TENNESSEE VALLEY AUTHORITY

Post Office Box 2000, Spring City, Tennessee 37381

December 16, 2021

WBL-21-057

10 CFR 50.4

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

Watts Bar Nuclear Plant, Unit 2
Facility Operating License No. NPF-96
NRC Docket No. 50-391

Subject: **Watts Bar Nuclear Plant (WBN) Unit 2 - Cycle 4 Mid-Cycle Outage Generic Letter 95-05 Voltage-Based Alternate Repair Criteria Final Report**

In accordance with the requirements of WBN Technical Specification (TS) 5.9.9, "Steam Generator Tube Inspection Report," the Enclosure provides the 90 Day Steam Generator Inspection Report for the Unit 2 Cycle 4 Mid-Cycle Outage. This report is required to be submitted within 90 days after the initial entry into MODE 4 following the completion of an inspection performed in accordance with TS 5.7.2.12, "Steam Generator (SG) Program" when voltage-based alternate repair criteria have been applied.

There are no new regulatory commitments contained in this letter. Please direct any questions concerning this matter to Randy Staggs, WBN Plant Support Director, at (423) 365-2329.

Respectfully,

Anthony L. Williams IV
Site Vice President
Watts Bar Nuclear Plant

Enclosure:

Watts Bar Unit 2 Cycle 4 Mid-Cycle Outage Generic Letter 95-05 Voltage-Based Alternate Repair Criteria Final Report

cc (Enclosure):

NRC Regional Administrator - Region II
NRC Senior Resident Inspector - Watts Bar Nuclear Plant
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ENCLOSURE
Tennessee Valley Authority
Watts Bar Nuclear Plant
Unit 2

Watts Bar Unit 2
Cycle 4 Mid-Cycle Outage Generic Letter 95-05 Voltage-Based Alternate Repair Criteria Final Report

SG-CDMP-21-30-NP
Revision 0

December 2021

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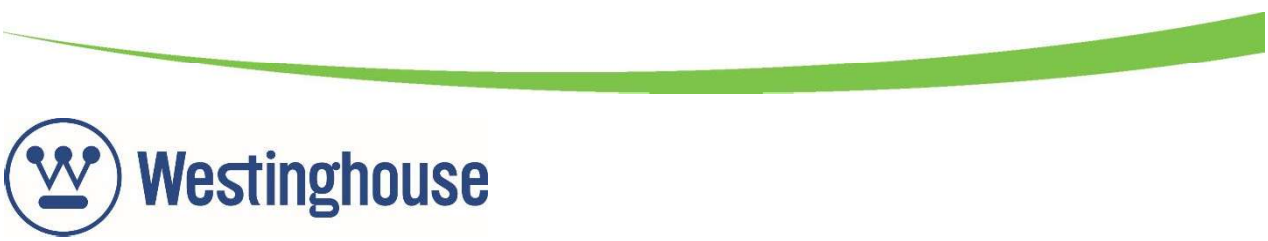

SG-CDMP-21-30-NP
Revision 0

Watts Bar Unit 2
Cycle 4 Mid-Cycle Outage Generic Letter 95-05
Voltage-Based Alternate Repair Criteria Final Report

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RECORD OF REVISIONS

Revision	Date	Description
0A	December 2021	Unverified draft provided to TVA for review and comment.
0	December 2021	Customer comments incorporated into verified document.

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1 INTRODUCTION

This report provides a summary of the Watts Bar Unit 2 (WBN U2) steam generator (SG) bobbin and **+POINT™**[1] probe inspections at tube support plate (TSP) intersections from the Fall 2021, Cycle 4 mid-cycle inspection outage (WBN F214), together with postulated Steam Line Break (SLB) leak rate and tube burst probability analyses. The WBN F214 outage represents the second application of the Generic Letter (GL) 95-05 (Reference 1) voltage-based repair criteria, and implementation of its requirements, to the Watts Bar Unit 2 SGs. Information required by the GL 95-05 and by WBN Technical Specification 5.9.9 is provided in this report, including steam line break (SLB) leak rates and tube burst probabilities calculated using the end-of-cycle (EOC) conditions for the recently completed Cycle 4a, representing a Condition Monitoring (CM) assessment of bobbin coil signal amplitudes for observed possible indications. In addition, a projection of EOC-4b bobbin coil voltage distributions, as well as the associated SG tube leak rates and burst probabilities through EOC-4b conditions, is provided. An itemized list of the TS reporting requirements and location of the information within this report is contained in Section 2. The evaluation is performed for the remaining duration of Cycle 4b until the replacement of the SGs.

The condition monitoring analysis at EOC-4a was carried out using the actual bobbin coil voltage distributions measured during the WBN F214 inspection outage. These results show that the EOC-4a condition monitoring leak rates and conditional burst probabilities for all four SGs are within their respective allowable limits. These evaluations were performed according to the methodology of WCAP-14277 (Reference 3).

The Operational Assessment (OA) analysis was performed to project leak rates and tube burst probabilities for postulated SLB conditions at the end of the next inspection interval (EOC-4b). These analyses utilized bobbin voltage distributions measured during the recent (WBN F214) inspection and a growth rate distribution bounding the last two inspections (U2R2 to U2R3 and U2R3 to WBN F214), with prior cycle bobbin measurements determined from lookbacks to the previously recorded eddy current data. Leak and burst analyses for the operational assessment were performed using the Reference 4 primary-to-secondary pressure differential of 2405 psi, which credits power-operated relief valve (PORV) actuation.

For clarity, this report refers to the recently completed partial operating cycle as Cycle 4a, the remaining part of the cycle as Cycle 4b, and the mid-cycle inspection outage as WBN F214.

[1] *+POINT is a trademark or registered trademark of Zetec, Inc. Other names may be trademarks of their respective owners.*

2 SUMMARY AND CONCLUSIONS

A total of 1583 axial ODSCC indications in all four SGs combined were reported during the WBN F214 bobbin coil inspection, of which 1581 were distorted support indications (DSI and DSV) and 2 axial ODSCC DDI indications that were at locations of pre-existing dents. Per GL 95-05, only those DSI and DSV signals with a bobbin coil signal amplitude of 1.0 volts (lower repair limit) or greater are required to be inspected using a **+POINT** (or equivalent) probe. Tubes with indications measured at 1.0V or greater and confirmed by +POINT probe were plugged. Tubes with indications measured at 2.85V or greater (conservative upper repair limit for indications at TSP locations established in Reference 18) by bobbin were plugged. All DSIs at the flow distribution baffle (H01) and all DSVs were plugged even if they did not confirm as axial ODSCC with the **+POINT** examination. A total of 304 axial ODSCC indications were removed from service by plugging. The maximum bobbin coil voltage indication in all SGs was 4.34 volts on R7 C69 at H02 in SG-3.

WBN Technical Specification 5.9.9 specifies that the GL 95-05 90-day report shall include information described in Section 6.b of Attachment 1 to GL 95-05. This information is contained within this report in the location noted next to each item in the table below. No tubes were pulled during WBN F214 for metallurgical examination associated with GL 95-05 Item 6.b(a).

GL Attachment 1, 6.b Item	Location
(a) Metallurgical Examination Results	N/A
(b)(i) EOC Voltage Distribution	EOC-4a: Table 3-2, Table 3-3, Table 3-4, Table 3-5 Figure 3-1, Figure 3-2, Figure 3-3, Figure 3-4 EOC-4b: Table 6-1 Figure 6-1, Figure 6-2, Figure 6-3, Figure 6-4
(b)(ii) Cycle Voltage Growth Rate Distribution	Table 3-11, Table 3-12, Table 3-13, Table 3-14, Table 3-15, Table 3-16 Figure 3-6, Figure 3-7, Figure 3-9, Figure 3-10
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(b)(vi) NDE Examination Uncertainty Distribution Used in Predicting the EOC Voltage Distribution	Section 3.4
(c) Tube Integrity Evaluation Results	Section 7 Table 7-1, Table 7-2

SLB leak rate and tube burst probability analyses were performed using the actual WBN F214 bobbin voltage distributions (condition monitoring analysis) as well as the projected EOC-4b bobbin voltage distributions (operational assessment). The SLB leak rates from the condition monitoring analysis meet the faulted SG allowable limit of 3.0 gpm (room temperature), Reference 11. The corresponding condition monitoring tube burst probability values are below the allowable limit of 1.0×10^{-2}.

At WBN F214, the largest SLB leak rate in the condition monitoring analysis is calculated for SG-3, with a magnitude of 0.0792 gpm, which is below the allowable SLB leakage limit of 3.0 gpm in the faulted SG. All leak rate values quoted are equivalent volumetric rates at room temperature.

The limiting conditional tube burst probability from the condition monitoring analysis, 1.20×10^{-3} calculated for SG-3, is acceptable per the allowable tube burst probability reporting guideline of 1.0×10^{-2}. The condition monitoring results for all other SGs are within the allowable limit.

The operational assessment for Cycle 4b was performed for 155 days which is the number of calendar days of operation until the replacement of the SGs. In accordance with Section 2.b.2(2) of Reference 1, the most limiting of the two previous growth rates distributions was used to estimate the voltage growth rate for the next cycle. SLB leak rate and tube burst probability projections at the EOC-4b conditions were performed using the latest alternate repair criteria (ARC) database available for 3/4-inch outside diameter (OD) tubing which is documented in Reference 4. Leak and burst analyses for the Cycle 4 operational assessment were performed using the Reference 4 primary-to-secondary pressure differential of 2405 psi, which credits PORV actuation. SG-3 is predicted to be the limiting SG for leakage and probability of burst. For the projected Cycle 4b duration of 155 calendar days when applying the NRC approved alternate POD discussed in Section 6.2, the EOC-4b leak rate projected for SG-3 is 0.152 gpm (at room temperature) which is less than the current limit of 3.0 gpm in the faulted SG. The leak rate projection utilized the leak rate calculation methodology of References 5 and 6. The limiting EOC-4b burst probability of 2.50×10^{-3} is calculated for SG-3 and is below the allowable limit of 1.0×10^{-2}. Therefore, all acceptance criteria of Reference 1 will be satisfied throughout 155 calendar days of operation.

3 WBN F214 INSPECTION RESULTS AND VOLTAGE GROWTH RATES

3.1 WBN F214 Inspection Results

WBN F214 is the second inspection outage for which the alternate repair criterion per GL 95-05 was implemented following NRC approval for Watts Bar Unit 2. In accordance with the guidance provided by GL 95-05, the WBN F214 inspection of the Watts Bar Unit 2 SGs consisted of a 100% eddy current (EC) bobbin probe full length examination of the tube bundles in all four SGs.

Tube-to-TSP intersections where the tubes with degradation may potentially collapse or deform as a result of the combined postulated loss-of-coolant accident (LOCA) and safe shutdown earthquake loadings were excluded from the ARC per Reference 7. The WBN F214 eddy current inspection plan included 100% **+POINT** probe inspection of all hot leg and cold leg dents $\geq$2 volts (as measured from the bobbin probe), which exceeds the requirement that the GL 95-05 ARC does not apply to intersections with dents greater than 5 volts. The WBN F214 eddy current inspection plan included 100% **+POINT** inspection of TSP mix residual signals that could cause a 1.0-volt bobbin signal to be missed or misread, as required by GL 95-05. There were no intersections identified with copper deposits which could interfere with the signal. Therefore, the requirements of the GL 95-05 methodology in Section 1.b of Reference 1 are satisfied.

