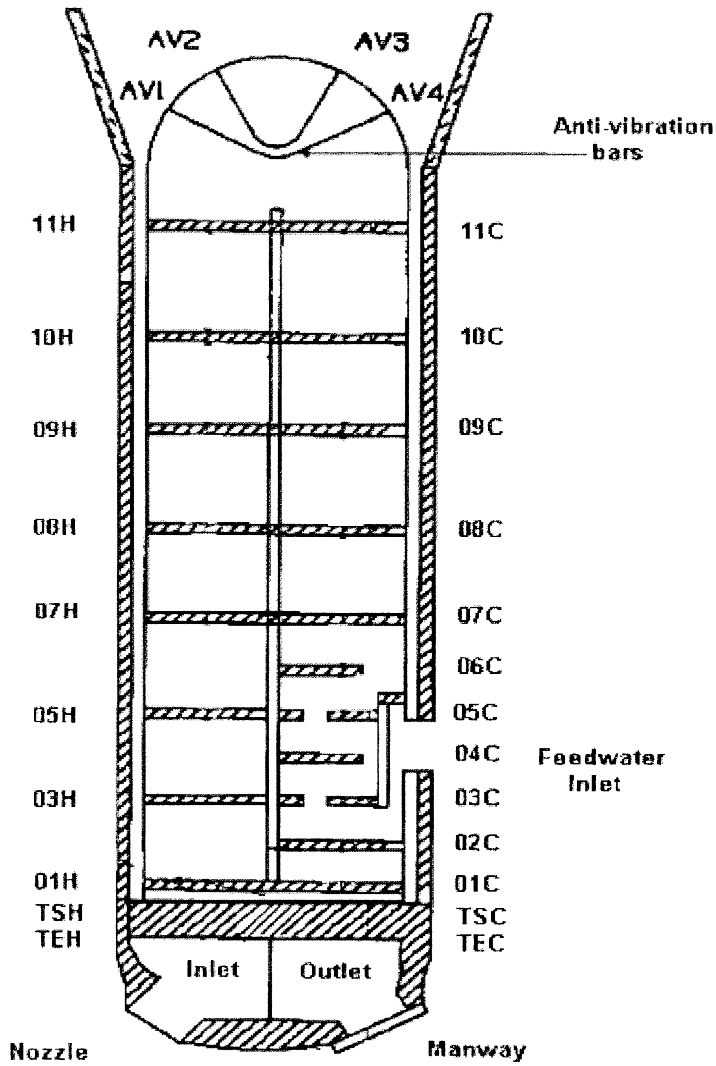
1. Design and operating parameters

The SGs at Braidwood Unit 2 are original Westinghouse Model D5 SGs, which have thermally treated Alloy 600 tubing. The SGs had operated one fuel cycle since the previous inspection in A2R22. Inspections of the SGs were last performed during A2R23. These inspections included eddy current testing of the SG tubing as well as primary and secondary side visual inspections. Table 1 provides the Braidwood Unit 2 SG design and operating parameter information.

Table 1: Braidwood Unit 2 - Steam Generator Design and Operating Parameters

SG Model / Tube Material / Number of SGs per Unit	Westinghouse Model D5 / Alloy 600TT / 4
Number of tubes per SG / Nominal Tube Diameter / tube thickness	4,570 / 0.75 in. / 0.043 in
Support Plate Style / Material	Quatrefoil (Broached) TSPs and U-bend AVBs / stainless steel
Last Inspection Date	Spring 2023 during A2R23
EFPM Since Last Inspection	17.4 EFPM (1.45 EFPY) (from A2R22 to A2R23)
Total Cumulative SG EFPY	31.3 EFPY (as of A2R23)
Mode 4 Initial Entry	5/11/2023 from A2R23
Observed Primary-to-Secondary Leak Rate	No Observed Leakage
Nominal Thot at Full Power Operation	611°F
Loose Parts Strainer	The Model D5 design has a preheater section with multiple baffles through which the main feedwater travels. Foreign objects entering the SGs tend to collect on the lowest elevation baffle plate. In addition, each main feedwater pump has small diameter holes in an inlet strainer to prevent the introduction of foreign material into the piping leading to the SGs.
Degradation Mechanism Sub-Population	A sub-population of 14 potentially high residual stress tubes has been identified from eddy current U-bend offset signals and are currently designated as a sub population potentially more susceptible to ODSCC in the A2R23 degradation assessment.
SG program guideline deviations since last Inspection	None
SG Schematic	See Figure 1

Figure 1: Tube Support Arrangement for Braidwood Unit 2 Model D5 SGs



Notes: Anti-Vibration Bars (AVB) are denoted as AV in the figure
##C – Cold Leg Tube Support Plate (quatrefoil) / Baffle (drilled hole)
##H – Hot Leg Tube Support Plate (quatrefoil) / Baffle (drilled hole)
TSH/TSC -Hot/Cold Tubesheet (designates top of tubesheet)
TEH/TEC - Hot/Cold Tube End

2. **The scope of the inspections performed on each SG (TS 5.6.9.a) and if applicable, a discussion of the reason for scope expansion**

The A2R23 outage was comprised of a 100% bobbin and 100% array probe full length examination of all in service tubes in all four SGs. These inspections may use a combination probe that contains a bobbin coil and array coils.

- Due to a low bend radius of tubes in Rows 1 and 2, these tubes were only inspected from tube end to the 11th hot leg and cold leg tube support (11H or 11C).

Rotating pancake coil (RPC) probes (Plus-Point) were used for special interest testing and resolution of bobbin and array indications when necessary. These included:

- 100% Row 1 and Row 2 U-bend region from TSP 11H to 11C.
- 100% Dents/Dings >5.0 volts located in the Hot leg, Cold leg and U-bend.

There was no scope expansion required or performed during the A2R23 eddy current inspections.

In addition to the eddy current inspections, visual inspections were also performed on both the primary and secondary sides. Primary side visual inspections included the channel head bowl cladding, divider plate, divider plate welds and previously installed tube plugs.

Secondary side visual inspections were performed at the preheater baffle plate in the SG 2A and SG 2C for detection of foreign objects. No top of tubesheet visual inspection or sludge lancing were performed in A2R23.

3. **The nondestructive examination techniques utilized for tubes with increased degradation susceptibility (TS 5.6.9.b).**

Prior to A2R22, a re-screening of high-stress tubes (increased degradation susceptibility to ODSCC) was performed using the EPRI Delta Offset method. As a result, the list of high stress tubes remaining in-service has been superseded by these results which contain 14 tubes remaining in-service identified as the next most susceptible to SCC initiation. One tube from the 15 identified during the re-screening was plugged during A2R22.

No instances of this degradation mechanism were detected during A2R23. During A2R23, all tube-to-TSP intersections received a bobbin and array exam, so tubes with potentially higher residual stresses no longer need to be treated differently for OA purposes since all tube-to-TSP intersections received the same baseline examinations.

4. **For each degradation mechanism found: The nondestructive examination technique utilized (TS 5.6.9.c.1)**

All SG eddy current examination techniques used for detection (see Table 2 below) and sizing degradation (see Table 3 below) were qualified in accordance with Appendix H or I of the EPRI PWR SG Examination Guidelines Revision 8. Each examination technique was evaluated to be applicable to the tubing and the degradation mechanisms found in the Braidwood Station Unit 2 SGs during A2R23.

Table 2 : Non Destructive Examination (NDE) Detection Techniques Utilized

Detection Probe Type	Detection Technique ETSS[1]	Degradation Mechanism	Location
Existing Degradation Mechanisms			
Bobbin Array	96041.1 (Rev 7) (App. I) 17908.1/.4 (Rev 1) (App. I)	Wear	AVB Supports
Bobbin Array	96042.1(Rev. 4) (App. I) 17908.1/.4 (Rev 1) (App. I)	Wear	FDB/ Baffle Pates (Drilled Hole)
Bobbin Array	96043.4 (Rev 1) 11956.3/.4 (Rev 3) (App. I)	Wear	Quatrefoil TSPs (broach)
Bobbin Array Array Array Array	27091.2 (Rev 2) 17901.1/.3 through 17906.1/.3 (Rev 0) 20400.1 (Rev 5) 20402.1 (Rev 5) 20403.1 (Rev 5)	Wear due to Foreign Objects	Top of Tubesheet and Sludge Pile Tube Support Plates and Freespan
Bobbin +Point Array	I28413 (Rev. 5) (broach/freespan) I28411 (Rev. 4) (drilled) I28424 (Rev. 4) (drilled) I28425 (Rev. 4) (broach and freespan) 20402.1 (Rev. 5)	Axial ODSCC	Tube Support Plates, FDB/Baffle Plates, Freespan, High Row Ubend (Rows 10 and higher)
Bobbin +Point	10013.1 (Rev. 1) (Dents)– Axial 24013.1 (Rev. 2) (Dings)- Axial 22401.1 (Rev. 4) Dents/Dings)– Axial 21410.1 (Rev. 6) (Dents/Dings)– Circ.	ODSCC	Dents/Dings <5v Dents/Dings >5v Baffle Plate Dents 2-5v Dings below Baffle Plates 2-5v
Potential Degradation Mechanisms			
Array Array +POINT	20501.1 (Rev 4) – Axial 20500.1 (Rev 4) – Circ. 11524 (Rev 0) – Circ. (App. I)	PWSCC, Axial/Circ.	Expansion Region to TTS-14.01"
Array Array	20501.1 (Rev 4) – Axial 20500.1 (Rev 4) – Circ.	PWSCC, Axial/Circ. (BLG/OXP)	Expansion Region to TTS-14.01"
+POINT Array	96511.2 (Rev 16) – Axial/Circ. 23513.1 (Rev 3) – Axial/Circ.	PWSCC, Axial/Circ.	Row 1/Row 2 U-Bend Low Row U-bend
Array	OD: 20402.1 (Rev 5) – Axial 20400.1 (Rev 5) – Circ. ID: 20501.1 (Rev 4) – Axial 20500.1 (Rev 4) – Circ.	ODSCC/PWSCC Axial/Circ.	Top of Tubesheet Expansion Transition, Abnormalities (Underexpansions and BLG/OXP) within the Tubesheet and Pre-heater Baffle Plate Expansion Transitions (TSP 02C/03C)
Bobbin +POINT +POINT Array Array Array	28413 (Rev 5) – Axial (App. I) 28424 (Rev 4) – Axial (App. I) 21410.1 (Rev 6) – Circ. 20402.1 (Rev 5) – Axial 20403.1 (Rev 5) –Axial 20400.1(rev. 5) -Circ	ODSCC, Axial/Circ	Sludge Pile
Array	10413.2 (Rev. 0)– Axial	ODSCC, Axial	Low Row U-bends,

			Rows 3-5
Bobbin Array	96005.2 (Rev. 9) 24998.1 (Rev. 1)	Pitting, Volumetric Indications	Top of tubesheet, Freespan

Note: (1) ETSS - Examination Technique Specification Sheet

Table 3 : NDE Sizing Techniques Utilized

Detection Probe	EPRI Technique ETSS	ETSS Rev.	Degradation Mechanism	Location Applicability
+Point™	21998.1	4	Volumetric Wear	Foreign Object Wear Locations
Bobbin	96004.3	14	Wear at Structure	AVBs(1)
+Point™	96910.1	12	Wear at Structure	TSPs(1) (Quatrefoil and Drilled Hole Baffle)

Note: (1) TSP – Tube Support Plate
AVB – Anti-Vibration Bar

5. **For each degradation mechanism found: 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 (TS 5.6.9.c.2)**

<u>Anti-Vibration Bar (AVB) Wear</u>

Tube degradation was found during bobbin coil examination in the U-Bend region due to fretting of the AVB on the outer surface of the tube. A total of 1131 indications were reported. After 1 operating cycle, two (2) tubes, one in SG 2A and one in SG 2C had indications of AVB wear meeting or exceeding the 40% TW plugging limit and were removed from service by mechanical tube plugging. The largest AVB wear indication found during A2R23 was measured at 40% through-wall (TW). The Table 4 below provides a summary of AVB wear degradation. Refer to Attachment A for detailed locations and sizing for all AVB wear indications.

Table 4: A2R23 AVB Wear Summary

	SG 2A	SG 2B	SG 2C	SG 2D	Total
	# of Ind.	# of Ind.	# of Ind.	# of Ind.	# of Ind.
Total Indications	462	133	320	216	1131
<= 20% TW	256	84	195	149	684

<u>Mechanical Wear at Tube Support Plates (TSPs)</u> – Tube degradation attributed to wear in the quatrefoil (broached) TSPs and in the pre-heater TSPs, which are drilled support baffle plates, was identified. A total of 10 indications in 9 support plate structures were identified as wear during A2R23. Within this population, 7 pre-existing TSP wear indications were identified in the 2A, 2B, and 2D SGs and 3 newly identified TSP wears were found in 2 tubes in 2D SG. The depth of the TSP wear ranged from 7% TW to 34% TW. Table 5 below provides a summary of the tubes that contain indications of pre-heater or quatrefoil TSP wear as identified during A2R23.

Table 5: A2R23 Tube Support (Quatrefoil and Baffle Plate) Wear Summary

SG	Row	Col	Location	Wear Type	A2R23 %TW	Total Length	Plus Point Voltage
2A	22	98	10C	Volumetric	34	0.15	0.34
2A	46	48	05C	Drilled Hole	7	0.21	0.15
2B	47	39	03C	Drilled Hole	7	0.22	0.20
2B	47	41	03C	Drilled Hole	9	0.34	0.23
2B	49	49	05C	Drilled Hole	8	0.21	0.22
2D	17	66	08H	Single Land	22	0.37	0.52
2D	23	109	11C	Quatrefoil Land[1]	12	0.52	0.22
2D	23	109	11C	Quatrefoil Land[1]	17	0.66	0.36
2D	44	26	10H	Single Land	9	0.51	0.17
2D	49	53	07C	Single Land	15	0.35	0.30

Note:

1. Wear at two lands at this quatrefoil TSP

Foreign Object (FO) Wear – A total of 26 indications of FO wear were identified during A2R23. All twenty-six (26) of the indications were historical with no new foreign object wear detected during A2R23. The indications ranged from 10% TW to 38% TW. The historical FO wear shows no significant change in eddy current signal response. No new Possible Loose Parts (PLP)s were reported during A2R23. The table below lists the data record for the eddy current signals corresponding to foreign object wear indications detected during A2R23.