All DSI indications which matched or exceeded the lower repair limit of 1.0 volt were subject to **+POINT** inspection in accordance with GL 95-05 (Reference 1). All DSI indications at the flow distribution baffle (H01) and all DSVs were plugged even if they did not confirm as axial ODSCC with the **+POINT** examination. All DSI indications which exceeded the upper voltage repair limit of 2.85 volts at tube-TSP intersections were plugged. The upper voltage repair criteria applied to the tube-to-TSP intersections and tube-to-FDB intersections are in accordance with Sections 2.a.2 and 2.a.3 of Reference 1, respectively.

The three-letter code for DSI indications which exceeded the upper voltage repair limit was reported as DSV instead of DSI. For the purpose of this report, the three-letter code DSI also includes indications which exceed the upper voltage repair limit and therefore includes those indications which were reported during WBN F214 with the three-letter code DSV. DSI indications detected on tubes excluded from application of GL 95-05, as documented in Reference 7, were reported as DSE during the WBN F214 inspections. DSE indications are not included in the GL 95-05 assessment and those indications are addressed through standard SG tube integrity assessments.

Table 3-1 provides a summary of the number of axial ODSCC indications reported in WBN F214 which were less than the lower voltage repair limit, greater than the lower voltage repair limit but less than the upper voltage repair limit, and greater than the upper voltage repair limit for each SG.

Table 3-1: WBN F214 Inspection Result Summary					
TSPs					
	SG-1	**SG-2**	**SG-3**	**SG-4**	**Total**
0 ≤ Volts < 1.0V	257	369	378	284	1288
1.0 ≤ Volts < 2.85V	45	65	125	51	286
2.85 ≤ Volts	0	1	2	1	4
FDB					
0 ≤ Volts < 1.0V	0	1	4	0	5
1.0 ≤ Volts	0	0	0	0	0
Total	302	436	509	336	1583

Table 3-3, Table 3-4, Table 3-5, and Table 3-6 present the WBN F214 bobbin voltage data for axial ODSCC indications at TSP intersections in the four SGs. Of the 1583 total indications, 1581 were DSI/DSV indications, of which 286 indications had voltage amplitudes greater than or equal to 1.0 volt and less than the upper voltage repair limit. A total of 4 indications exceeded the upper voltage repair limit.

The remaining two indications in the 1583 count were two DDI indications with axial ODSCC where the voltages were distorted by pre-existing dents. The dents were < 5.0V, so the indications are acceptable for inclusion in GL 95-05. The bobbin voltages for these indications were calculated by using the WBN F214 **+POINT** to bobbin voltage correlation to determine an equivalent bobbin voltage. Both tubes (SG1 R1C4 (1.0V at H03) and SG3 R9C105 (0.8V at H04)) were plugged. For conservatism, since the degradation mechanism for these DDIs was axial ODSCC at TSPs, they were included in the development of the GL 95-05 distributions and evaluation. For the analyses, the DSI indications are binned in 0.1-volt intervals where the numeric value of the bin represents the upper range of the bin. For example, the 1.0-volt bin contains DSI voltages from 0.91 to 1.00 volt. For WBN F214, all DSIs with a voltage amplitude greater than or equal to 1.0 volts were tested using the **+POINT** probe which exceeds the GL 95-05 requirement to RPC test indications that exceed the lower repair limit by bobbin coil.

There were a total of 110 new DSI indications confirmed by **+POINT** probe in WBN F214 of which 73 were greater than or equal to 1V. The indications were confirmed as Single Axial Indication (SAI) or Multiple Axial Indications (MAI) after analyst review of the RPC data.

- 13 SAIs and 5 MAIs in SG-1 (10 Total SAI/MAIs ≥1V)
- 23 SAIs and 9 MAIs in SG-2 (13 Total SAI/MAIs ≥1V)
- 28 SAIs and 19 MAIs in SG-3 (41 Total SAI/MAIs ≥1V)
- 9 SAIs and 4 MAI in SG-4 (9 Total SAI/MAIs ≥1V)

Table 3-3, Table 3-4, Table 3-5 and Table 3-6 tabulate the number of field bobbin indications, the number of those indications that were **+POINT** probe rotating pancake coil (RPC) inspected, the number of **+POINT** probe RPC confirmed indications, the number of indications removed from service, and the number of indications returned to service. In general, RPC diagnostics were performed for only flaws greater than 1 Volt. However, certain DSIs less than 1 volt were also inspected (e.g. if there was another reason for a diagnostic exam in that tube, the DSI would be inspected and included in this count). The distribution of WBN F214 indications is also shown in Figure 3-1, Figure 3-2, Figure 3-3, and Figure 3-4 for SG-1, SG-2, SG-3, and SG-4, respectively. From these figures, it appears that the EOC-3 OA prediction was bounding in the higher voltage region of the distribution. Since the overall number of predicted and

actual axial ODSCC quantities were similar, it is possible that this indicates the growth rate used in the previous OA was conservative.

The distribution of WBN F214 indications as a function of support plate location is summarized in Table 3-7, Table 3-8, Table 3-9, Table 3-10, and Table 3-11 and shown in Figure 3-5. This includes the maximum and average Cycle 4a growth for each support plate location (calculated with negative growth set to 0). The data indicates that the lower hot leg TSPs have the most ODSCC indications, reducing with TSP elevation after either the first or second TSP. The highest TSP elevation with an RPC confirmed DSI was H05 in SG2 at one location. There was one DSI reported at the FDB in SG-2 and four reported in SG-3. Only 23 indications were detected on the cold leg side, which none were found to exceed 1.0 volt. This distribution is consistent with that observed at other plants and is commonly attributed to the temperature dependence of outside diameter stress corrosion cracking (ODSCC).

Appendix A provides a listing of all DSIs and voltages reported at the WBN F214 inspection outage in Table A-1, Table A-2, Table A-3, and Table A-4, and includes whether axial ODSCC was confirmed as an SAI or MAI, whether the tube containing the indication(s) was plugged, and whether the indication was tested and no defect was found.

3.2 Voltage Growth Rates

For projection of leak rates and tube burst probabilities at EOC-4a, voltage growth rates were developed from the U2R3 and WBN F214 inspection bobbin data. Growth is determined when the same indication can be identified in more than two successive inspections. For all new indications in WBN F214, historical data was reviewed for all locations where DSIs and DSVs were reported, resulting in point-to-point growth values for most of the DSIs reported. The WBN F214 lookback process is the same as the process which was followed for the previous evaluation (after U2R3) and was used to develop the Cycle 3 growth rate.

For the EOC-4a GL 95-05 OA evaluation, there were a total of 1573 growth data points used for all four SGs combined. In order to ensure that sufficient and accurate point-to-point growth values were used in the growth projections in this report, the U2R3 historical data was reviewed for all locations where DSIs and DSVs were reported in WBN F214, resulting in a point-to-point growth value for each DSI reported at WBN F214. Lookback sizing for 10 indications (3 in SG1, 6 in SG2, and 1 in SG3) was unable to be determined from lookback data. The starting voltage for these indications was conservatively set at 0V for BOC-4a.

Table 3-7, Table 3-8, Table 3-9, Table 3-10, and Table 3-11 show the largest and average DSI voltage growth for each TSP in each SG, and for each TSP in all SGs combined. Table 3-12, Table 3-13, Table 3-14, and Table 3-15, and Table 3-16 show the frequency and cumulative probability distribution of growth as a function of voltage change in each WB2 steam generator during Cycle 4a. Table 3-17 lists the top 12 indications based on the Cycle 4a growth rate in descending order.

The Cycle 4a voltage growth distributions for each SG are shown in Figure 3-5 and Figure 3-6. From the figure, it is understood that SG-3 growth was the highest of the four generators for Cycle 4a. Figure 3-7 provides a magnified view of the upper 5% tail of the growth curves for all four SGs.

To determine if WB2 growth rates exhibited a potential dependency on the beginning of cycle (BOC) voltage, the growth rate data for Cycle 4a was plotted against BOC-4a voltage, and the resulting plot is shown in Figure 3-8. The Cycle 4a growth data, based on bobbin lookups from U2R3, do not show any tendency to increase with the BOC voltage; if at all, the growth seems to decrease with increasing BOC voltage. Therefore, for the purposes of this evaluation, growth can be assumed independent of voltage in the Monte Carlo analysis for the operational assessment.

A License Amendment Request (LAR) was approved by the NRC in Reference 14 which permits the adjustment of voltage growth rates used in the GL 95-05 evaluation to account for different operating temperatures via application of the Arrhenius correlation (seen in Equation 3-1) to voltage growth rates submitted by TVA in Reference 15. Watts Bar 2 Cycle 4a operated at a reduced temperature to lower the voltage growth rates, which changed the EOC-4a projected degradation and justified an operating interval of sufficient duration to reach the current mid-cycle inspection (Reference 16).

The limiting Cycle 4b operating temperature seen in Table 3-2 for the OA growth rate adjustment is 617 degrees Fahrenheit in Hot Leg 3 because of the total temperature increase relative to Cycle 3 compared to the other three SGs. This temperature difference was used as an input to the OA projection for Cycle 4b, where the HL 3 increase of 2.5 degrees over the Cycle 3 operating temperature of 614.5 degrees Fahrenheit was conservatively adjusted to a 3-degree difference, resulting in the application of a 1.152 increase factor (per the Arrhenius correlation).

Table 3-2: Bounding Cycle 4b Hot Leg Temperatures at WBN 2 (°F)

	HL 1 (SG1)	HL 2 (SG2)	HL 3 (SG3)	HL 4 (SG4)
Cycle 3	613.9	614.9	614.5	617.3
Cycle 4a	609.1	609.1	609.8	611.8
Cycle 4b	616	616	617	619

In Reference 18, the growth correction factor associated with a three-degree temperature increase is calculated to be 1.152. This calculation is repeated below with the Arrhenius correlation factor on degradation growth represented by Equation 3-1.

$$Growth\ Adjustment\ Factor = e^{\left(-\frac{Q}{RT_1}-\left(-\frac{Q}{RT_2}\right)\right)} \qquad \text{(Equation 3-1)}$$

Where:

$Q = activation\ energy\ (60\ kcal/mol\ for\ ODSCC\ Growth)$

$R = universal\ gas\ constant\ (1.986\ cal/mol - K)$

$T_1 - Cycle\ 4b\ HL\ Temperature\ (K)$

$T_2 - Cycle\ 3\ HL\ Temperature\ (K)$

The limiting growth rate was determined by comparing the Cycle 3 SG-3 growth distributions to the temperature adjusted Cycle 4a growth rate distributions as shown in Figure 3-9. As seen in the figure, the temperature adjusted Cycle 4a SG-3 growth rate is slightly higher in the lower voltage growth rate regions, but as seen in Figure 3-10, at about 1.35 V/EFPY and a CDF of 0.95 the SG-3 U2R3 growth rate is limiting. For this evaluation, the tail of the curve significantly effect on the result of the evaluation, indicating that the Cycle 3 SG-3 growth rate is limiting. For the growth rate comparison, the Cycle 4a growth values were increased

using a calculated 1.152 factor (via the Arrhenius correlation) to account for the different operating temperatures between the cycles, providing a more limiting value for direct degradation growth rate comparison. The GL 95-05 analysis results using the Cycle 3 SG-3 growth rate and the Cycle 4a bounding temperature adjusted growth rate were also compared to confirm that the Cycle 3 SG-3 growth rate is limiting.

Table 3-18 provides the projected voltage growth CDF for the Cycle 4b temperatures for the limiting SG, which is SG-3.

3.3 Probe Wear Criteria

The probe wear criterion approved by the NRC (Reference 8) was applied during the WBN F214 inspection. When a probe does not pass the 15% wear limit, this alternate criterion requires that only tubes with indications above 75% of the repair limit that were inspected since the last successful probe wear check be re-inspected with a good probe. As the lower repair limit for Watts Bar Unit 2 is 1.00 volts, all tubes containing indications for which the worn probe voltage is above 0.75 volts are to be inspected with a new probe. Any DSI indication found to be recorded in a scenario where the probe wear was found to be out of tolerance was re-inspected.

3.4 NDE Uncertainties

The NDE uncertainties applied for the WBN F214 voltage distributions in the Monte Carlo analyses for leak rate and burst probabilities are the same as those in the NRC Generic Letter 95-05 (Reference 1). The probe wear uncertainty has a standard deviation of 7.0% about a mean of zero and has a cut-off at 15% based on implementation of the probe wear standard. If the random sample of probe wear selected during the Monte Carlo simulations exceeds 15%, sampling of the probe wear distribution is continued until a value less than 15% is picked. The analyst variability uncertainty has a standard deviation of 10.3% about a mean of zero with no cut-off. These nondestructive examination (NDE) uncertainty distributions are included in the Monte Carlo analyses for SLB leak rates and tube burst probabilities based on the EOC-4a actual voltage distributions as well as for the EOC-4b projections.

Table 3-3: WBN F214 DDI/DSI/DSV Voltage Distribution for SG-1						
Voltage Bin	**Number of Indications**	**+POINT Probe Confirmed**	**+POINT Probe Tested But Not Confirmed**	**Not +POINT Probe Tested**	**Plugged**	**Returned to Service**
0.2	5	2	0	3	0	5
0.3	8	1	0	7	0	8
0.4	32	0	1	31	0	32
0.5	42	1	2	39	1	41
0.6	37	1	1	35	0	37
0.7	45	2	3	40	4	41
0.8	38	4	9	25	1	37
0.9	29	1	10	18	1	28
1	22	6	5	11	3	19
1.1	12	4	6	2	5	7
1.2	11	6	4	1	7	4
1.3	10	8	2	0	8	2
1.4	7	2	2	3	4	3
1.5	2	1	1	0	2	0
1.6	1	1	0	0	1	0
2.7	1	1	0	0	1	0
Total	**302**	**41**	**46**	**215**	**38**	**264**
Average Voltage = 0.704 volts						

Table 3-4: WBN F214 DSI/DSV Voltage Distribution for SG-2						
Voltage Bin	**Number of Indications**	**+POINT Probe Confirmed**	**+POINT Probe Tested But Not Confirmed**	**Not +POINT Probe Tested**	**Plugged**	**Returned to Service**
0.1	1	0	0	1	0	1
0.2	6	2	0	4	0	6
0.3	20	0	2	18	0	20
0.4	45	3	3	39	1	44
0.5	69	4	4	61	1	68
0.6	61	2	3	56	4	57
0.7	60	5	4	51	1	59
0.8	59	7	14	38	1	58
0.9	30	5	9	16	0	30
1	20	2	4	14	1	19
1.1	21	14	7	0	15	6
1.2	11	4	7	0	5	6
1.3	15	7	8	0	7	8
1.4	7	4	3	0	4	3
1.5	5	4	1	0	4	1
1.7	3	3	0	0	3	0
1.9	1	1	0	0	1	0
2.8	1	1	0	0	1	0
2.9	1	1	0	0	1	0
Total	**436**	**69**	**69**	**297**	**50**	**386**
Average Voltage = 0.685 volt						

Table 3-5: WBN F214 DDI/DSI/DSV Voltage Distribution for SG-3						
Voltage Bin	**Number of Indications**	**+POINT Probe Confirmed**	**+POINT Probe Tested But Not Confirmed**	**Not +POINT Probe Tested**	**Plugged**	**Returned to Service**
0.1	2	2	0	0	1	1
0.2	2	1	0	1	0	2
0.3	14	3	0	11	1	13
0.4	30	5	0	25	2	28
0.5	56	4	0	52	6	50
0.6	70	4	5	61	6	64
0.7	67	6	3	58	8	59
0.8	58	9	5	44	12	46
0.9	44	11	9	24	5	39
1	42	9	10	23	4	38
1.1	29	25	4	0	26	3
1.2	21	16	5	0	16	5
1.3	12	10	2	0	11	1
1.4	14	12	2	0	12	2
1.5	10	10	0	0	10	0
1.6	10	8	2	0	8	2
1.7	5	5	0	0	5	0
1.8	6	6	0	0	6	0
1.9	1	1	0	0	1	0
2	3	2	1	0	2	1
2.1	4	3	1	0	3	1
2.2	4	4	0	0	4	0
2.3	1	1	0	0	1	0
2.6	2	2	0	0	2	0
2.9	1	1	0	0	1	0
4.4	1	1	0	0	1	0
Total	**509**	**161**	**49**	**299**	**154**	**355**
Average Voltage = 0.827 volt						

Table 3-6: WBN F214 DSI/DSV Voltage Distribution for SG-4						
Voltage Bin	**Number of Indications**	**+POINT Probe Confirmed**	**+POINT Probe Tested But Not Confirmed**	**Not +POINT Probe Tested**	**Plugged**	**Returned to Service**
0.1	1	1	0	0	0	1
0.2	8	0	0	8	0	8
0.3	20	0	2	18	0	20
0.4	29	2	2	25	3	26
0.5	52	0	5	47	2	50
0.6	52	0	7	45	4	48
0.7	41	3	3	35	8	33
0.8	21	1	6	14	3	18
0.9	44	4	14	26	4	40
1	19	6	2	11	2	17
1.1	18	12	6	0	13	5
1.2	10	7	3	0	7	3
1.3	6	2	4	0	2	4
1.4	2	1	1	0	1	1
1.5	5	5	0	0	5	0
1.6	2	2	0	0	2	0
1.8	3	3	0	0	3	0
2	1	1	0	0	1	0
2.1	1	1	0	0	1	0
3.7	1	1	0	0	1	0
Total	**336**	**52**	**53**	**231**	**62**	**274**
Average voltage = 0.693 volt						

Table 3-7: SG-1 WBN F214 Indication Distribution as Function of Tube Support Plate						
SG	**TSP**	**Number of Indications**	**Max. Volts**	**Average Volts**	**Largest Growth, Volts**	**Average Growth, Volts**
1	H01	0	0.00	0.00	0.00	0.00
1	H02	63	2.61	0.85	1.83	0.30
1	H03	94	1.52	0.69	1.43	0.21
1	H04	63	1.35	0.80	0.51	0.10
1	H05	44	0.94	0.57	0.29	0.08
1	H06	26	0.93	0.50	0.51	0.08
1	H07	7	0.69	0.39	0.10	0.04
1	H08	1	0.43	0.43	0.04	0.04
1	C02	0	0.00	0.00	0.00	0.00
1	C05	0	0.00	0.00	0.00	0.00
1	C06	0	0.00	0.00	0.00	0.00
1	C08	0	0.00	0.00	0.00	0.00
1	C09	1	0.73	0.73	0.39	0.39
1	C10	1	0.45	0.45	0.06	0.06
1	C11	0	0.00	0.00	0.00	0.00
1	C12	0	0.00	0.00	0.00	0.00
1	C13	0	0.00	0.00	0.00	0.00
1	C14	2	0.57	0.47	0.28	0.15

Table 3-8: SG-2 WBN F214 Indication Distribution as Function of Tube Support Plate						
SG	**TSP**	**Number of Indications**	**Max. Volts**	**Average Volts**	**Largest Growth, Volts**	**Average Growth, Volts**
2	H01	1	0.50	0.50	0.50	0.50
2	H02	141	2.86	0.82	2.14	0.24
2	H03	154	1.69	0.67	1.19	0.18
2	H04	51	1.46	0.67	1.20	0.13
2	H05	48	1.21	0.56	0.52	0.06
2	H06	24	1.04	0.48	0.22	0.05
2	H07	5	0.47	0.37	0.15	0.04
2	H08	9	0.71	0.43	0.24	0.07
2	C02	0	0.00	0.00	0.00	0.00
2	C05	0	0.00	0.00	0.00	0.00
2	C06	0	0.00	0.00	0.00	0.00
2	C08	1	0.42	0.42	0.16	0.16
2	C09	0	0.00	0.00	0.00	0.00
2	C10	0	0.00	0.00	0.00	0.00
2	C11	0	0.00	0.00	0.00	0.00
2	C12	0	0.00	0.00	0.00	0.00
2	C13	1	0.50	0.50	0.12	0.12
2	C14	1	0.62	0.62	0.62	0.62

Table 3-9: SG-3 WBN F214 Indication Distribution as Function of Tube Support Plate						
SG	**TSP**	**Number of Indications**	**Max. Volts**	**Average Volts**	**Largest Growth, Volts**	**Average Growth, Volts**
3	H01	4	0.62	0.41	0.62	0.41
3	H02	240	4.34	0.94	3.75	0.38
3	H03	100	2.14	0.91	1.18	0.37
3	H04	87	1.72	0.65	1.02	0.12
3	H05	56	1.12	0.60	0.31	0.04
3	H06	13	0.92	0.55	0.20	0.08
3	H07	4	0.69	0.57	0.42	0.20
3	H08	2	0.50	0.35	0.00	0.00
3	C02	0	0.00	0.00	0.00	0.00
3	C05	1	0.76	0.76	0.76	0.76
3	C06	2	0.58	0.57	0.58	0.57
3	C08	0	0.00	0.00	0.00	0.00
3	C09	0	0.00	0.00	0.00	0.00
3	C10	0	0.00	0.00	0.00	0.00
3	C11	0	0.00	0.00	0.00	0.00
3	C12	0	0.00	0.00	0.00	0.00
3	C13	0	0.00	0.00	0.00	0.00
3	C14	0	0.00	0.00	0.00	0.00

Table 3-10: SG-4 WBN F214 Indication Distribution as Function of Tube Support Plate						
SG	**TSP**	**Number of Indications**	**Max. Volts**	**Average Volts**	**Largest Growth, Volts**	**Average Growth, Volts**
4	H01	0	0.00	0.00	0.00	0.00
4	H02	133	3.70	0.73	3.01	0.20
4	H03	92	2.07	0.75	1.18	0.21
4	H04	48	1.24	0.69	0.46	0.11
4	H05	38	1.08	0.58	0.59	0.06
4	H06	10	0.81	0.42	0.07	0.02
4	H07	1	0.24	0.24	0.00	0.00
4	H08	1	0.28	0.28	0.28	0.28
4	C02	1	0.45	0.45	0.12	0.12
4	C05	1	0.55	0.55	0.55	0.55
4	C06	2	0.81	0.58	0.09	0.05
4	C08	0	0.00	0.00	0.00	0.00
4	C09	3	0.61	0.57	0.22	0.18
4	C10	0	0.00	0.00	0.00	0.00
4	C11	1	0.27	0.27	0.01	0.01
4	C12	1	0.33	0.33	0.05	0.05
4	C13	4	0.54	0.43	0.47	0.20
4	C14	0	0.00	0.00	0.00	0.00

Table 3-11: WBN F214 Indication Distribution as Function of Tube Support Plate, All SGs Combined

SG	TSP	Number of Indications	Max. Volts	Average Volts	Largest Growth, Volts	Average Growth, Volts
All	H01	5	0.62	0.42	0.62	0.42
All	H02	577	4.34	0.85	3.75	0.29
All	H03	440	2.14	0.75	1.43	0.23
All	H04	249	1.72	0.70	1.20	0.12
All	H05	186	1.21	0.58	0.59	0.06
All	H06	73	1.04	0.49	0.51	0.06
All	H07	17	0.69	0.42	0.42	0.07
All	H08	13	0.71	0.41	0.28	0.07
All	C02	1	0.45	0.45	0.12	0.12
All	C05	2	0.76	0.66	0.76	0.66
All	C06	4	0.81	0.58	0.58	0.31
All	C08	1	0.42	0.42	0.16	0.16
All	C09	4	0.73	0.61	0.39	0.23
All	C10	1	0.45	0.45	0.06	0.06
All	C11	1	0.27	0.27	0.01	0.01
All	C12	1	0.33	0.33	0.05	0.05
All	C13	5	0.54	0.44	0.47	0.19
All	C14	3	0.62	0.52	0.62	0.31