Table 6: Braidwood A2R23 Foreign Object Wear Indication Summary and Sizing Results

SG	Row	Col	Locn	Inch1	Depth %TW	+PT Volts	Axial Length (inches)	Circ Extent (degrees)	New/ Legacy	FO Present
2A	2	2	08H	-1.01	14	0.13	0.13	58	Legacy	No
2A	8	9	05H	-0.36	19	0.17	0.11	62	Legacy	No
2A	8	94	07H	-0.77	36	0.36	0.1	60	Legacy	No
2A	15	47	07H	-0.55	20	0.19	0.19	34	Legacy	No
2A	24	22	05H	-0.74	18	0.13	0.11	63	Legacy	No
2A	30	53	01H	0.39	11	0.07	0.05	45	Legacy	No
2A	31	52	01H	0.38	29	0.3	0.11	49	Legacy	No
2A	32	53	01H	0.41	17	0.12	0.13	48	Legacy	No
2A	42	22	02C	0.73	14	0.11	0.1	46	Legacy	No
2B	2	80	07H	-0.75	16	0.16	0.21	48	Legacy	No
2B	17	59	10H	-0.81	27	0.28	0.24	51	Legacy	No
2B	20	64	05H	-0.68	14	0.13	0.12	49	Legacy	No
2B	21	108	07H	-0.69	27	0.26	0.19	52	Legacy	No
2B	40	50	03H	-0.59	18	0.13	0.19	51	Legacy	No
2B	49	51	TSC	0.65	20	0.15	0.39	52	Legacy	No
2B	49	52	TSC	1.06	34	0.42	0.22	63	Legacy	No
2B	49	52	TSC	0.43	21	0.2	0.29	52	Legacy	No
2B	49	53	TSC	0.49	10	0.08	0.22	57	Legacy	No
2C	7	67	07H	-0.64	38	0.41	0.21	49	Legacy	No
2C	14	43	07H	-0.84	29	0.3	0.25	45	Legacy	No
2C	17	49	05H	-0.57	23	0.18	0.21	58	Legacy	No
2C	22	42	07H	-0.66	12	0.12	0.16	45	Legacy	No
2D	22	73	05H	-0.76	31	0.36	0.21	71	Legacy	No
2D	24	86	05H	-0.75	23	0.19	0.29	66	Legacy	No
2D	31	48	01H	0.37	20	0.19	0.24	62	Legacy	No
2D	36	61	TSH	0.03	14	0.11	0.11	37	Legacy	No

Axial ODSCC in Freespan

During A2R23, one instance of an axial ODSCC at a Freespan ding in the U-bend was detected from both bobbin and array probe and confirmed with a +POINT probe inspection with details of location and bounding size of the indication presented in Table 7. The indication was sized using Appendix I +POINT technique. The flaw was detected coincident to a low-level ding which was found to not interfere with the flaw signal for sizing purposes.

Table 7: Axial ODSCC at Freespan Ding in SG 2C

SG	Row	Col	+POINT Volts	Deg	Ind	Locn	Inch1	Max Depth (%TW)	Total Length (inches)
C	49	59	0.47	46	SAI	AV3	+33.26	64	0.18

Volumetric Indication in Freespan

A volumetric indication (49% TW) in the Freespan above the 08H TSP in tube R41-C82 in the 2A SG was detected during A2R23. The flaw was detected from both bobbin and array probes and confirmed with a +PT probe inspection (0.53V) with a total length of 0.26 inches.

6. **For each degradation mechanism found: 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 (TS 5.6.9.c.3). Discuss any degradation that was not bounded by the prior operational assessment in terms of projected maximum flaw dimensions, minimum burst strength, and/or accident induced leak rate. Provide details of any in situ pressure test.**

A condition monitoring assessment was performed for each in-service degradation mechanism found during the A2R23 SG inspection. The condition monitoring assessment was performed in accordance with TS 5.5.9.a and NEI 97-06 Rev. 3 using the EPRI Steam Generator Integrity Assessment Guidelines, Revision 5. For each identified degradation mechanism, the as-found condition was compared to the appropriate performance criteria for tube structural integrity, accident induced leakage, and operational leakage as defined in TS 5.5.9.b. For each degradation mechanism a tube structural limit was determined to ensure that SG tube integrity would be maintained over the full range of normal operating conditions, all anticipated transients in the design specifications, 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 under the limiting design basis accident pressure differential. The structural limits for wear related degradation were performed in accordance with the EPRI Steam Generator Integrity Assessment Guidelines and the EPRI Steam Generator Degradation Specific Management Flaw Handbook, Revision 2 (Flaw Handbook).

The as-found condition of each tubing degradation mechanism found during the A2R23 outage was shown to meet the appropriate limiting structural integrity performance parameter with a probability of 0.95 at 50% confidence, including consideration of relevant uncertainties thus satisfying the condition monitoring requirements. The NDE measured flaw depths are compared to the structural integrity condition monitoring (CM) limits, which account for tube material strength, burst relation, and NDE measurement uncertainties with a 0.95 probability at 50% confidence. Therefore, the NDE measured flaw sizes are directly compared to the CM limit. No indications met the requirements for proof or leakage testing; therefore, no In Situ Pressure tests were performed during A2R23. In addition, no tube pulls were performed during A2R23.

The sections below provide a summary of the condition monitoring assessment for each degradation mechanism found during A2R23.

AVB Wear- The two largest AVB wear indications found during the A2R23 inspection were 40% TW in SG 2A (R41-C37) and 40% TW in SG 2C (R42-C90) as measured by the EPRI Appendix H qualified technique 96004.3. This is below the AVB wear CM limit of 64.3% TW.

Pre-Heater Baffle/TSP Wear- Both quatrefoil TSP wear (flat or tapered) and drilled hole baffle wear were sized by +POINT probe using ETSS 96910.1. Volumetric point indications within the TSP (one location) were sized using ETSS 21998.1. During prior inspections, drilled hole baffle plate wear was sized using bobbin technique ETSS 96004.3. Since the sizing method was changed to +POINT for A2R23, sizing was performed using both ETSS 96004.3 and ETSS 96910.1 to assess growth while baselining sizing to the +POINT technique ETSS 96910.1 for future inspections.

None of the TSP/drilled hole baffle plate wear indications exceeded the CM limits. The largest TSP wear indication at a quatrefoil tube support plate with single land contact wear was measured at 22% TW at SG 2D tube R17-C66 location 08H. This bounding quatrefoil wear is below the CM limit for quatrefoil TSP wear of 52.7% TW. In addition, the largest drilled hole baffle plate wear indication was measured at 9% TW at SG 2B tube R47C41 location 03C.
The bounding baffle plate wear (9% TW) is less than the CM limit for drilled hole baffle plate wear of 52.8% TW. Therefore, condition monitoring for structural and leakage integrity has been satisfied for both quatrefoil TSP wear and baffle plate wear.

Foreign Object Wear - No new foreign object wear indications were detected during A2R23. All foreign object wear was depth sized using the +Point Examination Technique Specification Sheet (ETSS) 21998.1 technique. The deepest foreign object wear indication found during the A2R23 inspection was 38% TW with axial extent of 0.21 inch and circ extent of 49 degrees (Tube R7-C67 in SG 2C). FO wear flaw measuring 0.5 inches in axial length and up to 135 degrees in circumferential extent, thus bounds the length of the FO wear flaw dataset, is 54% TW.

Since the largest flaw size is much smaller than this, CM is met for structural integrity for all tubes with foreign object wear.

A summary of the CM results from A2R23 as compared to the predictions from the most recent prior inspection (A2R22) is provided in Table 8.

Axial ODSCC in Freespan – For tube R49-C59 in the 2C SG, history review of the bobbin signal reveals that the flaw precursor has been present for many cycles, first detectable in 2006. The last +PT exam at this tube location was performed during A2R19 (2017). The signal has exhibited minor continual changes since 2006. Depth profiling of the flaw was performed based on the voltage-to-amplitude sizing correlation from ETSS I28432. The average depth of the flaw is 57.6% TW and effective length is 0.146 inches. A tube burst calculation is performed for a flaw of this size and the resulting burst pressure was 4883 psi, including burst relation, material property and NDE (depth and length) uncertainties. NDE depth sizing uncertainties are from ETSS I28432 and to account for NDE length uncertainty 0.09 inches was added to the structural equivalent length (SEL) of the flaw. Since the calculated pressure exceeds the 3ΔPNO performance criteria pressure of 4140 psi, the tube meets CM for structural integrity. The calculated ligament tearing pressure is 5439 psi, which is larger than the 1.4PSLB performance criteria pressure of 3584 psi. Therefore, the tube meets CM for leakage integrity.

The indication screens out of in situ pressure testing based on the maximum +PT voltage of 0.47V being less than the 0.5V voltage screening threshold. It screens out for leak testing based on the +PT voltage being less than the VTHR-L for axial ODSCC at a Freespan ding which is 1.26V.

Volumetric Indication in Freespan – For tube R41-C82 in the 2A SG, history review of the bobbin signal confirms that the flaw was present during A2R22 (2021) and had exhibited minor growth over the last cycle. The flaw was not present in the A2R19 (2017) bobbin data. Due to the unique axial and circumferential response of the signal, further investigation was performed on the indication following the issuance of the preliminary OA to confirm the morphology of the flaw. After extensive review, the flaw was determined to be volumetric in nature and exhibit the shape of a tapered football from the +PT graphic. A major factor in the determination of the flaw being volumetric is the circumferential channel response from the array probe exam. Axial SCC indications would not have generated a circumferential channel response.

The indication was sized using a calibration curve built from Appendix H technique 27903.2 for depth sizing of tapered football shaped volumetric indications in the Freespan. The maximum depth associated with a peak-to-peak voltage of 0.53V is 49% TW. The CM limit associated with a volumetric indication sized using ETSS 27903.2 is 64% TW for a flaw length of 0.5 inch. Since the CM limit significantly bounds the detected flaw size, depth profiling of the volumetric flaw is not performed.

Table 8: Comparison of Prior OA Projections to As-Found Results

Parameter	A2R22 OA Projection (NDE Depth)	A2R23 As-Found Result
Maximum Depth for Anti-Vibration Bar (AVB) Wear	51.4%TW	40%TW
Maximum Depth for Tube Support Wear	43.9%TW Quatrefoil 17.6%TW Baffle Plate	22%TW Quatrefoil 9%TW Baffle Plate
Growth of Repeat Foreign Object Wear Indications	No actual change in depth expected since foreign objects are no longer present	No change in measured depth
Maximum Depth for New Foreign Object Wear	Limiting flaw won't challenge structural or leakage integrity	No new FO wear
Maximum Depth for Axial ODSCC	See Note 1	64%
Maximum Volumetric (Freespan)	-	49%

Note:

1. For a more direct comparison, a mixed arithmetic / Monte Carlo OA calculation is retroactively performed for A2R22 below. This method is based on a worst-case degraded tube evaluation where the BOC flaw size is selected as the 95th percentile from the nondetected flaw population based on the technique POD function. Per the A2R22 CMOA, the 95th percentile max depth from the nondetected flaw population is approximately 63% TW. Growth is applied using Monte Carlo techniques and utilizes the EPRI default growth rate function from Reference 4 which has a 95th percentile max depth growth of approximately 16.5% TW/EFPY. NDE measurements uncertainties are not included since the flaw is assumed to be undetected. A one-cycle OA simulation of 1.45 EPFY is performed using Single Flaw Model to simulate the operating interval from A2R22 to A2R23. The calculated burst pressure is 4287 psi and ligament tearing pressure is 4340 psi. Both meet the SG performance criteria, and both are conservative in comparison to the A2R23 detected flaw.

Because volumetric wear indications will leak and burst at essentially the same pressure, accident-induced leakage integrity is also demonstrated. Operational leakage integrity was demonstrated by the absence of any detectable primary-to-secondary leakage during the operating interval prior to A2R23. Because tube integrity was demonstrated analytically, in-situ pressure testing was not required nor performed during A2R23. There were no tube pulls planned or performed during A2R23.

7. **For each degradation mechanism found: The number of tubes plugged during the inspection outage (TS 5.6.9.c.4). Also, provide the tube location and reason for plugging.**

Table 9 provides the numbers of tubes plugged for each degradation mechanism detected and for tubes plugged preventatively. Table 10 provides the tube location and reason for plugging.

Table 9: A2R23 Tube Plugging by Degradation Mechanism

Degradation Mechanism	2A SG	2B SG	2C SG	2D SG	Total
Anti-Vibration Bar (AVB) Wear	1	0	1	0	2
Quatrefoil TSP Wear	0	0	0	0	0
Foreign Object Wear	0	0	0	0	0
ODSCC	0	0	1	0	1
Volumetric Indication[1]	1	0	0	0	1
Total Plugged during A2R23	2	0	2	0	4

Notes: Volumetric indication above 08H at SG 2A tube R41C82 is treated separately from foreign object wear indications since it is believed the indication may be the result of a manufacturing defect such as a lap in the tube.

Table 10: Braidwood A2R23 New Plugging by Location, Degradation Mechanism and Reason

SG	Row	Col	Degradation Mechanism	Plugging Reason
A	41	37	AVB Wear	Tech Spec ≥ 40%
A	41	82	Volumetric Indication in Freespan above 08H (tapered football shape)	Tech Spec ≥ 40%
C	42	90	AVB Wear	Tech Spec ≥ 40%
C	49	59	Axial ODSCC at Freespan Ding	SCC Plug on Detection

8. **The repair methods utilized, and the number of tubes repaired by each repair method (section 5.6.7.c.5).**

   No tubes were repaired during A2R23.

9. **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 (TS 5.6.9.d). The effective full power months of operation permitted for the current operational assessment.**

Anti-Vibration Bar (AVB) Wear Operational Assessment (OA)

The OA for AVB wear will use the worst-case degraded tube simplified analysis procedure for plugging on NDE sizing where the NDE uncertainties are combined using a mixed arithmetic/simplified statistical strategy. This method combines the largest flaw left in service as measured by NDE techniques and growth allowance is applied to determine the predicted flaw depth at the end of the next inspection interval. The predicted NDE flaw depth is compared to the condition monitoring limit that includes uncertainties for NDE measurement, material property, and burst relation that are combined through Monte Carlo simulations. The largest AVB wear left in service during A2R23 was measured at 39%TW (ETSS 96004.3) The OA methodology must address flaws that may be undetected by the inspection technique however the 95th percentile undetected flaw is only 23%TW. Since this is less than the largest AVB wear flaw returned to service (39% TW), the OA for the undetected flaw population is bounded by that of the worst-case degraded tube of the existing flaw population. A separate OA for undetected flaws is not necessary. Therefore, the OA projects that AVB wear degradation will not violate the SG tube integrity performance criteria for a two-cycle or three-cycle interval until the next SG inspection.

The largest flaw size projected at A2R25 (2 cycles) and A2R26 (3 cycles) is determined as follows:

Table 11: Braidwood Unit 2 - Steam Generator 2 & 3 Cycle AVB OA Projections

OA for AVB Wear		
	2-cycle OA	**3-cycle OA**
Maximum BOC NDE Depth, %TW	39.0%TW	39.0%TW
99th Percentile Growth per EFPY	4.14%TW/EFPY	4.14%TW/EFPY
EFPY per Cycle	1.46 EFPY	1.46 EFPY
Number of Cycles	2	3
Predicted NDE Depth	51.4%TW	57.6%TW
Condition Monitoring Limit(1)	63.6%TW	63.6%TW
Notes: The CM limit includes NDE measurement, material property, and burst relation uncertainties at 0.95 probability and 50% confidence level.		

Mechanical Wear at Quatrefoil Tube Supports OA

The OA for Quatrefoil TSP wear will use the worst-case degraded tube simplified analysis procedure for plugging on NDE sizing where the NDE uncertainties are combined using a mixed arithmetic/simplified statistical strategy. This method combines the largest flaw left in service as measured by NDE techniques and growth allowance is applied to determine the predicted flaw depth at the end of the next inspection interval. The predicted NDE flaw depth is compared to the condition monitoring limit that includes uncertainties for NDE measurement, material property, and burst relation that are combined through Monte Carlo simulations. For OA purposes, all quatrefoil TSP wear flaws are conservatively assumed to be flat wear and conservatively assumes a flat wear profile of the maximum flaw depth applied over the entire 1.125 inch TSP thickness.

During the A2R23 inspection there was a total of 10 indications considered to be tube wear at TSP/baffle plates. The indications are comprised of five instances of tube wear at quatrefoil TSPs (maximum depth of 22% TW), four instances of tube wear at drilled hole baffle plates (maximum depth of 9% TW), and one instance of a volumetric indication within the TSP and without land contact that historically been sized using ETSS 21998.1. The indication has been slow growing from A2R17 (26%TW) to A2R19 (28% TW) to A2R22 (31% TW) and finally to A2R23 (34% TW). It exhibited growth of around 2% TW/EFPY over the last inspection interval, so while it is being treated with the other classical TSP wear in terms of OA, it is considered extremely conservative based on the historical data for the flaw. Two new TSP wear indications were detected at the same tube-to-TSP intersection in SG 2D tube R23C109 at two separate lands of 11C, one measured at 12% TW and the other at 17% TW.

Seven indications with point-to-point sizing data are too few to develop a 95th percentile plant specific growth rate and essentially no growth has been exhibited by the existing population of TSP/baffle plate wear flaws at A2R23. As such, bounding growth rates applied in the A2R22 CMOA will continue to be used for the A2R23 OA. These include 5.2% TW/EFPY for quatrefoil TSP wear, 4.2% TW/EFPY for drilled hole baffle plate wear, and 4.4% TW/EFPY for the volumetric indication within a TSP without land contact. A 2-cycle and a 3-cycle OA prediction was performed to provide flexibility in outage planning. The largest 3-cycle flaw size projected at A2R25 (2-cycles) and A2R26 (3-cycles) is determined as follows:

Table 12: Braidwood Unit 2 - Steam Generator 2 & 3 Cycle TSP OA Projections

OA for Quatrefoil TSP Wear		
	2-cycle OA	**3-cycle OA**
95^{th} Percentile from POD Curve, %TW (BOC depth)	22%TW	22%TW
95th Percentile Growth per EFPY	5.2%TW/EFPY	5.2%TW/EFPY
EFPY per Cycle	3.0 EFPY	4.5 EFPY
Predicted NDE Depth	37.6%TW	45.4%TW
Condition Monitoring Limit	52%TW	52%TW

Mechanical Wear at Drilled Hole Baffle Plate Supports OA

The OA for drilled hole baffle plate wear will use the worst-case degraded tube simplified analysis procedure for plugging on NDE sizing where the NDE uncertainties are combined using a mixed arithmetic/simplified statistical strategy. This method combines the largest flaw left in service as measured by NDE techniques and growth allowance is applied to determine the predicted flaw depth at the end of the next inspection interval. The predicted NDE flaw depth is compared to the condition monitoring limit that includes uncertainties for NDE measurement, material property, and burst relation that are combined through Monte Carlo simulations.

Similar to the quatrefoil TSP OA methodology described above, the OA for drilled hole baffle supports will conservatively assume flat wear instead of tapered wear.

The maximum measured wear indication at a drilled TSP that was left in service was 4% TW by bobbin and sized at 9% TW by +POINT. The three indications of drilled baffle plate wear exhibited essentially zero growth from A2R19. The length of the largest indication left in service is assumed to be 0.75 inch, which is the bounding length that was assumed. The uniform thinning model (degradation assumed 360-degrees circumferentially around the tube and axially flat) is applied for tube wear at drilled support plate intersections.

The 95th percentile undetected flaw size from the POD function is 5% TW. Since this is less than the largest baffle plate wear flaw returned to service (9% TW) the OA for the undetected flaw population is bounded by that of the worst-case degraded tube of the existing flaw population.

A 2-cycle and a 3-cycle OA prediction was performed to provide flexibility in outage planning. The largest 2-cycle flaw size projected at A2R25 (2 cycles) and A2R26 (3-cycles) is determined as follows:

Table 13: Braidwood Unit 2 - Steam Generator 2 & 3 Cycle Drilled Hole Baffle OA Projections

OA for Drilled Hole Baffle Wear		
	2-cycle OA	**3-cycle OA**
Maximum BOC NDE Depth, %TW	9%TW	9%TW
95th Percentile Growth per EFPY	4.2%TW/EFPY	4.2%TW/EFPY
EFPY per Cycle	1.46 EFPY	1.46 EFPY
Number of Cycles	2	3
Predicted NDE Depth	21.6%TW	27.9%TW
Condition Monitoring Limit	52.4%TW	52.4%TW

Mechanical Wear due to Foreign Objects OA

There were no tubes containing newly reported FO wear during A2R23 that had to be preventively plugged. The only FO wear indications remaining inservice have been in service for multiple cycles and with no evidence of a FO. These indications have not changed or grown since their initial detection. Therefore, continued operation until the next planned SG inspection during A2R25 or A2R26 is acceptable since there is no wear mechanism for continued growth All the existing FO wear indication wear depths are less than the condition monitoring limit and therefore meets the OA performance criteria for existing volumetric wear with the upper tube bundle.

For new FO wear associated with migration of objects that caused the existing wear found in A2R23, an OA is performed based upon a volumetric work rate that caused a known existing or new wear FO wear in the upper bundle In addition to no growth being anticipated for foreign object wear flaws, a reasonable amount of margin exists between the maximum measured foreign object wear indication of 38% TW with a 0.25-inch foreign object wear flaw measured with ETSS 21998.1 and a limit of 63.5% TW. The length of the largest object known to be remaining in the SGs is 1.25-inch. The structural limit for a 1.25 inch wear scar is 66% TW. This object resides in the preheater baffle plate region where only one current FO wear indication exists, which was measured at 14% TW.

One instance of a volumetric indication was detected from both array and bobbin probes during the full-length exams in the Freespan above 08H. The indication in tube R41-C82 in the 2A SG is potentially the result of a foreign object, but also could be a manufacturing defect in the tube such as a lap that became more prominent over time. Either way, from an OA perspective it is treated similar to foreign object wear where the degradation is not projected over the next inspection interval with no wear initiating mechanism known to be present. Further, the tube was plugged during A2R23.

No new tube wear was detected from foreign objects in high flow regions or otherwise typical foreign object locations during A2R23. Therefore, the structural and leakage integrity performance criteria limits are not expected to be challenged over the next inspection interval (two or three cycles until the next SG ECT examination) due to existing foreign object wear.

Based upon the above evaluations, it is concluded that OA performance criteria is satisfied with margin for all existing wear degradation mechanisms for inspection intervals of both 2-cycles and 3-cycles. These results are summarized in Table 14.

Table 14: Braidwood-2 Deterministic Operational Assessment Summary for Existing Wear Degradation Mechanisms

Degradation Mechanism	2-Cycle Projection, %TW	3-Cycle Projection, %TW	Condition Monitoring Limit, %TW	2-Cycle Margin to Limit, %TW	3-Cycle Margin to Limit, %TW
AVB Wear	51.4	57.6	63.6	12.2	6.0
Quatrefoil TSP Single Land Wear	37.6	45.4	52	14.4	6.6
Quatrefoil TSP Volumetric Wear	47.2	53.8	63.5	16.3	9.7
Drilled Hole Baffle Wear	21.6	27.9	52.4	30.8	24.4
Foreign Object Wear(1)	< 66	< 66	66	No growth expected for existing indications	
Notes: 1) Structural Limit for a 1.25 inch wear scar.					

<u>Stress Corrosion Cracking OA</u>

The Final Operational Assessment for SCC mechanisms provides reasonable assurance that SG tube integrity will be maintained until the next planned SG inspection. These OA evaluations are performed for existing SCC mechanisms (whether detected during A2R23 or not) via probabilistic calculations using the Westinghouse Full Bundle Model software. The maximum achievable OA duration of 2 cycles, due to SCC detection during A2R23, will be performed for each existing mechanism. As assessment is also conducted of the limiting potential mechanisms based on OE of other Alloy 600TT SG units.

The OA performed for existing SCC mechanisms includes Axial ODSCC at Freespan (ding or no ding present), which was detected during A2R23. Also, Axial ODSCC at tube-to-TSP intersections, which was not detected during A2R23, was included in the OA.

Table 15 provides a summary of the OA results for the SCC mechanism evaluated using fully probabilistic methods with their margin to the performance criterion.

Table 15: Braidwood-2 Fully Probabilistic Operational Assessment Summary for SCC Degradation Mechanisms

Degradation Mechanism	OA Interval (cycles)	POB (%)	POL (%)	Burst Pressure (psi)	SLB Leak Rate (gpm)	Burst Pressure Margin to Criterion (psi)	SLB Leak Rate Margin to Criterion (gpm)
Existing Mechanisms[1]							
Axial ODSCC at TSP	2	2.427	1.678	4691	0.0021	491	0.498
Axial ODSCC at Dent Ding	2	1.692	0.442	4869	0	669	0.5
Potential Mechanisms[2]							
Circumferential ODSCC at TTS	3	1.069	1.352	5695	0.02	1495	0.48
Axial ODSCC at TTS	3	0.873	0.292	5216	0	1016	0.5
Performance Criterion		< 5%	< 5%	> 4200	< 0.5	--	--

Notes:
(1) OA for existing mechanisms is a 2-cycle evaluation performed from A2R23 to A2R25.
(2) OA for limiting potential mechanisms is a 3-cycle evaluation performed from A2R22 to A2R25.

10. The number and percentage of tubes plugged to date, and the effective plugging percentage in each SG (TS 5.6.9.e).

Table 16 shows the number of tubes plugged before and after the A2R23 outage and the percentage of tubes currently plugged (total and effective). No sleeves have been installed in Braidwood Unit 2.

Table 16: Braidwood-2 Tube Plugging Through A2R23

	SG 2A	SG 2B	SG 2C	SG 2D	Total
No. Tubes Plugged prior to A2R23	119	81	81	55	336
No. Tubes Plugged during A2R23	2	0	2	0	4
Total No. Tubes Plugged through B2R23	121	81	83	55	340
Percent (Actual and Effective) Tubes Plugged	2.65%	1.77%	1.82%	1.20%	1.86%
Allowable Percent Tubes Plugged	10%	10%	10%	10%	10%

11. The results of any SG secondary-side inspection (TS 5.6.9.f). The number, type, and location (if available) of loose parts that could damage tubes removed or left in service in each SG.

Foreign object search and retrieval (FOSAR) inspections were conducted from the secondary side at the preheater baffle plate in SGs 2A and 2C. This included visual examination of tube bundle periphery tubes from the hot leg and cold leg annulus and center no tube lane. As listed in Table 17, a total of two foreign objects were removed from the preheater baffle plate region. The foreign objects remaining are wire bristles, fibrous materials, machine turnings, machine remnants which are located at the top of the tubesheet on the CL side, these foreign objects were considered to be not capable of causing significant tube wear. There were no objects identified that had the potential to pose an imminent threat to tube integrity.