Table 3-12: SG-1 Voltage Growth Cumulative Distribution		
Voltage Change: EOC-4a minus EOC-3	**Number of Indications**	**Cumulative Probability Distribution**
ΔV≤0.0	66	0.219
0.01≤ΔV≤0.1	91	0.522
0.11≤ΔV≤0.2	57	0.711
0.21≤ΔV≤0.3	32	0.817
0.31≤ΔV≤0.4	21	0.887
0.41≤ΔV≤0.5	13	0.930
0.51≤ΔV≤0.6	8	0.957
0.61≤ΔV≤0.7	2	0.963
0.71≤ΔV≤0.8	3	0.973
0.81≤ΔV≤0.9	3	0.983
0.91≤ΔV≤1	3	0.990
1.01≤ΔV≤1.1	1	0.993
1.41≤ΔV≤1.5	1	0.997
1.81≤ΔV≤1.9	1	1
Number of Indications	302	
EOC-4a Average Growth	0.19V	
EOC-3 Average Growth	0.08V	

Table 3-13: SG-2 Voltage Growth Cumulative Distribution		
Voltage Change: EOC-3 minus EOC-2	**Number of Indications**	**Cumulative Probability Distribution**
ΔV≤0.0	124	0.284
0.01≤ΔV≤0.1	123	0.567
0.11≤ΔV≤0.2	67	0.720
0.21≤ΔV≤0.3	39	0.810
0.31≤ΔV≤0.4	31	0.881
0.41≤ΔV≤0.5	15	0.915
0.51≤ΔV≤0.6	10	0.938
0.61≤ΔV≤0.7	6	0.952
0.71≤ΔV≤0.8	9	0.972
0.81≤ΔV≤0.9	3	0.979
0.91≤ΔV≤1	2	0.984
1.11≤ΔV≤1.2	4	0.993
1.31≤ΔV≤1.4	1	0.995
1.81≤ΔV≤1.9	1	0.998
2.11≤ΔV≤2.2	1	1.000
Number of Indications	436	
EOC-4a Average Growth	0.17V	
EOC-3 Average Growth	0.14V	

Table 3-14: SG-3 Voltage Growth Cumulative Distribution		
Voltage Change: EOC-3 minus EOC-2	**Number of Indications**	**Cumulative Probability Distribution**
ΔV≤0.0	83	0.163
0.01≤ΔV≤0.1	114	0.387
0.11≤ΔV≤0.2	70	0.525
0.21≤ΔV≤0.3	69	0.660
0.31≤ΔV≤0.4	50	0.758
0.41≤ΔV≤0.5	38	0.833
0.51≤ΔV≤0.6	24	0.880
0.61≤ΔV≤0.7	10	0.900
0.71≤ΔV≤0.8	12	0.923
0.81≤ΔV≤0.9	7	0.937
0.91≤ΔV≤1	9	0.955
1.01≤ΔV≤1.1	6	0.967
1.11≤ΔV≤1.2	5	0.976
1.21≤ΔV≤1.3	5	0.986
1.31≤ΔV≤1.4	1	0.988
1.51≤ΔV≤1.6	1	0.990
1.71≤ΔV≤1.8	1	0.992
1.81≤ΔV≤1.9	1	0.994
1.91≤ΔV≤2	1	0.996
2.01≤ΔV≤2.1	1	0.998
3.71≤ΔV≤3.8	1	1.000
Number of Indications	509	
EOC-4a Average Growth	0.33V	
EOC-3 Average Growth	0.52V	

Table 3-15: SG-4 Voltage Growth Cumulative Distribution		
Voltage Change: EOC-4a minus EOC-3	**Number of Indications**	**Cumulative Probability Distribution**
ΔV≤0.0	101	0.301
0.01≤ΔV≤0.1	81	0.542
0.11≤ΔV≤0.2	58	0.714
0.21≤ΔV≤0.3	48	0.857
0.31≤ΔV≤0.4	14	0.899
0.41≤ΔV≤0.5	10	0.929
0.51≤ΔV≤0.6	6	0.946
0.61≤ΔV≤0.7	7	0.967
0.71≤ΔV≤0.8	3	0.976
0.81≤ΔV≤0.9	1	0.979
0.91≤ΔV≤1	1	0.982
1.01≤ΔV≤1.1	2	0.988
1.11≤ΔV≤1.2	1	0.991
1.31≤ΔV≤1.4	1	0.994
1.71≤ΔV≤1.8	1	0.997
3.01≤ΔV≤3.1	1	1.000
Number of Indications	336	
EOC-4a Average Growth	0.17V	
EOC-3 Average Growth	0.19V	

Table 3-16: Voltage Growth Cumulative Distribution, All SGs		
Voltage Change: EOC-4a Minus EOC-3	**Number of Indications**	**Cumulative Probability Distribution**
ΔV≤0.0	374	0.236
0.01≤ΔV≤0.1	409	0.495
0.11≤ΔV≤0.2	252	0.654
0.21≤ΔV≤0.3	188	0.773
0.31≤ΔV≤0.4	116	0.846
0.41≤ΔV≤0.5	76	0.894
0.51≤ΔV≤0.6	48	0.924
0.61≤ΔV≤0.7	25	0.940
0.71≤ΔV≤0.8	27	0.957
0.81≤ΔV≤0.9	14	0.966
0.91≤ΔV≤1	15	0.975
1.01≤ΔV≤1.1	9	0.981
1.11≤ΔV≤1.2	10	0.987
1.21≤ΔV≤1.3	5	0.991
1.31≤ΔV≤1.4	3	0.992
1.41≤ΔV≤1.5	1	0.993
1.51≤ΔV≤1.6	1	0.994
1.71≤ΔV≤1.8	2	0.995
1.81≤ΔV≤1.9	3	0.997
1.91≤ΔV≤2	1	0.997
2.01≤ΔV≤2.1	1	0.998
2.11≤ΔV≤2.2	1	0.999
3.01≤ΔV≤3.1	1	0.999
3.71≤ΔV≤3.8	1	1.000
Number of Indications	1583	

Table 3-17: Indications with Largest Growth in Cycle 4a								
SGID	**Row**	**Col**	**Locn**	**EOC-4a Vpp**	**EOC-3 Vpp**	**Cycle 4a Vpp Growth**	**RPC Tested**	**Newly Reported at F214?**
3	7	69	H02	4.34	0.59	3.75	Yes (MAI)	No (U2R3 RTS)
4	4	99	H02	3.7	0.69	3.01	Yes (SAI)	No (U2R3 RTS)
2	2	47	H02	2.86	0.72	2.14	Yes (SAI)	No (U2R3 RTS)
3	30	25	H02	2.57	0.53	2.04	Yes (MAI)	No (U2R3 RTS)
3	5	109	H02	2.12	0.18	1.94	Yes (SAI)	Yes
3	17	38	H02	2.88	0.98	1.9	Yes (MAI)	No (U2R3 RTS)
2	31	72	H02	2.8	0.92	1.88	Yes (MAI)	No (U2R3 RTS)
1	6	106	H02	2.61	0.78	1.83	Yes (SAI)	No (U2R3 RTS)
4	28	101	H02	1.99	0.21	1.78	Yes (SAI)	Yes
3	4	99	H02	2.52	0.77	1.75	Yes (MAI)	No (U2R3 RTS)
3	6	9	H02	1.77	0.17	1.6	Yes (SAI)	Yes
4	10	5	H02	1.6	0.2	1.4	Yes (SAI)	No (U2R3 RTS)

Table 3-18 Voltage Growth Cumulative Distribution Function for Limiting SG		
Cycle 3 Actual Voltage Growth (ΔV) 496.3 EFPD	**Cycle 4b Projected Voltage Growth (ΔV) 155 EFPD**	**CDF**
0.000	0	0.029
0.025	0.010	0.059
0.055	0.020	0.088
0.075	0.030	0.118
0.115	0.040	0.147
0.135	0.050	0.176
0.170	0.060	0.206
0.210	0.080	0.235
0.250	0.090	0.265
0.330	0.120	0.294
0.385	0.140	0.324
0.465	0.170	0.353
0.530	0.190	0.382
0.610	0.220	0.412
0.700	0.250	0.441
0.830	0.300	0.471
1.160	0.420	0.500
1.205	0.430	0.529
1.330	0.480	0.559
1.510	0.540	0.588
1.750	0.630	0.618
1.900	0.680	0.647
2.000	0.720	0.676
2.230	0.800	0.706
2.270	0.820	0.735
2.415	0.870	0.765
2.490	0.900	0.794
2.800	1.010	0.824
3.640	1.310	0.853
4.680	1.680	0.882
4.895	1.760	0.912
6.870	2.470	0.941
7.840	2.820	0.971
9.350	3.360	1.000