Any foreign objects not able to be retrieved were characterized and an analysis performed to demonstrate acceptability of continued operation without exceeding the performance criteria. No top of tubesheet in-bundle visual inspection was performed During A2R23. The tube integrity assessment of the foreign objects remaining in the SGs also supports the conclusion as no adverse effects on tube integrity are projected within two cycles of operation.

Table 17: Foreign Object Summary

SG / FO ID	Retrieval Status	Foreign Object Description	Location	Row-Col	New/ Legacy	Dimensions, inch	Comment
2A/001	Active	Wire Bristle	TSP 02C	R22-C73	New	0.25 x 0.01	Fixed
2A/002	Retrieved	Machine Remnant	TSP 02C	R22-C95	New	0.625 x 0.2 x 0.0625	---
2A/003	Active	Wire Bristle	TSP 02C	R27-C65	New	0.25 x 0.005	Fixed
2A/004	Active	Machine Turning	TSP 02C	R27-C36	New	0.25 x 0.05 x 0.01	Loose
2A/005	Active	Wire Bristle	TSP 02C	R30-C25	New	0.625 x 0.01	Fixed
2A/006	Active	Wire Bristle	TSP 02C	R31-C20	New	0.3125 x 0.01	Loose
2A/007	Active	Wire Bristle	TSP 02C	R33-C30	New	0.125 x 0.02	Fixed
2C/001	Active	Machine Turning	TSP 02C	R22-C100	New	0.5 x 0.125 x 0.0625	Loose
2C/002	Active	Wire Bristle	TSP 02C	R30-C64	Legacy	0.25 x 0.01	Fixed
2C/003	Active	Wire Bristle	TSP 02C	R33-C99	Legacy	0.3125 x 0.02	Fixed
2C/004	Active	Machine Turning	TSP 02C	R48-C64	New	0.1 x 0.05 x 0.05	Loose
2C/005	Active	Rectangular Metallic Object	TSP 02C	R44-C44	New	0.3 x 0.1 x 0.02	Fixed
2C/006	Active	Wire Bristle	TSP 02C	R26-C10	New	0.25 x 0.0625	Fixed
2C/007	Active	Wire Bristle	TSP 02C	R22-C20	New	0.15 x 0.0625	Fixed
2C/009	Active	Fibrous Material	TSP 02C	R10-C56	New	0.3125 x 0.01 x 0.3125	Loose
2C/010	Active	Wire Bristle	TSP 02C	R9-C59	Legacy	0.125 x 0.0625	Fixed
2C/011	Active	Wire Bristle	TSP 02C	R12-C59	New	0.0625 x 0.01	---
2C/012	Active	Wire Bristle	TSP 02C	R1-C60	Legacy	1.25 x 0.0625	Scale and deposits in the vicinity of the object which may be keeping the object at the location and preventing its migration despite not being fixed
2C/013	Active	Wire Bristle	TSP 02C	R2-C61	New	0.6 x 0.0625	Loose
2C/014	Active	Wire Bristle	TSP 02C	R13-C62	New	0.6 x 0.0625	Fixed
2C/015	Retrieved	Wire Bristle	TSP 02C	R2-C59	Legacy	0.5 x 0.05	---

Waterbox/ Pre-Heater Inspections

A visual inspection of the 2A and 2C SG waterbox and cap plate regions was performed during A2R23. All four fit-up backing blocks under TSP 03C were intact in both SGs inspected. The vertical rib plates, impingement plate and cap plates were inspected in both SGs and found to be in acceptable condition with no notable indications of degradation erosion or other inspection anomalies.

A visual inspection of the 2A and 2C SG preheater regions where the feedwater enters the SG were performed during A2R23. All four (4) fit-up blocks under TSP 03C were found intact in the 2A and 2C SGs inspected. The waterbox vertical rib plates and target plate in both SGs inspected were found to be in acceptable condition with no indication of degradation, erosion or other anomalies.

Steam Drum Inspections

During A2R23, steam drum inspections were performed in all four SGs. The only degradation noted in this report was Flow Accelerated Corrosion (FAC) degradation of the carbon steel material of the SGs primary moisture separator (PMS) riser barrels, swirl vane blades, spacer tabs, downcomer barrels and tangential nozzles. This degradation includes the general material loss (i.e., thinning) of the primary moisture separator components that has been monitored for the past 19-plus years, with through-wall holes discovered during the A2R22 and A2R23 refueling outages. Repairs were made in A2R23 to address the as-found conditions. However, no evidence of loose part generation over prior operating cycles was found.

A prioritized list was developed by Constellation and Westinghouse post inspection of the steam drum using degradation trends based A2R23 and previous outages to determine the likelihood of through-wall holes or other conditions that required immediate repairs. The PMS components and corresponding degradation locations were ranked in in terms of severity to indicate the priority of repairs needed to be completed in order to satisfy acceptability for one, two or three cycles of operation. Various swirl vane blade and/or riser barrel components were repaired, and spacer tabs were removed in eleven (11) PMS in SG 2A, twelve (12) PMS in SG 2B, thirteen (13) PMS in SG 2C and eight (8) PMS in SG 2D which completed the prioritized list of repairs for up to three operating cycles.

It was concluded that operation of all four SGs for the next three operating cycles poses a low risk of impacting SG structural integrity, thermal performance, and nuclear safety.

12. The scope, method, and results of secondary-side cleaning performed in each SG

Due to Sludge lancing activities being performed in A2R22, no sludge lancing was performed in A2R23. Historical weight of deposits removed from each SG by sludge lancing is provided in Table 18. Secondary side deposits that may affect tube integrity have been managed by periodic sludge lancing, one "soft" chemical cleaning (ASCA) in 2017 and improving deposit removal efficiency through the use of a polyacrylic acid dispersant (PAA). These actions, combined with a lower feedwater iron concentration achieved through the combination of high pH and amines, have maintained the iron deposit inventory low and broach blockage at a low level such that SG water levels and steam pressure have been relatively steady for the past 2 years.

Table 18: A2R23 and Prior Outage Sludge Lance Deposit Removal Results

Outage	SG 2A (lbs)	SG 2B (lbs)	SG 2C (lbs)	SG 2D (lbs)	Total (lbs)
A2R17	24.25	8.5	41	24.75	99
A2R18	Sludge Lancing Not Performed				
A2R19 (ASCA)	69	106	84.5	76	335.5
A2R20	Sludge Lancing Not Performed				
A2R21	Sludge Lancing Not Performed				
A2R22	23	46	28.5	21.5	119
A2R23	Sludge Lancing Not Performed				

13. The results of primary side component visual inspections performed in each SG

Visual Inspection of Installed Tube Plugs and Tube-to-Tubesheet Welds

All previously installed tube plugs were visually inspected for signs of degradation and leakage. The tube-to-tubesheet welds were visually inspected during eddy current. No degradation or anomalies were found.

SG Channel Head Bowl Visual Inspections

Each SG hot and cold leg primary channel head was visually examined in accordance with the recommendations of Westinghouse NSAL 12-01 and NRC IN 2013-20 for evidence of breaches in the cladding or cracking in the divider to channel head weld and for evidence of wastage of the carbon steel channel head. No evidence of cladding breaches, wastage or corrosion in the channel head was identified. Also, no cracking in the divider to channel head weld was identified.

14. Braidwood Unit 2 has the following plant specific reporting requirements:

For Unit 2, the operational primary to secondary leakage rate observed (greater than three gallons per day) in each steam generator (if it is not practical to assign the leakage to an individual steam generator, the entire primary to secondary leakage should be conservatively assumed to be from one steam generator) during the cycle preceding the inspection which is the subject of the report (TS 5.6.9.g); and

There was no confirmed operational primary to secondary leakage rate exceeding 3 gallons per day in the operating period since the last SG inspection.

For Unit 2, the calculated accident induced leakage rate from the portion of the tubes below 14.01 inches from the top of the tubesheet for the most limiting accident in the most limiting SG. In addition, if the calculated accident induced leakage rate from the most limiting accident is less than 3.11 times the maximum operational primary to secondary leakage rate, the report should describe how it was determined (TS 5.6.9.h); and

Based on the Braidwood Updated Final Safety Analysis Report (UFSAR) the accident leakage limit for the most limiting accident scenario leading to offsite dose consequences is the steam line break

(SLB) accident. For this accident, the limiting accident induced leak rate in the affected SG is 0.5 gpm. If no SCC is detected above the tubesheet and in the portion of the tube 14.01 inches from the top of the tubesheet and no wear induced leakage exists, then the entire accident induced allowable leakage (0.5 gpm) divided by 3.11 can be allocated to the tubesheet expansion region below 14.01 inches from the top of the tubesheet. Effectively, this means that 0.16 gpm leakage (0.5 gpm/3.11) is allowed during operation from the faulted SG within the portion of the tubes below 14.01 inches from the top of the tubesheet. Therefore, no administrative limit on operational leakage is necessary since the more limiting 150 gpd (0.104 gpm) TS operational leakage limit assures that the 0.5 gpm accident leakage limit is not exceeded.

For Unit 2, the results of monitoring for tube axial displacement (slippage). If slippage is discovered, the implications of the discovery and corrective action shall be provided (TS 5.6.9.i).

The bobbin data collected from all SGs were screened by automated data analysis for large amplitude tubesheet indications of greater than 50 volts with a phase angle between 25° and 50° suggestive of tube severance with tube slippage. No indications of tube slippage were detected during the A2R23 inspection. Additionally, the 100% full-length array probe inspections did not identify any signals indicative of tube severance (i.e., tube slippage) within the tubesheet.

References

1. CEG letter to NRC, RS-22-086, Application to Revise Technical Specifications to Adopt TSTF-577, “Revised Frequencies for Steam Generator Tube Inspections”, dated August 10, 2022 (ML22222A068)

2. CEG letter to NRC, RS-23-050, Application to Revise Technical Specifications to Adopt TSTF-577, "Revised Frequencies for Steam Generator Tube Inspections" (ML23143A136)

3. NRC letter to CEG,” BRAIDWOOD STATION, UNIT NOS. 1 AND 2 - ISSUANCE OF AMENDMENTS 233 AND 233 RE: ADOPTION OF TSTF-577, “REVISED FREQUENCIES FOR STEAM GENERATOR TUBE INSPECTIONS,” REVISION 1 (EPID L-2022-LLA-0115)”, dated July 26, 2023 (ML23188A129)

4. Steam Generator Management Program: Steam Generator Integrity Assessment Guidelines, Revision 5, EPRI, Palo Alto, CA, December 2021 (3002020909)

ATTACHMENT A

Anti-Vibration Bar (AVB) Wear Indications (SG 2A)

SGID	Row	Col	Volts	Per	Locn	Inch1
A	16	74	0.8	13	AV4	-0.16
A	16	75	2.29	27	AV4	-0.19
A	20	60	3.46	34	AV1	-0.03
A	20	60	1.89	25	AV4	0
A	20	89	0.66	12	AV4	-0.51
A	24	40	1.59	23	AV1	-0.36
A	24	40	1.3	20	AV2	-0.08
A	24	40	2.12	27	AV3	-0.05
A	25	78	1.19	19	AV3	-0.22
A	25	78	1.41	21	AV4	-0.19
A	25	105	0.82	15	AV2	-0.19
A	25	106	1.46	21	AV2	-0.08
A	25	106	1.27	19	AV3	-0.24
A	25	106	0.88	15	AV4	-0.08
A	25	107	2.59	29	AV1	0.19
A	25	107	3.61	34	AV4	-0.24
A	25	108	1.4	20	AV4	0.03
A	26	8	2.91	30	AV1	-0.09
A	26	8	1.44	21	AV2	-0.03
A	26	8	1.77	23	AV4	0.12
A	26	10	0.99	18	AV2	0
A	26	41	1.68	25	AV3	0.63
A	26	97	0.99	17	AV3	-0.16
A	27	105	1.95	25	AV1	-0.25
A	27	105	1.66	23	AV2	-0.22
A	27	105	1.14	18	AV3	-0.19
A	27	106	2.17	26	AV1	-0.14
A	27	106	2.17	26	AV2	0.22
A	27	106	2.09	26	AV3	-0.24
A	27	106	1.29	19	AV4	-0.16
A	28	13	0.73	15	AV2	-0.08
A	28	99	0.68	13	AV3	0.03
A	28	104	1.92	24	AV2	-0.22
A	28	105	1.27	19	AV1	0
A	28	105	0.79	14	AV2	-0.08
A	28	105	0.76	13	AV3	0
A	29	12	2.34	27	AV3	-0.11

SGID	Row	Col	Volts	Per	Locn	Inch1
A	29	35	1.17	20	AV4	-0.13
A	29	77	1.19	17	AV2	0.14
A	29	77	0.57	10	AV3	-0.05
A	29	78	1.22	20	AV2	0.11
A	29	87	0.84	15	AV2	-0.05
A	29	100	1.07	17	AV2	-0.11
A	29	100	1.3	19	AV3	0
A	29	102	0.85	14	AV2	-0.25
A	29	102	1.28	19	AV3	-0.11
A	29	103	1.01	17	AV1	-0.17
A	29	103	0.84	15	AV3	-0.19
A	29	103	1.16	18	AV4	-0.24
A	29	104	1.43	21	AV1	0.4
A	29	104	3.27	33	AV2	0.27
A	29	104	3.28	33	AV3	0.44
A	29	105	2.2	27	AV2	-0.03
A	29	105	4.02	36	AV3	-0.16
A	30	11	1.12	19	AV1	-0.17
A	30	11	2.37	28	AV3	-0.03
A	30	12	1.93	26	AV2	0.08
A	30	13	2.74	30	AV2	-0.25
A	30	13	0.79	15	AV3	-0.11
A	30	24	0.82	16	AV4	-0.08
A	30	28	0.78	15	AV2	-0.08
A	30	28	1.03	18	AV3	-0.13
A	30	39	1.42	23	AV2	-0.11
A	30	39	2.58	30	AV3	-0.22
A	30	39	1.26	21	AV4	-0.24
A	30	41	1.27	21	AV3	-0.14
A	30	42	1.38	21	AV3	-0.19
A	30	70	0.92	17	AV1	-0.03
A	30	76	0.97	17	AV2	-0.11
A	30	76	1.33	21	AV3	-0.16
A	30	100	0.88	15	AV1	-0.08
A	30	103	2.52	29	AV1	-0.2
A	30	103	1.82	24	AV2	0.16
A	30	103	2.38	28	AV3	-0.24
A	31	13	1.28	19	AV2	-0.19
A	31	14	0.88	15	AV2	-0.11
A	31	14	0.67	12	AV3	-0.16

SGID	Row	Col	Volts	Per	Locn	Inch1
A	31	38	1.58	23	AV2	-0.08
A	31	38	1.89	25	AV3	0
A	31	44	0.95	17	AV3	-0.13
A	31	79	0.97	15	AV1	-0.03
A	31	79	1.6	21	AV2	0.14
A	31	79	2.36	27	AV3	-0.24
A	31	90	1.2	20	AV3	0
A	31	93	0.83	15	AV2	-0.11
A	31	93	1.24	19	AV3	-0.27
A	31	102	1.07	17	AV3	-0.05
A	32	73	1.09	17	AV1	-0.29
A	32	73	1.1	18	AV2	-0.11
A	32	73	1.41	21	AV3	-0.14
A	32	73	0.68	12	AV4	0
A	33	13	0.65	12	AV3	-0.14
A	33	15	1.45	21	AV2	0.18
A	33	15	2.85	30	AV3	-0.11
A	33	76	1.11	19	AV2	-0.08
A	33	77	0.78	13	AV1	0.16
A	33	77	0.6	10	AV2	0.19
A	33	81	0.73	12	AV2	0.11
A	33	88	1.51	21	AV2	-0.17
A	33	91	0.77	13	AV2	0.16
A	33	94	0.63	12	AV2	-0.03
A	33	94	0.66	12	AV3	-0.13
A	33	98	1.3	19	AV2	-0.08
A	33	98	3.55	34	AV3	0.25
A	33	99	2.05	26	AV2	0.19
A	33	99	1	17	AV3	-0.08
A	34	14	1.89	23	AV1	-0.2
A	34	14	1.71	22	AV2	-0.22
A	34	14	2	24	AV3	-0.13
A	34	78	1.47	22	AV2	-0.06
A	34	81	1.82	23	AV2	0.16
A	34	94	1.04	17	AV2	-0.1
A	34	98	1.04	17	AV3	-0.12
A	35	14	0.79	13	AV4	0.18
A	35	19	1.3	18	AV3	-0.03
A	35	90	1.08	18	AV1	-0.18
A	35	90	0.7	14	AV2	-0.08

Enclosure 2

SGID	Row	Col	Volts	Per	Locn	Inch1
A	35	90	2.17	27	AV3	-0.21
A	35	93	0.62	12	AV3	-0.19
A	35	96	2.1	26	AV2	0.48
A	35	101	0.84	14	AV2	-0.23
A	36	16	3.9	35	AV2	-0.3
A	36	16	0.72	12	AV3	0.03
A	36	17	1.46	21	AV2	-0.11
A	36	17	0.72	14	AV3	0.03
A	36	18	1.77	24	AV2	-0.17
A	36	18	1.66	23	AV3	-0.16
A	36	19	1	17	AV2	-0.11
A	36	26	1.26	20	AV2	-0.08
A	36	27	0.67	13	AV2	0.17
A	36	30	1.64	23	AV1	-0.24
A	36	30	0.84	15	AV2	-0.11
A	36	30	1.42	21	AV3	-0.16
A	36	36	0.6	12	AV2	-0.19
A	36	36	0.96	17	AV3	0
A	36	66	1.45	21	AV3	0
A	36	83	1.7	23	AV2	-0.17
A	36	85	1.24	20	AV2	-0.11
A	36	85	0.87	16	AV4	0
A	36	87	1.45	22	AV3	-0.08
A	36	88	1.01	16	AV2	0.11
A	36	88	1.54	22	AV3	0.17
A	36	89	0.64	12	AV1	0.17
A	36	89	1.04	17	AV2	0.19
A	36	89	1.27	19	AV3	-0.03
A	36	90	1.03	18	AV2	0
A	36	92	1.51	22	AV2	0.19
A	36	92	1.87	25	AV3	-0.08
A	36	93	0.76	14	AV2	0.11
A	37	25	0.94	15	AV2	0.11
A	37	25	0.76	13	AV3	0.14
A	37	26	1.37	19	AV3	-0.13
A	37	42	0.98	17	AV2	-0.17
A	37	42	1.33	21	AV3	-0.11
A	37	73	0.76	15	AV1	-0.21
A	37	73	2.37	29	AV2	0.19
A	37	73	0.9	17	AV3	-0.08

SGID	Row	Col	Volts	Per	Locn	Inch1
A	37	73	1.21	20	AV4	-0.16
A	37	74	0.6	13	AV1	-0.24
A	37	74	1.38	22	AV2	-0.19
A	37	74	0.76	15	AV4	-0.16
A	37	75	1.02	17	AV1	0.05
A	37	75	3.49	34	AV2	-0.28
A	37	75	1.43	21	AV3	-0.16
A	37	75	0.79	14	AV4	-0.13
A	37	76	1.32	21	AV1	-0.24
A	37	76	3.41	34	AV2	0.22
A	37	76	2.04	27	AV3	-0.19
A	37	76	1.08	19	AV4	-0.16
A	37	77	1.29	19	AV2	-0.22
A	37	77	1.12	18	AV4	0
A	37	78	0.95	17	AV1	-0.15
A	37	81	1.04	17	AV1	-0.21
A	37	81	2.83	30	AV2	-0.25
A	37	81	2.62	29	AV3	-0.22
A	37	82	1.48	22	AV1	-0.09
A	37	82	1.01	17	AV3	-0.19
A	37	83	0.64	12	AV1	0
A	37	83	2.67	30	AV2	0.19
A	37	83	2.51	29	AV3	0.2
A	37	85	0.74	14	AV2	-0.11
A	37	90	1.15	19	AV2	-0.11
A	37	92	1.37	21	AV3	-0.13
A	37	93	1.4	21	AV3	-0.22
A	38	20	1.01	16	AV1	0.16
A	38	20	2.67	29	AV2	-0.3
A	38	20	2.78	30	AV3	-0.3
A	38	20	2.84	30	AV4	-0.21
A	38	23	2.22	26	AV2	-0.17
A	38	24	1.05	18	AV1	-0.23
A	38	24	1.81	25	AV2	-0.11
A	38	24	1.62	23	AV3	-0.08
A	38	24	1.29	21	AV4	-0.16
A	38	26	1.26	18	AV1	0.08
A	38	26	1.48	20	AV2	-0.11
A	38	26	3.57	33	AV3	-0.27
A	38	27	1.65	22	AV2	-0.08

SGID	Row	Col	Volts	Per	Locn	Inch1
A	38	27	2.25	26	AV3	-0.13
A	38	28	0.64	13	AV2	-0.14
A	38	28	1.94	26	AV3	-0.13
A	38	28	0.72	14	AV4	-0.13
A	38	29	0.95	18	AV3	-0.14
A	38	30	1.28	20	AV1	0.11
A	38	30	2.03	26	AV2	0.16
A	38	30	2.03	26	AV3	-0.16
A	38	31	1.87	26	AV2	-0.11
A	38	31	2.48	30	AV3	-0.24
A	38	31	1.08	19	AV4	-0.03
A	38	33	0.71	15	AV2	-0.06
A	38	33	1.47	23	AV3	0
A	38	34	0.64	13	AV2	-0.11
A	38	35	1.89	26	AV2	-0.08
A	38	86	0.6	11	AV1	-0.24
A	38	86	1.64	22	AV2	-0.19
A	38	86	1.21	18	AV3	-0.16
A	38	87	1.2	20	AV2	-0.03
A	38	89	1.76	23	AV2	0.16
A	38	89	1.05	17	AV3	-0.13
A	38	90	0.98	17	AV1	-0.09
A	38	90	1.32	21	AV2	-0.22
A	38	90	1.53	23	AV3	-0.19
A	38	92	3.79	36	AV2	-0.27
A	38	92	2.14	27	AV3	-0.13
A	38	93	1.97	25	AV2	-0.19
A	38	93	3.18	33	AV3	-0.24
A	39	20	3.58	34	AV1	0.16
A	39	20	1.25	20	AV2	-0.14
A	39	20	4.04	36	AV3	-0.08
A	39	20	1.45	22	AV4	-0.16
A	39	21	1.2	20	AV1	0
A	39	21	3.72	35	AV2	0.49
A	39	21	1.51	22	AV3	-0.16
A	39	21	1.77	25	AV4	-0.16
A	39	22	1.2	20	AV1	0.25
A	39	22	1.99	26	AV2	-0.08
A	39	41	1.44	20	AV2	0
A	39	41	0.71	12	AV3	0

SGID	Row	Col	Volts	Per	Locn	Inch1
A	39	50	0.91	16	AV3	-0.19
A	39	51	0.76	13	AV3	-0.16
A	39	65	1.25	18	AV1	0.08
A	39	65	1.36	20	AV2	0.24
A	39	65	2.31	27	AV3	0.19
A	39	67	0.98	16	AV1	0.08
A	39	67	1.85	24	AV2	0.14
A	39	68	0.67	13	AV1	0.05
A	39	70	2.48	29	AV2	0.14
A	39	70	1.17	19	AV3	-0.19
A	39	72	1.33	20	AV2	-0.17
A	39	75	0.96	16	AV3	-0.14
A	39	76	0.91	17	AV1	-0.15
A	39	76	0.98	18	AV2	0.03
A	39	76	0.88	16	AV3	-0.05
A	39	76	1	18	AV4	-0.11
A	39	78	2.34	28	AV2	0.16
A	39	78	1.91	25	AV3	0.19
A	39	84	1.04	17	AV1	-0.21
A	39	84	1.42	21	AV2	-0.25
A	39	84	1.48	21	AV3	-0.16
A	39	84	0.85	14	AV4	-0.03
A	39	85	1.09	18	AV2	-0.14
A	39	85	1.9	25	AV3	-0.13
A	39	86	1.91	25	AV2	0.16
A	39	86	1.3	19	AV3	-0.19
A	39	90	0.88	16	AV1	-0.11
A	39	90	4.69	39	AV2	-0.27
A	39	90	3.1	32	AV3	-0.24
A	39	90	1.03	18	AV4	-0.19
A	40	24	1	16	AV1	-0.06
A	40	24	4.92	39	AV2	0.27
A	40	24	0.88	15	AV3	-0.11
A	40	24	1.62	22	AV4	-0.19
A	40	25	2.79	30	AV1	-0.21
A	40	25	2.58	29	AV2	-0.22
A	40	25	3.13	32	AV3	0.47
A	40	25	0.98	16	AV4	0
A	40	26	1.39	20	AV2	-0.11
A	40	26	3.76	34	AV3	-0.27

SGID	Row	Col	Volts	Per	Locn	Inch1
A	40	29	2.94	31	AV2	0.16
A	40	29	2.69	29	AV3	0.14
A	40	29	1.16	18	AV4	-0.13
A	40	31	1.6	23	AV1	0.45
A	40	31	1.55	23	AV2	-0.06
A	40	31	2.34	28	AV3	-0.21
A	40	31	1.19	20	AV4	0.09
A	40	33	1.18	17	AV3	-0.14
A	40	34	1.42	18	AV2	-0.2
A	40	37	1.06	16	AV2	-0.08
A	40	37	1.31	19	AV3	0.06
A	40	38	2.39	26	AV1	0.13
A	40	38	0.72	11	AV2	0.29
A	40	38	1.48	19	AV3	-0.16
A	40	38	0.66	10	AV4	0.07
A	40	40	1.14	15	AV2	0.16
A	40	40	0.8	12	AV3	0.08
A	40	43	0.72	12	AV1	0.08
A	40	43	1.13	17	AV2	-0.17
A	40	43	1.1	17	AV3	0.08
A	40	45	0.93	15	AV3	-0.03
A	40	47	1.47	20	AV2	-0.08
A	40	61	4.12	36	AV2	0.4
A	40	61	2.37	28	AV3	0.19
A	40	64	1.16	19	AV3	-0.11
A	40	66	0.83	15	AV1	0.08
A	40	66	1.18	19	AV2	-0.17
A	40	66	0.67	13	AV3	-0.11
A	40	68	1.62	23	AV2	0.16
A	40	68	0.67	13	AV3	0.06
A	40	69	0.84	13	AV1	0.08
A	40	73	0.5	11	AV1	-0.3
A	40	73	2.97	32	AV2	0.19
A	40	73	2.47	29	AV3	-0.19
A	40	74	0.99	16	AV3	-0.14
A	40	75	1.24	19	AV3	-0.16
A	40	77	2.6	29	AV2	-0.19
A	40	78	1.38	21	AV2	0
A	40	78	1.08	18	AV3	-0.11
A	40	79	2.88	31	AV2	0.27