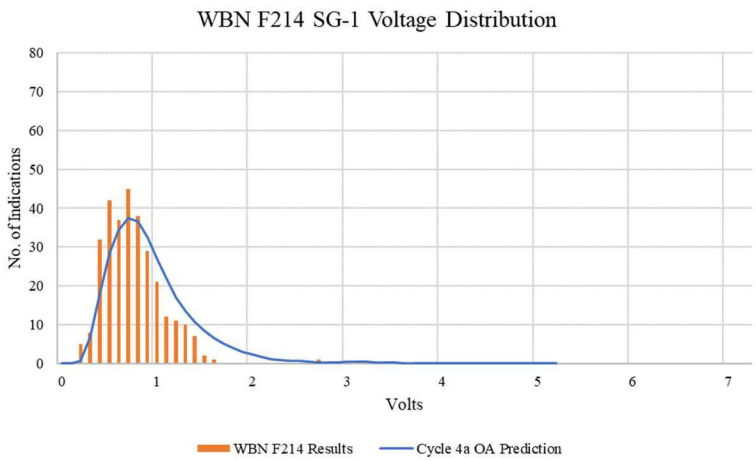

Figure 3-1 Voltage Distribution in SG-1

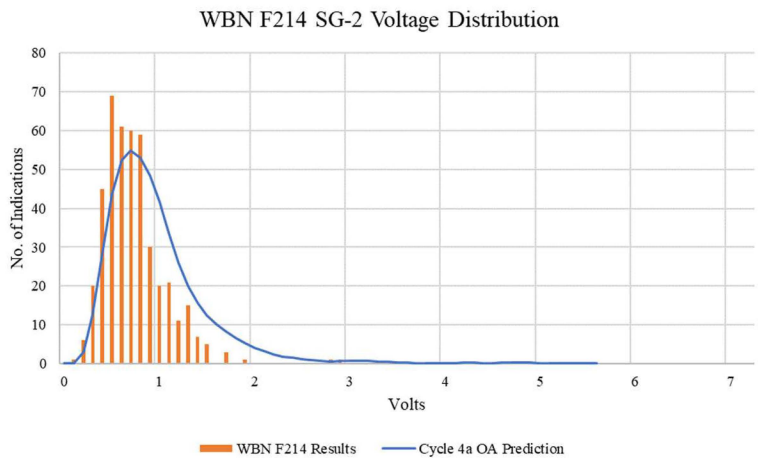

Figure 3-2 Voltage Distribution in SG-2

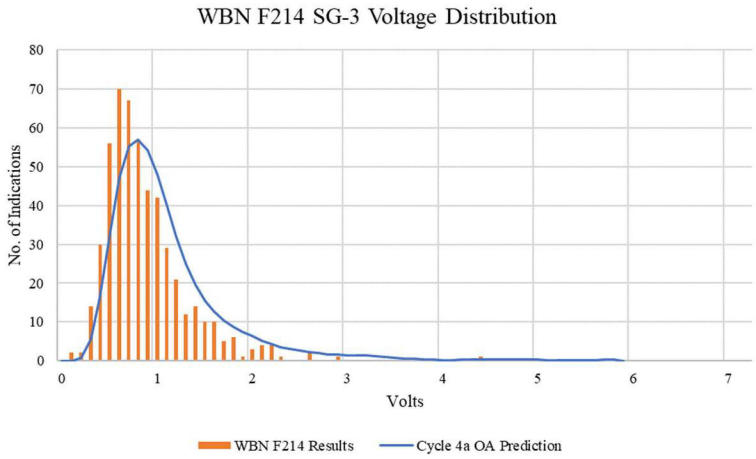

Figure 3-3 Voltage Distribution in SG-3

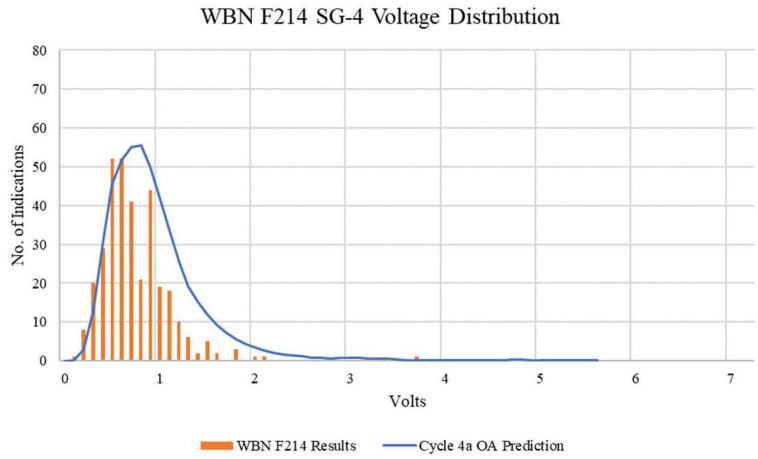

Figure 3-4 Voltage Distribution in SG-4

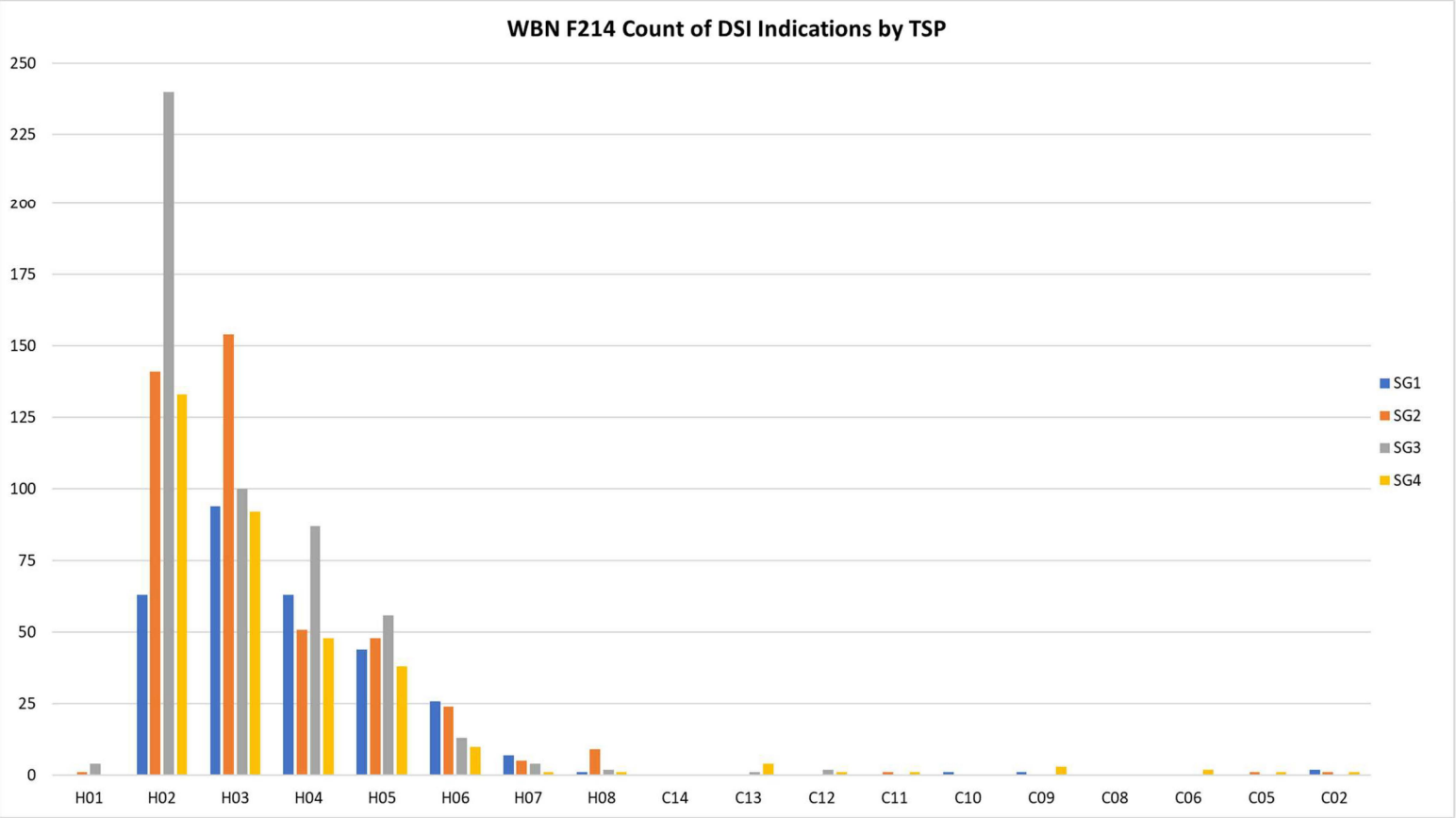

Figure 3-5 Indication Distribution by TSP

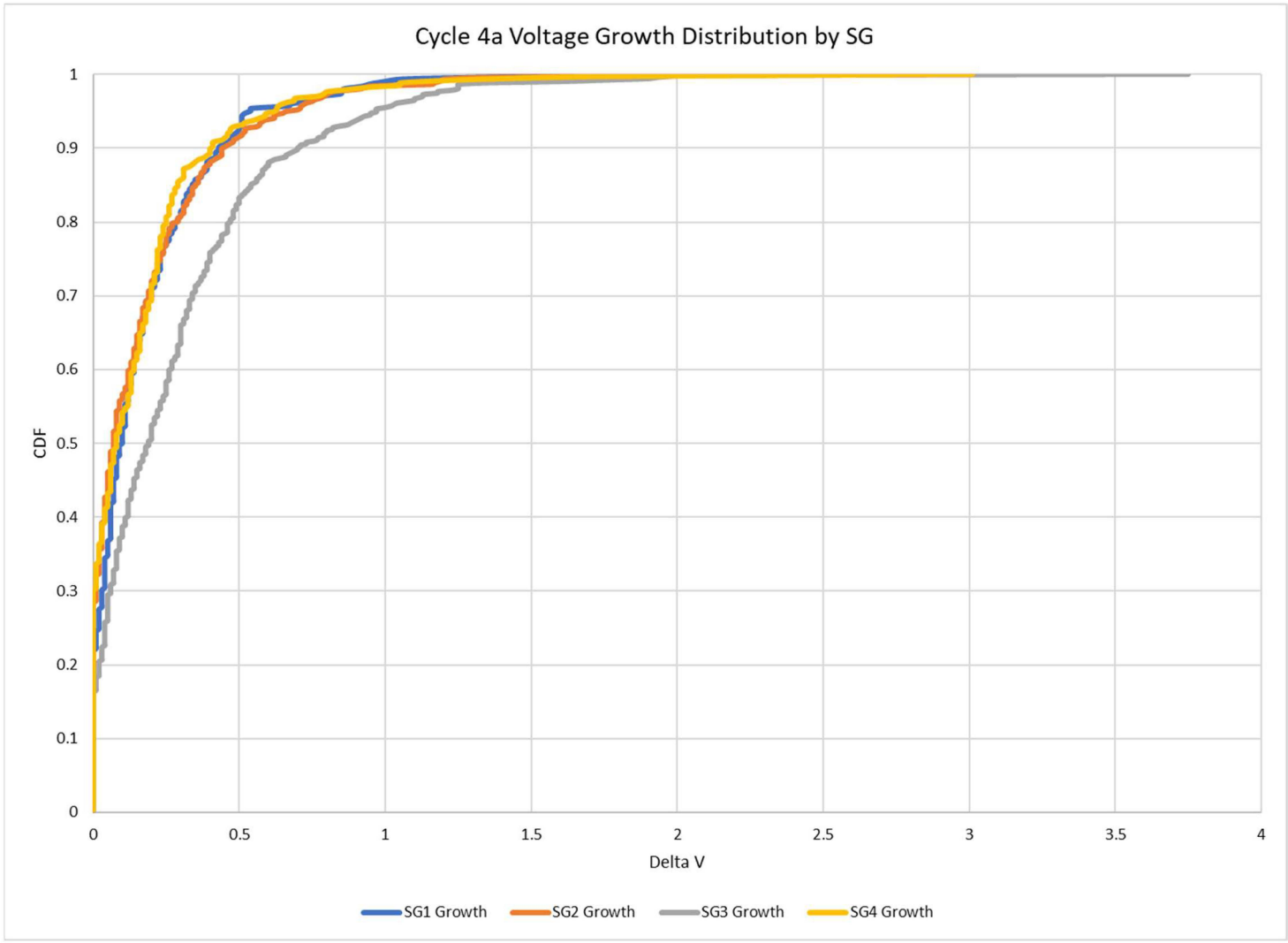

Figure 3-6 Voltage Growth during Cycle 4a

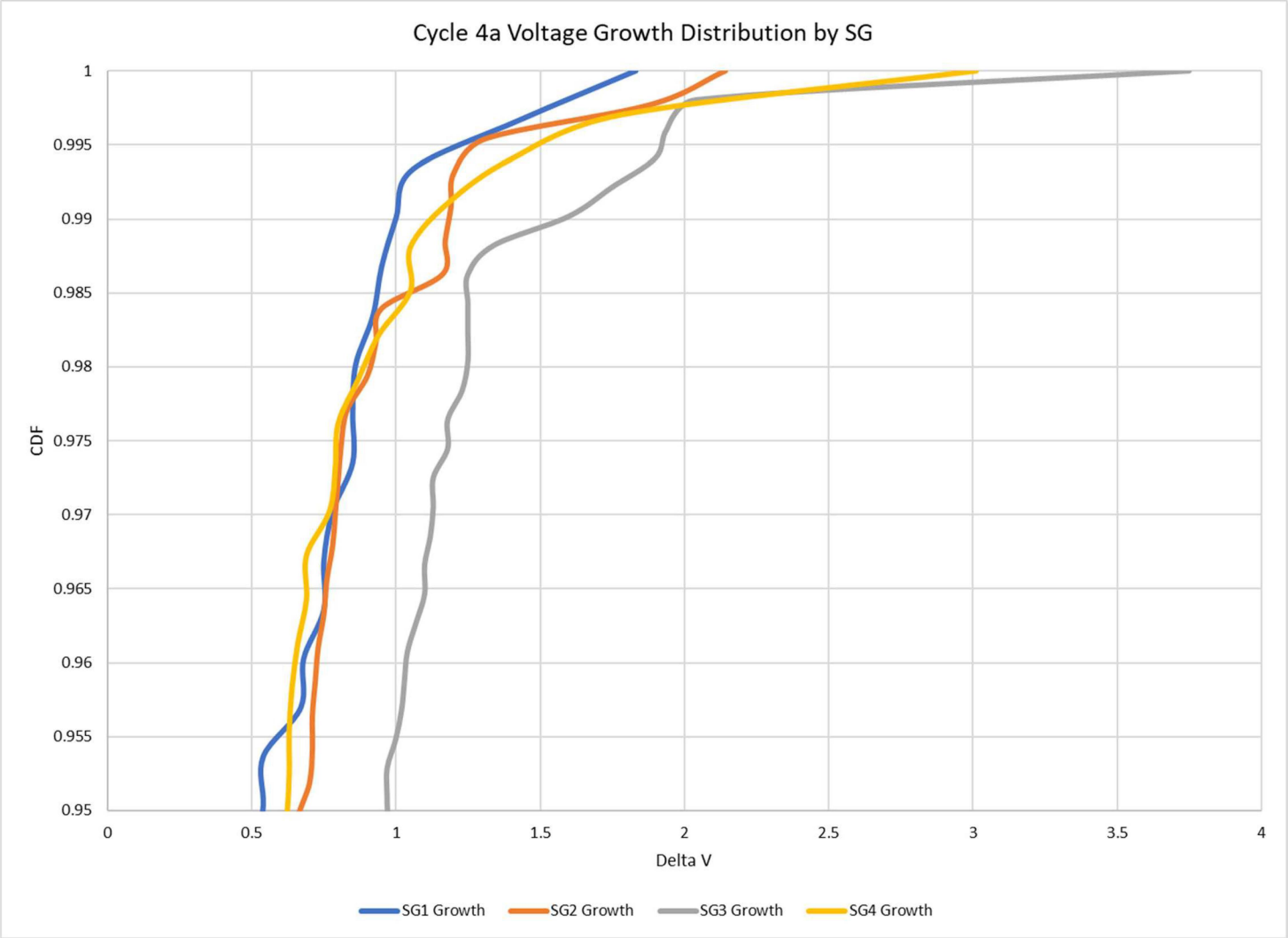

Figure 3-7 Upper 5% of Voltage Growth during Cycle 4a

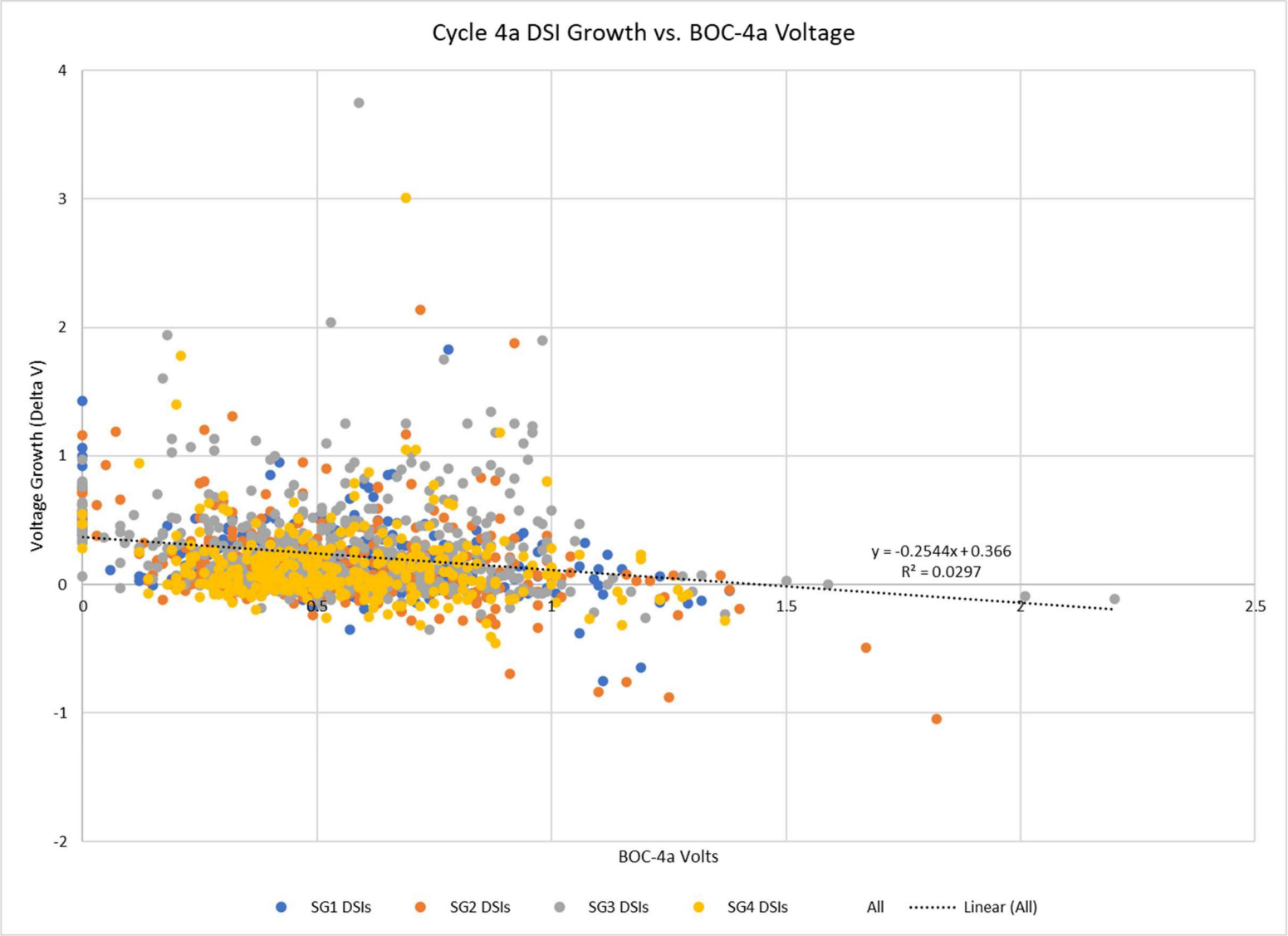

Figure 3-8 Cycle 4a Voltage Growth vs. BOC Voltage

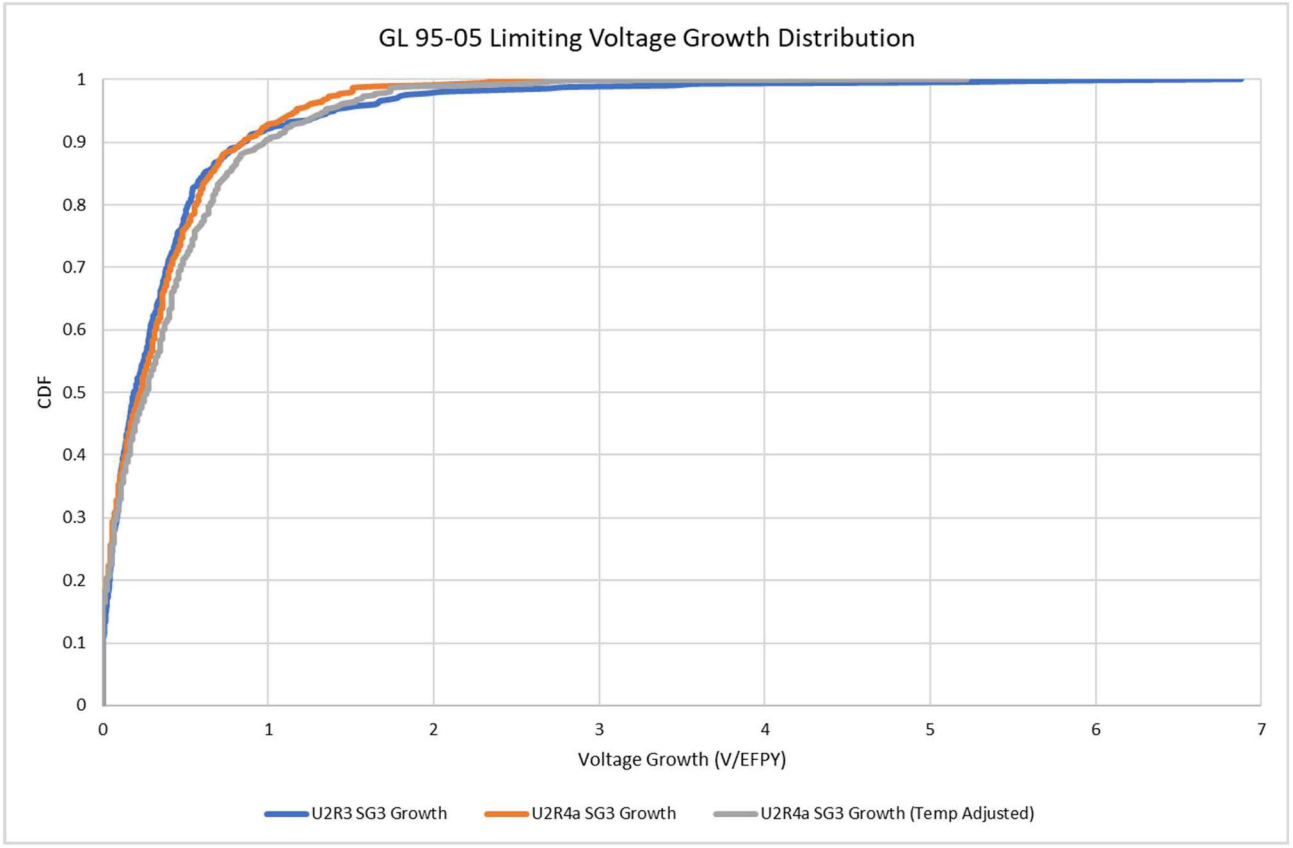

Figure 3-9 Voltage Growth Distribution for Cycle 3 and Cycle 4a for Limiting SG

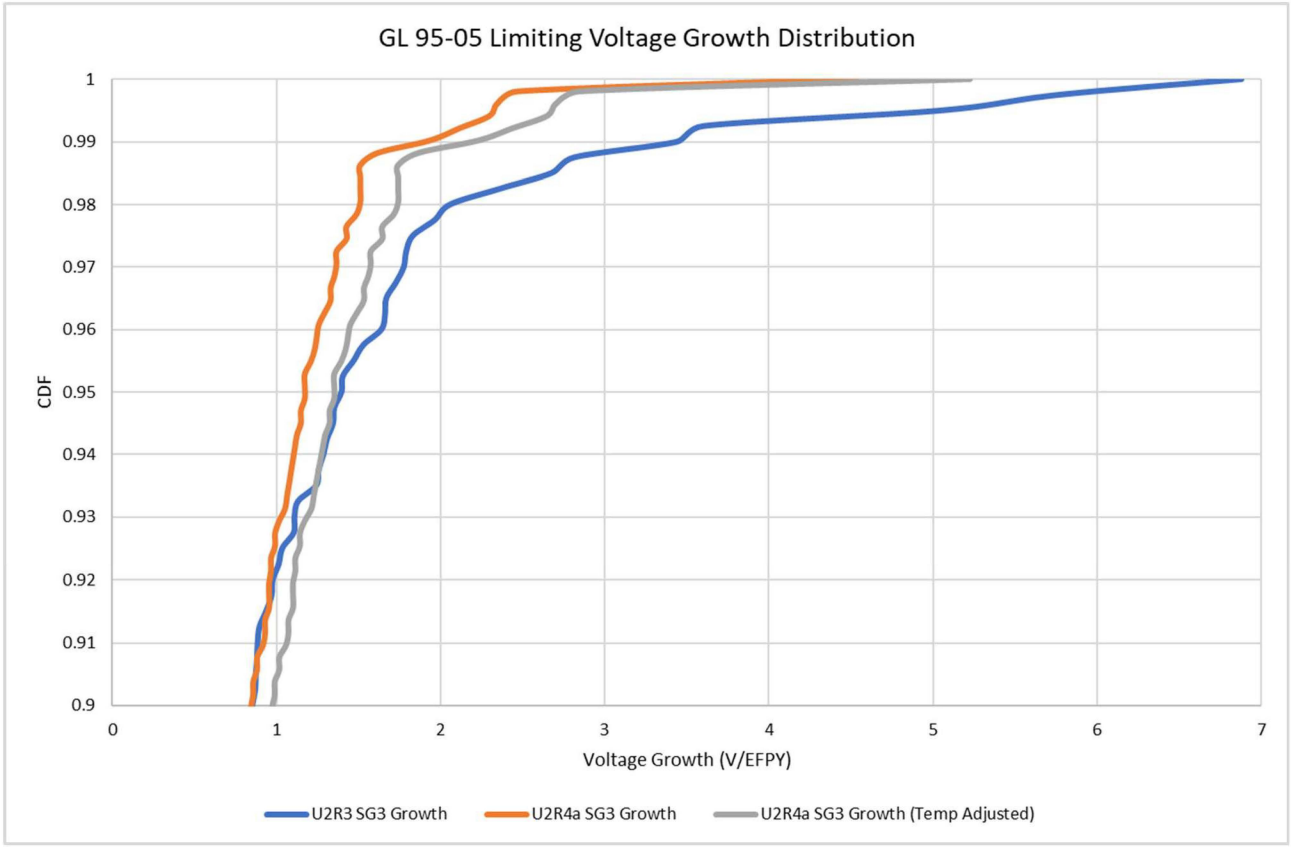

Figure 3-10 Upper 10% of Voltage Growth Distribution for Cycle 3 and Cycle 4a for Limiting SG

4 DATABASE APPLIED FOR LEAK AND BURST CORRELATIONS

4.1 Tube Material Properties

The tube material properties are provided in Table 4-1 of Reference 2 for the 3/4-inch diameter tubes in the WB2 SGs at 650°F. The normalized mean flow stress (sum of yield and ultimate strengths divided by 2) used in the analysis is 71.565 ksi with a standard deviation of 3.565 ksi.

4.2 Burst Correlation

The burst pressure, P_b, is normalized to a material with a flow stress of 71.565 ksi, which is the mean of the Westinghouse 3/4-inch tube data. This aligns with the flow stress values used in the burst pressure analysis. The correlation parameters used in the analysis are taken from Table 6-1 in Reference 4.

4.3 Leak Rate Correlation

The steam line break pressure to be applied is typically 2560 psi unless a lower pressure can be justified. At WB2, credit can be taken for operability of the pressurizer PORVs during a SLB event. Therefore, the SLB primary-to-secondary pressure differential was selected as 2405 psi for the leak correlation per Reference 13 which is used for the leakage predictions in this analysis. The parameters used in the analysis are taken from Table 6-3 in Reference 4. The leak rate criterion is given in terms of gallons per minute as condensed liquid at room temperature.

4.4 Probability of Leak Correlation

The probability of leak as a function of indication voltage parameters are taken from Table 6-2 of Reference 4. In the Monte Carlo analysis, leakage is quantified only if the indication is computed to be a leaker, based on the probability of leak correlation.

4.5 NDE Uncertainties

The NDE uncertainties applied for the EOC-4a and EOC-4b voltage projections are described in Reference 1. The probe wear uncertainty has a standard deviation of 7% about a mean of zero and has a cut-off at 15% based on implementation of the probe wear standard. The analyst variability uncertainty has a standard deviation of 10.3% about a mean of zero with no cut-off. These NDE uncertainty distributions are used in the Monte Carlo analysis to predict the burst probabilities and accident leak rates at EOC-4a and EOC-4b.

5 SLB ANALYSIS METHODS

A Monte Carlo analysis technique is used to calculate the SLB leak rates and tube burst probabilities for both actual BOC-4a and projected EOC-4b voltage distributions. The Monte Carlo analysis accounts for parameter uncertainty. The analysis methodology is described in the Westinghouse generic methods report of Reference 4 as supplemented by References 5 and 6. The Monte Carlo computer program used to implement this method is documented in Reference 9.