SGID	Row	Col	Volts	Per	Locn	Inch1
A	40	79	3.23	33	AV3	-0.24
A	40	80	4.66	39	AV2	0.22
A	40	80	1.03	18	AV3	-0.13
A	40	81	2.21	27	AV2	-0.17
A	40	82	2.76	31	AV2	0.19
A	40	82	3.13	33	AV3	0.2
A	40	83	2.81	30	AV1	-0.21
A	40	83	2.52	29	AV2	-0.19
A	40	83	1.51	21	AV3	-0.16
A	40	83	0.93	15	AV4	-0.19
A	40	84	0.71	13	AV3	-0.13
A	40	88	3.04	32	AV2	-0.3
A	40	88	2.1	26	AV3	-0.22
A	40	88	1.07	17	AV4	-0.24
A	40	89	0.91	15	AV2	-0.17
A	40	89	0.93	16	AV3	-0.13
A	41	24	3.12	32	AV2	-0.22
A	41	24	2.59	30	AV3	-0.05
A	41	30	0.76	15	AV2	-0.06
A	41	34	1.14	15	AV2	0.11
A	41	34	1.18	16	AV3	-0.14
A	41	37	4.98	40	AV2	0
A	41	37	4.63	39	AV3	0.14
A	41	38	0.75	11	AV2	0.22
A	41	39	3.08	31	AV2	-0.22
A	41	39	3.02	31	AV3	-0.22
A	41	39	1.5	20	AV4	-0.16
A	41	41	0.65	11	AV2	0.16
A	41	41	1.64	22	AV3	-0.16
A	41	42	2.17	24	AV2	-0.19
A	41	42	2.3	25	AV3	-0.16
A	41	52	1.17	16	AV2	0.14
A	41	53	0.79	13	AV3	-0.03
A	41	68	1.16	19	AV2	0.14
A	41	68	2.75	30	AV3	0.2
A	41	69	0.81	14	AV1	-0.06
A	41	69	0.81	14	AV2	-0.17
A	41	69	1.21	19	AV3	-0.19
A	41	70	0.8	14	AV3	-0.16
A	41	72	1.41	21	AV3	0.19

SGID	Row	Col	Volts	Per	Locn	Inch1
A	41	75	1.72	24	AV1	0
A	41	75	4.44	38	AV2	-0.06
A	41	75	1.72	24	AV3	-0.03
A	41	78	1.37	21	AV3	-0.21
A	41	79	1.17	18	AV1	0.05
A	41	79	1.47	21	AV2	-0.2
A	41	79	2.8	30	AV3	-0.19
A	41	79	0.69	12	AV4	-0.13
A	41	82	1.33	21	AV1	0.11
A	41	82	4.08	37	AV2	-0.28
A	41	82	2.26	28	AV3	-0.24
A	41	82	1.36	21	AV4	-0.16
A	41	84	1.13	18	AV2	-0.19
A	41	85	2.45	29	AV2	-0.17
A	41	85	1.42	22	AV3	-0.16
A	41	87	4.43	38	AV2	-0.06
A	41	87	2.56	30	AV3	-0.13
A	41	89	1.36	20	AV3	-0.14
A	42	26	0.8	14	AV2	0.05
A	42	26	1.6	22	AV3	-0.08
A	42	28	1.16	19	AV2	-0.08
A	42	28	1.34	21	AV3	-0.13
A	42	28	1.01	18	AV4	-0.19
A	42	30	1.08	19	AV1	-0.16
A	42	30	0.99	18	AV2	-0.13
A	42	30	1.5	22	AV3	-0.13
A	42	36	0.87	12	AV3	0.06
A	42	51	1.67	22	AV2	0.05
A	42	51	0.94	15	AV3	-0.05
A	42	56	1.66	20	AV2	-0.14
A	42	62	0.72	13	AV2	-0.11
A	42	62	0.73	13	AV3	-0.13
A	42	71	1.22	19	AV3	-0.05
A	42	89	1.3	19	AV2	0.16
A	42	89	1.2	18	AV3	-0.16
A	42	89	0.55	10	AV4	-0.05
A	42	94	1.25	20	AV4	-0.19
A	43	71	1.58	22	AV1	-0.21
A	43	71	2.86	31	AV2	0.22
A	43	71	1.73	23	AV3	-0.16

SGID	Row	Col	Volts	Per	Locn	Inch1
A	43	72	0.88	15	AV1	-0.18
A	43	72	0.85	15	AV3	-0.08
A	43	93	1.31	20	AV3	-0.16
A	43	93	1.1	18	AV4	0.21
A	44	24	0.68	14	AV1	0.02
A	44	55	0.59	10	AV3	-0.05
A	44	60	1.01	17	AV4	-0.13
A	44	67	0.52	10	AV1	0.03
A	44	92	0.79	15	AV4	-0.13
A	45	40	0.65	10	AV1	0.24
A	45	40	0.83	12	AV2	0.3
A	45	41	1.26	18	AV2	-0.06
A	45	41	1.05	16	AV3	-0.03
A	45	45	0.6	10	AV1	0.05
A	45	45	2.72	29	AV2	0.16
A	45	45	1.43	20	AV3	0
A	45	46	0.7	10	AV2	-0.14
A	45	48	1.07	17	AV3	-0.13
A	45	49	1.08	16	AV2	-0.03
A	45	51	0.93	15	AV3	0.14
A	45	52	0.81	12	AV2	0.08
A	45	54	0.89	13	AV3	0
A	45	55	2.06	25	AV2	0.16
A	45	55	2.48	28	AV3	0.2
A	45	59	0.96	16	AV2	0.13
A	45	59	2.46	28	AV3	-0.19
A	45	62	0.85	15	AV3	-0.19
A	45	65	0.99	16	AV1	0.08
A	45	65	0.96	16	AV3	-0.11
A	45	70	2.01	25	AV2	-0.17
A	45	70	1.83	24	AV3	-0.16
A	45	70	1.17	17	AV4	0
A	45	71	1.16	18	AV1	0.13
A	45	71	0.95	16	AV2	-0.11
A	45	80	1.68	23	AV2	0.14
A	45	80	2.79	30	AV3	-0.19
A	45	80	1.52	21	AV4	-0.08
A	45	82	0.86	15	AV2	-0.14
A	45	82	1.99	25	AV3	-0.24
A	45	91	1.62	23	AV1	-0.09

SGID	Row	Col	Volts	Per	Locn	Inch1
A	46	26	0.65	13	AV4	-0.37
A	46	33	1.11	17	AV3	-0.14
A	46	33	1.18	17	AV4	-0.13
A	46	56	1.2	16	AV3	-0.16
A	46	60	1.13	18	AV1	0.11
A	46	60	2.92	31	AV2	-0.22
A	46	61	0.71	13	AV1	0.11
A	46	61	0.95	16	AV2	-0.14
A	46	65	1.38	21	AV2	-0.19
A	46	71	1.22	19	AV2	-0.17
A	46	71	0.61	12	AV3	-0.13
A	46	71	0.97	17	AV4	-0.16
A	46	73	1.03	18	AV1	0.13
A	46	73	3.48	34	AV2	0.19
A	46	73	4.11	37	AV3	0.31
A	47	29	2	26	AV2	0.14
A	47	29	2.1	27	AV3	0.08
A	47	30	1.71	23	AV2	-0.06
A	47	30	1.52	21	AV3	-0.16
A	47	33	0.8	13	AV1	-0.06
A	47	34	1.28	17	AV3	-0.08
A	47	34	1.18	16	AV4	0.09
A	47	72	0.95	16	AV1	0.16
A	47	88	1.74	23	AV4	-0.24
A	49	41	0.62	11	AV1	0.16

ATTACHMENT A

Anti-Vibration Bar (AVB) Wear Indications (SG 2B)

SGID	Row	Col	Volts	Per	Locn	Inch1
B	21	110	1.21	21	AV4	-0.19
B	22	109	0.77	16	AV1	0.72
B	22	109	0.91	17	AV4	0.64
B	24	78	0.74	12	AV4	0.12
B	24	107	0.83	16	AV1	-0.5
B	24	107	0.41	10	AV3	0.48
B	25	75	1.59	21	AV3	-0.73
B	25	107	0.61	13	AV3	-0.11
B	25	108	2.43	28	AV1	-0.24
B	25	108	0.42	8	AV2	-0.05
B	25	108	0.58	11	AV3	0.26
B	25	108	1.79	24	AV4	-0.16
B	27	106	0.72	15	AV1	-0.22
B	27	106	1.03	19	AV3	-0.14
B	28	34	0.79	13	AV1	0.32
B	28	34	0.98	15	AV2	0.22
B	28	104	1.57	24	AV2	0.03
B	29	85	0.69	12	AV1	-0.06
B	29	85	1.07	17	AV3	0.14
B	29	100	1.43	25	AV2	-0.14
B	29	100	0.78	19	AV3	0
B	29	104	0.97	21	AV3	-0.22
B	30	101	1.06	19	AV2	0.08
B	30	101	1.1	19	AV3	-0.14
B	30	103	0.89	17	AV3	-0.13
B	31	38	0.39	7	AV1	0
B	32	39	0.77	12	AV2	0.16
B	32	48	0.65	11	AV2	0.14
B	32	101	1.9	26	AV3	-0.16
B	32	101	0.74	15	AV4	0.14
B	33	14	0.64	12	AV1	0.16
B	33	14	2.51	28	AV2	0.17
B	33	14	1.42	20	AV3	-0.21
B	33	103	0.75	15	AV2	-0.11
B	33	103	1.36	22	AV3	-0.22
B	34	59	0.75	11	AV3	0.17
B	35	31	0.6	10	AV2	0.06
B	35	98	0.68	18	AV3	-0.08

SGID	Row	Col	Volts	Per	Locn	Inch1
B	36	73	0.64	14	AV2	0.19
B	36	81	0.61	10	AV2	0.24
B	36	93	0.83	16	AV2	0.14
B	36	96	1.79	25	AV2	-0.19
B	36	96	0.75	15	AV3	0.36
B	36	96	0.59	13	AV4	0.06
B	36	97	1.56	24	AV1	0.11
B	36	97	0.93	17	AV2	0.05
B	36	97	1.55	23	AV3	-0.14
B	36	97	0.89	17	AV4	-0.19
B	36	99	1.39	22	AV1	-0.23
B	36	99	1.55	24	AV2	0.14
B	36	100	1.23	21	AV1	0.14
B	36	100	1.46	23	AV2	-0.17
B	37	36	0.96	15	AV1	0.32
B	37	36	1.23	18	AV2	0.14
B	37	36	1.4	20	AV3	-0.21
B	37	36	0.98	15	AV4	0.16
B	37	38	1.54	20	AV1	0.11
B	37	38	4.42	38	AV2	0.2
B	37	38	3.5	33	AV3	0.53
B	37	38	0.54	9	AV4	0.03
B	37	98	0.67	17	AV4	-0.11
B	37	99	0.75	15	AV2	-0.14
B	37	99	1.25	21	AV3	-0.16
B	38	24	0.79	13	AV2	0.17
B	38	24	0.78	15	AV3	-0.1
B	38	39	1.47	21	AV2	-0.13
B	38	41	1.12	18	AV2	-0.6
B	38	41	1.91	25	AV3	-0.16
B	38	41	1.69	23	AV4	-0.13
B	38	59	2.23	25	AV2	0.19
B	38	59	2.19	25	AV3	0.17
B	38	67	1.17	16	AV3	0.11
B	38	95	3.43	33	AV2	-0.28
B	38	98	1.28	21	AV3	-0.14
B	38	98	1.01	18	AV4	-0.05
B	39	34	0.61	11	AV1	0.3
B	39	85	0.8	15	AV1	-0.12
B	39	85	1.25	20	AV2	-0.17

SGID	Row	Col	Volts	Per	Locn	Inch1
B	39	85	1.6	23	AV3	-0.24
B	40	18	0.53	10	AV2	-0.19
B	40	18	0.66	12	AV3	0
B	40	22	1.57	21	AV2	-0.19
B	40	22	1.2	18	AV3	-0.19
B	40	44	0.85	15	AV2	-0.13
B	40	46	1.54	22	AV2	0.24
B	40	46	1.46	21	AV3	0.08
B	40	47	1.08	18	AV3	-0.16
B	40	66	0.6	10	AV1	0
B	40	66	1.5	20	AV2	0.33
B	40	66	1.21	17	AV3	0.03
B	40	74	1.66	24	AV2	-0.17
B	40	74	1.27	21	AV3	-0.11
B	40	76	0.84	16	AV3	-0.22
B	40	82	0.84	16	AV1	0.05
B	40	82	0.67	14	AV2	0.16
B	40	82	2.71	31	AV3	-0.24
B	40	82	0.53	12	AV4	0.18
B	40	87	0.68	14	AV2	0.11
B	40	87	0.73	15	AV3	0.22
B	40	90	1.36	22	AV2	0.22
B	40	90	1.87	26	AV3	0.22
B	40	92	1.11	19	AV2	0.19
B	40	92	2.8	31	AV3	0
B	40	92	0.73	15	AV4	-0.19
B	40	93	1.83	26	AV2	-0.22
B	40	93	2.18	28	AV3	-0.24
B	40	95	0.92	17	AV2	-0.14
B	40	95	0.91	17	AV3	-0.11
B	41	26	1.27	19	AV2	0.11
B	41	36	1.34	19	AV1	0.11
B	41	40	0.85	15	AV2	0.05
B	41	40	2.22	27	AV3	-0.23
B	41	50	1.71	23	AV3	0
B	41	55	1.2	19	AV1	0.18
B	41	55	2.38	28	AV2	-0.03
B	41	55	3.83	36	AV3	-0.34
B	41	55	1.19	19	AV4	-0.1
B	42	44	1.27	20	AV1	0.11

SGID	Row	Col	Volts	Per	Locn	Inch1
B	42	44	0.78	14	AV2	0.08
B	42	44	1.08	18	AV3	-0.16
B	43	30	2.34	26	AV2	-0.22
B	43	30	0.91	13	AV3	-0.11
B	43	32	1.3	19	AV1	0.41
B	43	32	1.49	21	AV2	0.16
B	43	32	0.91	15	AV3	0.08
B	43	37	1.9	23	AV1	0.11
B	43	37	3.4	33	AV2	0.16
B	43	37	2.95	30	AV3	0.11
B	44	36	0.63	11	AV1	-0.03
B	44	81	1.11	19	AV3	-0.05
B	47	59	1.42	18	AV1	0.16
B	47	59	2.31	26	AV2	0.14
B	47	59	1.65	20	AV3	-0.16

ATTACHMENT A

Anti-Vibration Bar (AVB) Wear Indications (SG 2C)