In general, the methodology involves application of correlations for burst pressure, probability of leakage and leak rate to a measured or calculated EOC voltage distribution to estimate the likelihood of tube burst and primary-to-secondary leakage during a postulated SLB event. Uncertainties associated with burst pressure, leak rate probability and leak rate correlation parameters are explicitly included by sampling distributions for the parameter uncertainties through the Monte Carlo sampling process. NDE uncertainties are also included. The voltage distributions used in the leak and burst projections for the next operating cycle are obtained by applying growth data to the BOC distribution.

6 BOBBIN VOLTAGE DISTRIBUTIONS

This section describes the input data used to calculate EOC bobbin voltage distributions and presents results of calculations to project EOC-4b voltage distributions. The cycle length used to project the EOC condition at the next planned outage for the operational assessment is 155 days.

6.1 Calculation of Voltage Distributions

An initial voltage distribution for BOC-4b is determined based on the EOC-4a voltage distribution and the POD. The BOC-4b voltage distribution is projected to the end-of-cycle conditions based on the growth rate and the anticipated cycle operating duration. The POD applied was specifically developed for Watts Bar Unit 2 for use in GL 95-05 calculations for Cycle 4 and is discussed in greater detail in Section 6.2. The calculation of projected bobbin voltage frequency distribution is based on a net total number of indications returned to service, defined as follows.

$$N_{Tot_{RTS}} = \frac{N_i}{POD} - N_{Repaired} + N_{Deplugged}$$

where,

Variable	Description
$N_{Tot_{RTS}}$	Number of bobbin indications being returned to service for the next cycle
N_i	Number of bobbin indications (in tubes in service) identified by inspection after the previous cycle
POD	Probability of detection,
$N_{Repaired}$	Number of N_i which are repaired (plugged) after the last cycle
$N_{Deplugged}$	Number of indications in tubes deplugged after the last cycle and returned to service in accordance with voltage-based repair criteria

There are no deplugged tubes returned to service at the beginning of Cycle 4b (BOC-4b); therefore, $N_{Deplugged} = 0$. Several tubes were plugged due to DSI exceeding the upper repair limit, RPC confirmed above the lower repair limit, or for other degradation mechanisms. During the Monte Carlo simulations, voltages for bins with several indications are selected by randomly sampling the voltage bins.

The methodology used in the projection of EOC-4b bobbin voltage frequency distributions is described in Reference 3.

6.2 Probability of Detection (POD)

The Generic Letter 95-05 (Reference 1) requires the application of a constant POD value of 0.6 to define the BOC distribution for EOC voltage projections unless an alternate POD is approved by the NRC. A POD value of 1.0 represents the ideal situation where all indications are detected. Reference 10 provides the technical basis for the use of an alternate POD at Watts Bar Unit 2 for Cycle 4b GL 95-05 ARC calculations. The POD is a step function where the default value of 0.6 is used up to an indication size of 3.2V at which point the POD increases to 0.9. A POD of 0.9 is maintained up to an indication size of 6.0V, at which point the POD increases

to 0.95. The POD is developed based on the inspection technique implemented at WBN F214 as well as WB2 plant-specific noise as documented in Reference 12. The POD is applied to all four SGs for determination of BOC-4b flaw distributions. NRC approval of the alternate POD is documented in Reference 12.

6.3 Limiting Growth Rate Distribution

As discussed in Section 3.2, the NRC guidelines in Generic Letter 95-05 stipulate that the more conservative growth rate distributions from the past two inspections should be utilized for projecting EOC distributions for the next cycle. Since WBN F214 is the second application of GL 95-05 at Watts Bar Unit 2 the DSI growth rate of U2R2 to U2R3 is compared to the DSI growth rate of U2R3 to EOC-4a.