SGID	Row	Col	Volts	Per	Locn	Inch1
C	22	92	0.49	10	AV4	-0.32
C	26	9	1.03	17	AV1	0.14
C	26	9	0.88	15	AV4	0.08
C	27	9	1.32	17	AV1	-0.17
C	27	9	0.6	9	AV2	0.08
C	27	9	0.63	10	AV3	-0.14
C	27	9	1.7	21	AV4	0.17
C	27	103	0.68	11	AV2	0.14
C	28	42	0.75	12	AV1	0.13
C	28	42	0.87	13	AV2	0.27
C	28	42	1.35	18	AV3	-0.19
C	28	42	0.75	12	AV4	0.09
C	30	13	1.22	18	AV1	-0.2
C	30	60	2.56	27	AV1	0.19
C	30	60	2.19	24	AV2	-0.11
C	30	60	1.58	19	AV3	0
C	30	60	0.69	10	AV4	0.13
C	30	62	1.08	14	AV2	0.11
C	30	98	0.74	14	AV3	0.06
C	31	101	0.99	15	AV3	0
C	31	102	0.82	15	AV2	-0.03
C	31	102	1.88	25	AV3	-0.05
C	32	16	0.54	10	AV1	0.22
C	32	16	0.71	13	AV2	0.14
C	32	16	0.71	13	AV4	0
C	32	89	0.92	14	AV2	-0.06
C	32	99	1	15	AV3	0.11
C	33	14	2.22	27	AV2	-0.19
C	33	14	1.81	24	AV3	-0.25
C	33	14	2.31	27	AV4	-0.19
C	33	16	0.63	12	AV1	0.24
C	33	72	0.65	12	AV2	0.11
C	33	72	1.65	23	AV3	-0.03
C	33	76	0.5	10	AV1	-0.38
C	33	85	0.71	12	AV3	-0.03
C	33	90	0.55	11	AV2	0.25
C	33	90	0.6	12	AV3	0
C	33	92	0.99	17	AV3	0.03

SGID	Row	Col	Volts	Per	Locn	Inch1
C	34	16	0.49	9	AV3	0.11
C	34	17	1.04	15	AV1	-0.18
C	34	17	0.96	14	AV2	0.16
C	34	17	1.67	21	AV3	-0.16
C	34	18	1.07	18	AV2	-0.03
C	34	56	1.65	23	AV1	0.03
C	34	100	1.5	22	AV3	-0.24
C	34	101	0.6	12	AV2	0.14
C	34	101	1.93	25	AV3	-0.14
C	35	54	1.86	24	AV1	0.05
C	35	56	1.26	19	AV2	0.24
C	36	17	3.18	31	AV2	0.22
C	36	17	2.57	28	AV3	-0.16
C	36	17	1.2	17	AV4	0.08
C	36	19	2.83	29	AV2	-0.47
C	36	19	3.81	34	AV3	-0.03
C	36	19	0.72	10	AV4	0.23
C	36	20	0.78	12	AV1	0.37
C	36	20	1.43	19	AV2	0.14
C	36	20	0.87	13	AV3	0.08
C	36	20	0.9	14	AV4	0.03
C	36	21	0.83	12	AV1	-0.09
C	36	21	1.21	16	AV3	-0.19
C	36	26	0.96	14	AV2	0.05
C	36	26	1.36	18	AV3	-0.16
C	36	26	1.08	15	AV4	-0.16
C	36	34	0.49	8	AV2	0.24
C	36	34	2.36	26	AV3	-0.19
C	36	56	1.64	23	AV2	0.08
C	36	78	1.33	20	AV2	-0.06
C	36	86	0.77	13	AV1	-0.35
C	36	86	1.6	22	AV2	0.3
C	36	86	2.48	28	AV3	0.03
C	36	86	1.68	22	AV4	-0.21
C	36	89	0.61	11	AV2	0.11
C	36	89	1.45	20	AV3	-0.22
C	36	90	1.04	15	AV1	0.05
C	36	90	2.88	29	AV2	0.19
C	36	90	3.74	34	AV3	-0.24
C	36	90	1.38	18	AV4	-0.08

SGID	Row	Col	Volts	Per	Locn	Inch1
C	36	93	1.36	19	AV2	-0.03
C	36	93	0.72	12	AV3	0.17
C	36	95	0.74	13	AV3	0.14
C	36	96	1.03	14	AV2	0.11
C	36	96	1.39	18	AV3	-0.03
C	36	99	0.96	14	AV1	0.05
C	36	99	2.14	24	AV2	-0.27
C	36	99	3.69	34	AV3	-0.24
C	36	99	1.74	21	AV4	-0.16
C	37	17	0.81	12	AV2	0.24
C	37	23	1.23	16	AV3	-0.14
C	37	47	0.84	12	AV2	0
C	37	77	1.69	20	AV2	0.14
C	37	77	2.54	26	AV3	-0.05
C	37	87	0.75	13	AV1	0.03
C	37	87	1.38	20	AV2	0.16
C	37	87	1.73	23	AV3	-0.14
C	37	87	0.76	13	AV4	0.13
C	37	88	0.78	12	AV2	0.05
C	37	89	0.89	14	AV3	-0.11
C	37	93	1.05	16	AV2	0.03
C	37	93	1.12	17	AV3	0.03
C	38	21	2.18	24	AV2	0.19
C	38	21	1.83	22	AV3	-0.14
C	38	27	0.88	12	AV1	0.29
C	38	27	2.33	25	AV2	0.16
C	38	27	1.78	21	AV3	-0.19
C	38	30	0.91	14	AV1	0.34
C	38	30	2.07	24	AV2	0.33
C	38	30	2.19	25	AV3	-0.19
C	38	34	1.34	18	AV2	-0.17
C	38	34	0.59	10	AV3	0.06
C	38	39	1.15	15	AV2	0.03
C	38	39	1.24	16	AV3	0.14
C	38	42	1.06	15	AV1	-0.12
C	38	56	1.92	25	AV3	-0.13
C	38	60	1.98	22	AV1	0.32
C	38	60	1.76	21	AV2	0
C	38	60	1.84	21	AV3	-0.19
C	38	60	1.17	15	AV4	-0.16

SGID	Row	Col	Volts	Per	Locn	Inch1
C	38	66	3.01	30	AV2	-0.19
C	38	66	1.27	16	AV3	-0.19
C	38	66	0.72	10	AV4	0.26
C	38	68	1.02	14	AV1	0.19
C	38	68	1.9	22	AV2	-0.11
C	38	68	0.98	13	AV3	0.11
C	38	71	1.51	22	AV2	-0.19
C	38	71	1.15	19	AV3	-0.08
C	38	72	0.65	12	AV2	0.11
C	38	72	1.35	21	AV3	-0.05
C	38	73	0.6	12	AV1	0.08
C	38	84	0.69	13	AV2	0.16
C	38	84	0.63	12	AV3	0.3
C	38	91	1.19	18	AV2	0
C	38	91	3.35	33	AV3	-0.16
C	38	95	1.05	16	AV2	-0.08
C	38	95	1.4	20	AV3	-0.14
C	39	59	0.39	8	AV3	-0.4
C	39	64	0.65	12	AV1	-0.03
C	39	65	0.75	13	AV2	0.08
C	40	73	1.06	18	AV2	0.16
C	40	73	2.12	27	AV3	-0.19
C	40	77	1.55	22	AV2	-0.06
C	40	77	1.76	24	AV3	-0.22
C	40	81	0.71	13	AV1	-0.06
C	40	81	3.02	32	AV2	0.16
C	40	81	1.58	22	AV3	0.17
C	40	83	0.67	13	AV1	0.11
C	40	83	3.34	33	AV2	-0.28
C	40	83	3.69	35	AV3	-0.24
C	40	84	0.85	15	AV3	-0.05
C	40	85	2.05	26	AV2	0.16
C	40	85	1.17	19	AV3	-0.13
C	40	88	1.08	15	AV1	-0.09
C	40	88	1.93	23	AV2	0.3
C	40	88	2.79	29	AV3	0.03
C	40	88	0.9	13	AV4	0.31
C	40	91	2	25	AV3	-0.16
C	40	91	0.63	11	AV4	-0.13
C	40	92	0.67	10	AV1	0.13

SGID	Row	Col	Volts	Per	Locn	Inch1
C	40	92	2.69	28	AV2	-0.22
C	40	92	4.5	38	AV3	-0.24
C	40	92	1.22	16	AV4	-0.05
C	40	93	0.75	13	AV2	0.11
C	40	94	0.86	13	AV2	0.16
C	40	94	1.79	22	AV3	-0.22
C	40	97	0.7	11	AV3	0.08
C	40	97	1.85	22	AV4	-0.16
C	41	22	0.77	16	AV2	0.11
C	41	22	1.96	27	AV3	-0.27
C	41	22	1.47	23	AV4	-0.24
C	41	24	1.19	21	AV3	-0.16
C	41	30	1.17	20	AV2	-0.08
C	41	30	1.37	22	AV3	0.03
C	41	31	2.18	24	AV1	-0.18
C	41	31	3.78	34	AV2	-0.31
C	41	31	2.65	28	AV3	-0.14
C	41	31	0.8	11	AV4	-0.16
C	41	34	2.34	29	AV2	0.16
C	41	34	2.61	31	AV3	-0.22
C	41	34	0.9	17	AV4	0.06
C	41	35	0.66	10	AV1	0.08
C	41	35	1.17	15	AV2	0.08
C	41	36	0.47	11	AV1	0.1
C	41	36	2.9	32	AV2	0.16
C	41	36	1.89	26	AV3	-0.24
C	41	36	0.69	15	AV4	-0.08
C	41	38	3.1	33	AV2	-0.22
C	41	38	1.73	25	AV3	-0.19
C	41	41	1.08	15	AV3	-0.08
C	41	41	0.73	11	AV4	0.03
C	41	44	0.66	14	AV2	0.21
C	41	49	1.38	22	AV1	-0.03
C	41	50	0.73	15	AV1	0.11
C	41	50	1.49	23	AV2	0.05
C	41	50	3.23	34	AV3	0.17
C	41	56	0.62	12	AV1	-0.09
C	41	71	1.35	17	AV1	-0.03
C	41	71	1.31	16	AV2	0.08
C	41	71	2.01	23	AV3	-0.11

SGID	Row	Col	Volts	Per	Locn	Inch1
C	41	82	1.27	16	AV2	0.22
C	41	83	1.06	14	AV1	0
C	41	83	1	13	AV2	0.11
C	41	83	0.96	13	AV3	0
C	41	88	0.9	13	AV1	-0.03
C	41	88	1.62	20	AV2	-0.03
C	41	88	1.48	19	AV3	-0.14
C	41	88	0.76	11	AV4	0.26
C	41	92	3.65	34	AV2	-0.25
C	41	92	2.07	24	AV3	-0.16
C	41	92	1.15	16	AV4	0.32
C	41	94	1.09	15	AV2	-0.08
C	41	94	1.5	19	AV3	-0.16
C	42	21	1.44	21	AV2	-0.06
C	42	22	3.13	32	AV3	-0.22
C	42	22	1.91	25	AV4	0.15
C	42	23	0.79	14	AV2	0.05
C	42	23	1.53	21	AV3	-0.14
C	42	23	0.55	10	AV4	0.09
C	42	25	3.82	35	AV2	0.43
C	42	25	3.62	35	AV3	-0.22
C	42	25	1.76	24	AV4	0.09
C	42	36	1.28	19	AV2	0.11
C	42	36	4.01	36	AV3	0.2
C	42	36	1.07	17	AV4	0.13
C	42	39	1.57	22	AV2	-0.11
C	42	39	2.68	30	AV3	0.08
C	42	79	1.11	18	AV3	-0.11
C	42	79	0.84	15	AV4	0.13
C	42	80	1.1	18	AV2	-0.03
C	42	80	1.8	24	AV3	-0.19
C	42	80	0.83	15	AV4	0.38
C	42	81	1.31	20	AV1	-0.12
C	42	81	2.99	32	AV2	0
C	42	81	2.01	26	AV3	-0.24
C	42	81	1.24	19	AV4	-0.05
C	42	82	2.18	27	AV2	0.38
C	42	82	1.22	19	AV3	0
C	42	83	0.9	16	AV2	0.03
C	42	83	1.2	19	AV3	-0.21

SGID	Row	Col	Volts	Per	Locn	Inch1
C	42	90	1.72	21	AV1	-0.15
C	42	90	4.59	38	AV2	0.19
C	42	90	5.11	40	AV3	-0.13
C	42	90	1.02	14	AV4	-0.08
C	42	94	0.72	11	AV3	0
C	42	94	1.35	18	AV4	-0.03
C	43	33	0.63	14	AV1	0.11
C	43	33	1.15	20	AV2	-0.11
C	43	44	0.68	15	AV1	0.24
C	43	44	0.78	16	AV3	0.06
C	43	54	0.87	15	AV1	0.13
C	43	54	1.69	23	AV2	-0.08
C	43	54	2.04	26	AV3	-0.16
C	43	55	0.7	11	AV2	0.16
C	43	56	4.38	38	AV1	0.19
C	43	56	2.02	25	AV4	0.25
C	43	78	0.82	11	AV1	0.16
C	43	78	1.18	15	AV2	-0.08
C	43	78	2.19	24	AV3	0
C	43	80	0.87	12	AV1	0.32
C	43	80	1.55	19	AV2	-0.03
C	43	80	0.73	10	AV3	0.08
C	43	84	2.99	29	AV2	-0.19
C	43	84	2.87	29	AV3	-0.24
C	43	89	0.6	11	AV4	0.1
C	43	91	1.11	17	AV4	-0.19
C	43	93	0.93	13	AV4	0.19
C	44	28	1.68	23	AV2	0.03
C	44	28	1.85	24	AV3	0.08
C	44	28	1.2	18	AV4	-0.08
C	44	50	1.14	19	AV1	0.13
C	44	50	0.98	17	AV2	-0.08
C	44	50	0.67	13	AV3	0.28
C	44	52	1.23	21	AV2	-0.06
C	44	52	0.76	16	AV3	0
C	44	54	0.79	16	AV3	0.03
C	44	55	0.52	12	AV3	-0.43
C	45	26	4.47	38	AV2	-0.31
C	45	26	2.54	28	AV3	-0.03
C	45	26	0.59	11	AV4	0.09

SGID	Row	Col	Volts	Per	Locn	Inch1
C	45	30	2.07	27	AV2	-0.14
C	45	30	4.59	39	AV3	-0.3
C	45	30	1.49	23	AV4	-0.18
C	45	36	0.64	14	AV2	0.16
C	45	36	1.05	19	AV3	-0.11
C	45	50	0.79	14	AV1	0.26
C	45	52	1.66	23	AV1	-0.22
C	45	52	1.84	24	AV2	-0.08
C	45	52	3.2	33	AV3	-0.16
C	45	53	1.24	19	AV1	0.13
C	45	53	1.1	17	AV2	-0.03
C	45	53	1.55	22	AV3	-0.13
C	45	54	0.85	15	AV1	0.27
C	45	54	1.14	18	AV3	0.03
C	45	55	1.63	24	AV1	0.13
C	45	55	2.16	28	AV2	0.13
C	45	55	1.3	22	AV3	-0.11
C	45	61	1.96	25	AV2	-0.08
C	45	61	2.19	27	AV3	0.2
C	45	61	1.85	24	AV4	-0.16
C	45	85	0.76	13	AV1	0.13
C	45	85	1.03	16	AV2	-0.06
C	45	85	3.59	34	AV3	-0.19
C	46	34	2.28	27	AV2	-0.14
C	46	34	2.46	28	AV3	-0.14
C	46	34	1.95	25	AV4	-0.19
C	46	55	0.44	11	AV3	0.14
C	46	63	0.8	16	AV1	0.42
C	46	63	0.76	15	AV2	-0.06
C	46	63	0.89	17	AV3	-0.05
C	46	63	0.55	13	AV4	0.07
C	46	70	0.56	13	AV1	0.12
C	46	89	0.85	12	AV4	-0.08
C	47	29	0.75	13	AV2	0.13
C	47	44	1.04	14	AV1	0.18
C	47	60	1.41	21	AV2	-0.14
C	47	66	1.21	19	AV1	0.11
C	48	29	0.53	10	AV4	0.25
C	48	30	1.19	18	AV4	0.13
C	48	56	0.96	16	AV1	0.11

SGID	Row	Col	Volts	Per	Locn	Inch1
C	49	41	0.28	7	AV1	-0.38
C	49	82	0.67	12	AV4	0

ATTACHMENT A

Anti-Vibration Bar (AVB) Wear Indications (SG 2D)

SGID	Row	Col	Volts	Per	Locn	Inch1
D	23	9	0.86	16	AV4	-0.08
D	26	8	1.42	21	AV1	0.11
D	26	8	0.85	16	AV4	-0.11
D	26	48	1.71	25	AV2	0.19
D	26	48	1.17	20	AV3	-0.16
D	26	50	0.91	17	AV1	0.35
D	26	50	1.17	20	AV2	0.24
D	26	50	1.07	19	AV3	-0.19
D	26	103	0.7	13	AV2	0
D	27	106	0.71	15	AV1	0.27
D	27	106	0.5	11	AV4	0.24
D	28	18	0.62	13	AV3	-0.21
D	29	10	1.42	21	AV2	0.13
D	29	10	1.89	25	AV3	-0.18
D	29	11	2.18	27	AV2	0.19
D	29	11	1.73	24	AV3	-0.16
D	29	11	0.72	14	AV4	0.05
D	29	12	1.53	22	AV4	-0.16
D	29	13	0.8	15	AV2	-0.08
D	29	14	1.27	20	AV2	-0.19
D	29	14	1.1	18	AV3	-0.11
D	29	19	0.61	12	AV2	0.19
D	29	31	0.62	12	AV1	0.35
D	29	31	1.53	22	AV3	-0.21
D	29	31	2.44	29	AV4	-0.19
D	30	11	3.2	33	AV2	0.19
D	30	11	1.68	24	AV3	0.03
D	30	11	1.17	19	AV4	-0.16
D	30	13	0.61	13	AV2	0.08
D	30	13	1.27	21	AV3	-0.16
D	30	101	1.06	17	AV2	0.08
D	30	101	0.76	13	AV3	-0.05
D	31	14	0.72	14	AV1	0.32
D	31	101	0.86	15	AV1	0.16
D	31	101	0.63	12	AV4	-0.03
D	32	37	1.12	17	AV3	0.11
D	33	14	0.66	13	AV2	0.11
D	33	14	0.49	10	AV3	0.05
D	33	15	0.93	17	AV2	-0.11

SGID	Row	Col	Volts	Per	Locn	Inch1
D	33	36	1.03	18	AV3	-0.19
D	33	37	0.91	15	AV3	-0.19
D	33	38	0.55	12	AV3	0.27
D	33	47	0.96	16	AV2	0.19
D	33	52	0.55	12	AV3	0
D	33	52	0.75	15	AV4	-0.1
D	34	25	0.7	14	AV2	0.3
D	34	25	1.27	20	AV3	0.03
D	34	41	0.51	10	AV2	0.38
D	34	81	0.59	12	AV2	0.08
D	34	81	0.68	13	AV3	0.03
D	34	82	1.18	19	AV2	-0.16
D	34	82	1.09	18	AV3	-0.13
D	35	75	0.72	14	AV1	0.16
D	35	75	1.57	23	AV3	0.22
D	35	83	1.31	20	AV2	0.11
D	35	84	1.15	19	AV2	-0.11
D	35	84	1	17	AV4	-0.18
D	35	92	0.75	15	AV2	-0.13
D	35	97	2.13	27	AV2	-0.24
D	35	97	0.61	12	AV3	0.11
D	36	17	1.23	20	AV2	-0.13
D	36	39	2.75	31	AV2	-0.05
D	36	39	1.8	25	AV3	-0.13
D	36	75	0.92	17	AV2	0.22
D	36	93	1.35	21	AV1	0.14
D	36	93	0.83	15	AV3	0.11
D	37	23	1.19	19	AV2	-0.19
D	37	23	0.61	12	AV3	0.11
D	37	27	0.71	14	AV1	0.1
D	37	27	1.23	20	AV3	-0.15
D	37	28	1.04	18	AV2	0.14
D	37	28	0.79	15	AV3	0.11
D	37	29	1.1	18	AV3	-0.13
D	37	34	1.27	20	AV2	0.13
D	37	34	1.25	20	AV3	-0.16
D	37	43	1.07	19	AV2	-0.21
D	37	51	1.36	21	AV2	-0.16
D	37	74	1.13	19	AV1	-0.11
D	37	74	1.25	20	AV2	0.16

SGID	Row	Col	Volts	Per	Locn	Inch1
D	37	74	1.04	18	AV3	-0.11
D	37	79	0.8	15	AV2	0.16
D	38	41	0.41	10	AV2	0.06
D	38	41	0.52	11	AV3	0.08
D	38	43	1.14	19	AV2	0.08
D	38	43	0.62	13	AV3	0.03
D	38	44	1.68	24	AV2	0.19
D	38	44	1.39	22	AV3	0.16
D	38	47	0.54	12	AV2	0.3
D	38	64	1.56	23	AV2	0.16
D	38	64	2.84	31	AV3	0.19
D	38	67	0.73	14	AV2	-0.24
D	38	67	1.89	25	AV3	0
D	38	75	0.99	17	AV2	0.19
D	38	75	0.95	17	AV3	0.35
D	38	85	0.92	18	AV3	-0.13
D	38	97	2.33	27	AV1	0.19
D	38	97	1.26	19	AV2	0
D	38	97	1.21	18	AV3	0.08
D	39	37	0.71	14	AV3	0.14
D	39	38	0.73	15	AV3	0.08
D	39	39	1.75	25	AV2	-0.19
D	39	40	0.91	17	AV3	0.16
D	39	43	0.77	15	AV1	-0.14
D	39	43	0.83	16	AV3	0.11
D	39	44	1.07	19	AV3	-0.16
D	39	45	0.93	17	AV2	0.13
D	39	45	1.63	24	AV3	-0.03
D	39	47	0.53	12	AV1	0.3
D	39	47	2.17	28	AV2	0.19
D	39	47	2.17	28	AV3	0.16
D	39	48	1.12	19	AV2	0.16
D	39	48	1.36	21	AV3	-0.18
D	39	68	1.3	20	AV2	0.32
D	39	68	1.14	18	AV3	-0.16
D	39	70	1.26	20	AV2	-0.19
D	39	70	1.25	20	AV3	-0.16
D	39	76	0.87	15	AV2	-0.16
D	39	93	1.15	19	AV2	0.19
D	39	95	0.99	16	AV3	-0.16

SGID	Row	Col	Volts	Per	Locn	Inch1
D	39	95	0.82	14	AV4	-0.24
D	39	96	1.61	22	AV2	0.16
D	39	96	1.4	20	AV3	0.16
D	40	42	0.94	17	AV2	0.34
D	40	48	1.24	20	AV2	0.47
D	40	48	2.04	27	AV3	0.03
D	40	48	0.5	11	AV4	0.12
D	40	49	0.58	12	AV1	0.41
D	40	49	1.09	19	AV2	-0.24
D	40	49	0.58	12	AV3	-0.23
D	40	50	0.53	12	AV2	0.07
D	40	62	1.43	21	AV2	-0.16
D	40	62	1.15	19	AV3	-0.18
D	40	97	1.25	20	AV2	-0.18
D	40	97	1.44	22	AV3	-0.18
D	41	29	1.38	21	AV3	-0.18
D	41	33	1.79	25	AV2	-0.16
D	41	33	1.06	18	AV3	0.27
D	41	34	0.86	16	AV2	0.11
D	41	34	1.33	21	AV3	-0.13
D	41	42	1.36	21	AV2	-0.19
D	41	42	0.82	16	AV3	-0.16
D	41	46	0.67	14	AV2	0.11
D	41	46	2.49	30	AV3	-0.19
D	41	48	3.27	33	AV2	0.19
D	41	48	1.32	21	AV3	0
D	41	48	0.47	11	AV4	0
D	41	49	4.36	38	AV2	0
D	41	49	1.03	18	AV3	0
D	41	65	1.78	24	AV3	-0.24
D	41	67	0.91	16	AV2	0.03
D	41	67	1.54	22	AV3	0
D	41	72	0.66	13	AV1	0.13
D	41	76	1.21	19	AV1	0.08
D	41	76	0.83	15	AV2	0.13
D	41	76	1.07	18	AV3	0.11
D	41	78	0.7	13	AV2	0.34
D	41	78	1.02	17	AV3	0.14
D	41	84	0.61	12	AV1	0.42
D	41	84	0.59	12	AV2	0.13

SGID	Row	Col	Volts	Per	Locn	Inch1
D	41	84	1.59	23	AV3	0.14
D	42	35	0.89	17	AV1	0.11
D	42	35	1.75	25	AV2	-0.19
D	42	35	0.83	16	AV3	0.06
D	42	35	0.63	13	AV4	0.3
D	42	45	1.12	19	AV4	0.04
D	42	47	1.91	26	AV3	-0.21
D	42	51	0.91	17	AV1	0.37
D	42	51	0.94	17	AV2	0.13
D	42	51	0.74	15	AV3	-0.55
D	42	52	3.22	33	AV2	-0.24
D	42	52	1.55	23	AV3	-0.16
D	42	66	0.91	16	AV3	0.17
D	42	80	0.6	12	AV1	0.19
D	42	80	0.49	10	AV3	0.06
D	42	82	0.57	11	AV2	0.35
D	42	82	0.76	14	AV3	0.36
D	42	85	1.12	18	AV2	-0.19
D	42	85	1.65	23	AV3	0.03
D	42	85	1.11	18	AV4	0.09
D	43	35	0.67	14	AV4	0.03
D	43	36	1.93	26	AV1	-0.22
D	43	36	2.79	31	AV3	-0.24
D	43	40	1.01	18	AV1	0.13
D	43	40	1.68	24	AV2	0.16
D	43	40	3.5	35	AV3	0.19
D	43	40	0.61	13	AV4	0.03
D	43	45	1	18	AV2	0.11
D	43	48	0.81	16	AV1	0.11
D	43	82	0.85	15	AV2	0.08
D	43	84	0.79	14	AV1	0.4
D	43	84	1.76	24	AV3	0
D	44	43	0.68	14	AV2	0.22
D	44	56	1.62	24	AV2	-0.19
D	44	56	1.25	21	AV3	-0.18
D	44	86	1.13	20	AV2	0.32
D	44	92	0.79	16	AV4	-0.16
D	45	44	1.1	19	AV2	-0.14
D	45	44	1.62	24	AV3	0.14
D	45	44	1.12	19	AV4	-0.18

SGID	Row	Col	Volts	Per	Locn	Inch1
D	45	46	1.54	23	AV3	-0.18
D	45	46	1.3	21	AV4	-0.18
D	45	50	1.26	21	AV1	0.13
D	45	50	2.98	32	AV2	0.43
D	45	50	2.12	27	AV3	0.17
D	45	56	0.99	18	AV1	0.16
D	45	56	2.34	29	AV2	-0.21
D	45	56	2.86	32	AV3	-0.18
D	46	56	1.84	25	AV2	-0.05
D	46	56	1.58	23	AV3	-0.18
D	48	37	0.65	13	AV3	-0.13
D	49	50	0.61	13	AV1	0.34
D	49	51	0.83	16	AV4	0.03
D	49	61	1.45	21	AV1	0.45
D	49	65	0.55	11	AV1	0.35
D	49	66	0.76	14	AV1	0.32
D	49	71	0.64	12	AV1	0.05