The Cycle 4a growth distributions were determined utilizing bobbin lookbacks of U2R3 eddy current testing (ECT) data to develop meaningful growth distributions. Growth distributions were determined for each individual SG and can be seen in Figure 6-1, Figure 6-2, Figure 6-3, and Figure 6-4. Performing the lookbacks and creating distributions for each SG provides a more comprehensive and accurate look at the voltage growth that has occurred over the past cycle. For conservatism, the bounding growth curve from Figure 3-9 and Figure 3-10 (U2R3 SG-3) was used as input for the operational assessment performed individually for each SG. Growth distributions used in the Monte Carlo calculations are specified in the form of a histogram, so no interpolation is performed between growth bins. This assures that the largest growth value in the distribution is utilized in the Monte Carlo simulations.

As discussed in Section 3.2, the limiting growth distribution from Cycle 3 was adjusted to account for the operating conditions during Cycle 4b which is conservatively assumed to be at a minimum reduced hot leg temperature of three degrees. The modified voltage growth distribution is shown in Table 3-17 and Figure 3-9.

6.4 Cycle Operating Period

The operating periods used in the growth rate/EFPY calculations and voltage projections are as follows.

Cycle 3	-	496.3 EFPD (actual)
Partial Cycle 4a	-	302 EFPD (actual)
Partial Cycle 4b	-	155 EFPD* (assumed)

Note: * The cycle length of 155 days which is selected for the OA is the number of calendar days from the time the plant ascended to Mode 4 following WBN F214 (September 29, 2021) to the planned SG replacement outage on March 3, 2022. Based on the OA projection results in this analysis, additional margin is available beyond 155 days and can be further refined to by adjusting the conservative operating temperature assumption to the actual Cycle 4b operating temperature. The OA duration is measured in calendar days since WB2 is operating at less than 100% power during Cycle 4b. The use of EFPD in tube integrity calculations is intended to account for startups, cooldowns and downpowers; it is not intended for use in extension of the cycle length due to operating at a lower power. Therefore, although the typically reported value is EFPD, in this circumstance that value should be considered to be calendar days of operation without adjustment for operating power levels.

6.5 Projected EOC-4b Voltage Distribution

Calculations for the EOC-4b bobbin voltage projections were performed for all four SGs based on the WBN F214 distributions shown in Table 6-1. The BOC-4b distributions were adjusted to account for probability of detection as described above, and the adjusted number of indications at BOC-4b is also shown in Table 6-1. Calculations were performed using the alternate POD described in Section 6.2 and 1,000,000 Monte Carlo trials. The distribution of indications at BOC-4b and the distribution of indications projected at EOC-4b are shown in Figure 6-1, Figure 6-2, Figure 6-3, and Figure 6-4 for SG-1, SG-2, SG-3 and SG-4, respectively. SG-3 has the largest number of indications at BOC-4b. For clarity, fractional EOC indication predictions below 1.0 are not shown in Figure 6-1, Figure 6-2, Figure 6-3, and Figure 6-4. Therefore, higher voltage bins are not displayed in these figures. The maximum voltage where a fractional number of indications are projected at EOC-4b is displayed in Table 7-2 for each SG. Fractional values are considered in the determination of probability of burst and leak rates for the OA calculation.

Table 6-1: Projected Voltage Distribution

Volt Bins	SG-1 Number of Indications			SG-2 Number of Indications			SG-3 Number of Indications			SG-4 Number of Indications		
	Measured	Input	Predicted	Measured	Input	Predicted	Measured	Input	Predicted	Measured	Input	Predicted
	EOC-4a	BOC-4b	EOC-4b	EOC-4a	BOC-4b	EOC-4b	EOC-4a	BOC-4b	EOC-4b	EOC-4a	BOC-4b	EOC-4b
0.1	0	0	0.02	1	1.67	0.53	2	2.33	0.71	1	1.67	0.53
0.2	5	8.33	2.58	6	10	3.76	2	3.33	1.88	8	13.33	4.73
0.3	8	13.33	7.31	20	33.33	14.12	14	22.33	8.67	20	33.33	14.48
0.4	32	53.33	21.93	45	74	35.26	30	48	23.12	29	45.33	27.21
0.5	42	69	38.74	69	114	61.52	56	87.33	45.64	52	84.67	45.47
0.6	37	61.67	49.69	61	97.67	78.13	70	110.67	68.1	52	82.67	58.67
0.7	45	71	55.63	60	99	85.26	67	103.67	81.07	41	60.33	60.11
0.8	38	62.33	56.77	59	97.33	83.93	58	84.67	82.7	21	32	55.07
0.9	29	47.33	52.58	30	50	73.58	44	68.33	77.05	44	69.33	50.47
1	22	33.67	44.06	20	32.33	58.18	42	66	66.56	19	29.67	43.85
1.1	12	15	34.24	21	20	43.46	29	22.33	52.93	18	17	34.71
1.2	11	11.33	25.58	11	13.33	32.42	21	19	39.82	10	9.67	25.81
1.3	10	8.67	19.14	15	18	24.83	12	9	29.69	6	8	18.97
1.4	7	7.67	14.46	7	7.67	19.39	14	11.33	22.62	2	2.33	13.86
1.5	2	1.33	10.8	5	4.33	14.93	10	6.67	17.57	5	3.33	10.06
1.6	1	0.67	7.85	0	0	11.1	10	8.67	13.85	2	1.33	7.27
1.7	0	0	5.57	3	2	8	5	3.33	10.95	0	0	5.29
1.8	0	0	3.81	0	0	5.62	6	4	8.69	3	2	3.94
1.9	0	0	2.54	1	0.67	3.87	1	0.67	6.88	0	0	2.94
2	0	0	1.77	0	0	2.84	3	3	5.56	1	0.67	2.21
2.1	0	0	1.42	0	0	2.29	4	3.67	4.64	1	0.67	1.78
2.2	0	0	1.17	0	0	1.9	4	2.67	4.03	0	0	1.58
2.3	0	0	0.94	0	0	1.5	1	0.67	3.48	0	0	1.29
2.4	0	0	0.77	0	0	1.2	0	0	2.87	0	0	0.94
2.5	0	0	0.63	0	0	0.94	0	0	2.29	0	0	0.7
2.6	0	0	0.5	0	0	0.7	2	1.33	1.8	0	0	0.56
2.7	1	0.67	0.39	0	0	0.53	0	0	1.39	0	0	0.44
2.8	0	0	0.32	1	0.67	0.48	0	0	1.08	0	0	0.34
2.9	0	0	0.33	1	0.67	0.51	1	0.67	0.89	0	0	0.31
3	0	0	0.32	0	0	0.54	0	0	0.79	0	0	0.33
3.1	0	0	0.31	0	0	0.54	0	0	0.73	0	0	0.32
3.2	0	0	0.36	0	0	0.58	0	0	0.67	0	0	0.3
3.3	0	0	0.35	0	0	0.57	0	0	0.64	0	0	0.34

Table 6-1: Projected Voltage Distribution

Volt Bins	SG-1 Number of Indications			SG-2 Number of Indications			SG-3 Number of Indications			SG-4 Number of Indications		
	Measured	Input	Predicted	Measured	Input	Predicted	Measured	Input	Predicted	Measured	Input	Predicted
	EOC-4a	BOC-4b	EOC-4b	EOC-4a	BOC-4b	EOC-4b	EOC-4a	BOC-4b	EOC-4b	EOC-4a	BOC-4b	EOC-4b
3.4	0	0	0.31	0	0	0.48	0	0	0.59	0	0	0.33
3.5	0	0	0.27	0	0	0.41	0	0	0.5	0	0	0.26
3.6	0	0	0.24	0	0	0.37	0	0	0.41	0	0	0.24
3.7	0	0	0.23	0	0	0.36	0	0	0.38	1	0.11	0.25
3.8	0	0	0.26	0	0	0.38	0	0	0.39	0	0	0.27
3.9	0	0	0.13	0	0	0.36	0	0	0.4	0	0	0.19
4	0	0	0	0	0	0.27	0	0	0.37	0	0	0
4.1	0	0	0.7	0	0	0	0	0	0.31	0	0	0.7
4.2	0	0	0	0	0	0.7	0	0	0.08	0	0	0
4.3	0	0	0	0	0	0	0	0	0	0	0	0
4.4	0	0	0.3	0	0	0	1	0.11	0.7	0	0	0.3
4.5	0	0	0	0	0	0.3	0	0	0	0	0	0
4.6	0	0	0	0	0	0	0	0	0	0	0	0
4.7	0	0	0	0	0	0	0	0	0.3	0	0	0
4.8	0	0	0	0	0	0	0	0	0	0	0	0
4.9	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
Total	302	465	465	436	677	677	509	694	694	336	497	497

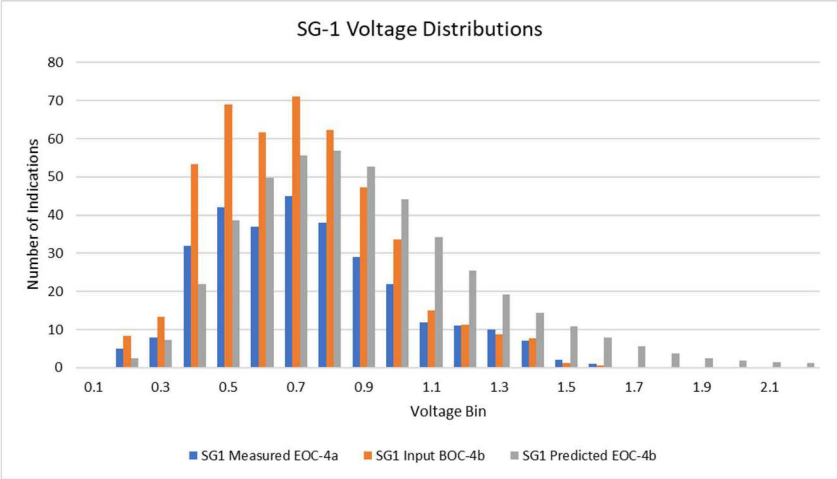

Figure 6-1 SG-1 Voltage Distributions

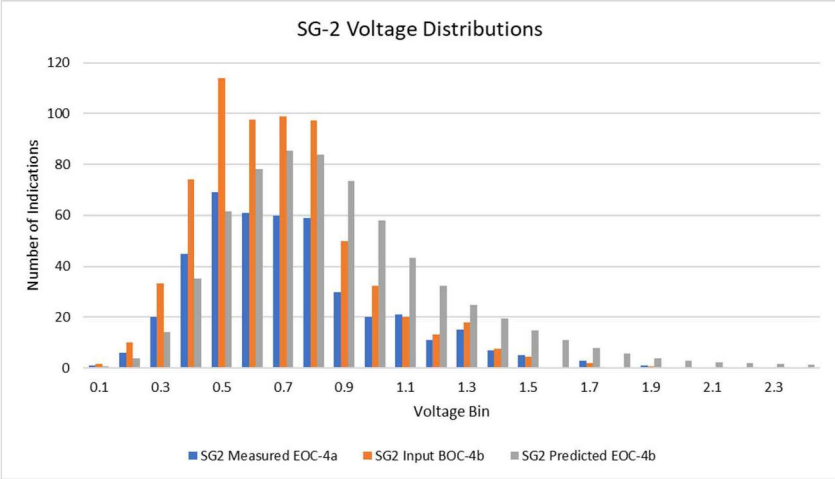

Figure 6-2 SG-2 Voltage Distributions

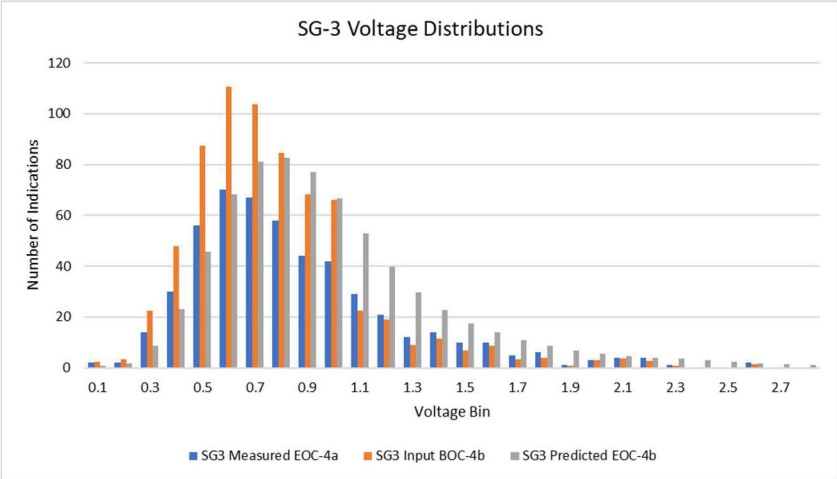

Figure 6-3 SG-3 Voltage Distributions

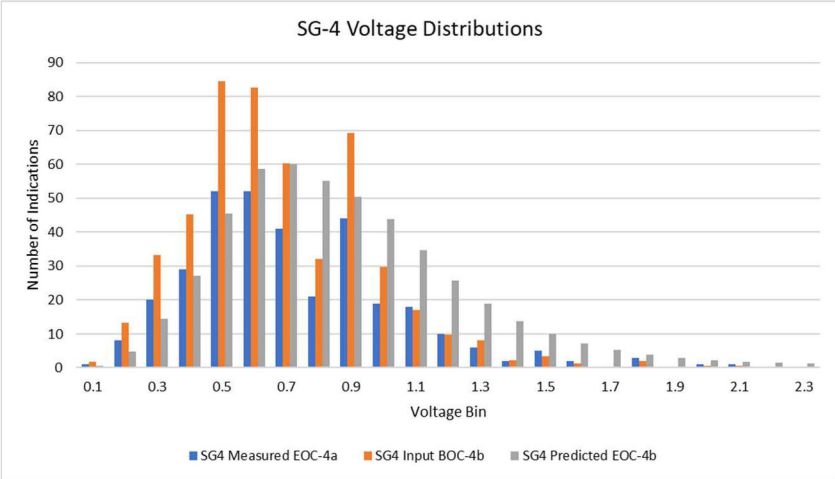

Figure 6-4 SG-4 Voltage Distributions

7 SLB LEAK RATE AND TUBE BURST PROBABILITY ANALYSES

This section presents the results of the analyses carried out to predict leak rates and tube burst probabilities at the postulated SLB conditions using the actual voltage distributions from the EOC-4a inspection (condition monitoring assessment) as well as for the projected EOC-4b voltage distributions (operational assessment). The methodology used in these analyses is described in Section 6.

7.1 EOC-4a Condition Monitoring Leak Rate and Tube Burst Probability

Analyses to calculate the EOC-4a SLB leak rates and tube burst probabilities were performed using the actual bobbin voltage distributions presented in Table 3-3, Table 3-4, Table 3-5, and Table 3-6. The results of the Monte Carlo calculations are summarized in Table 7-1. As a result, the OA produces conservative results for leak rate and burst probability by the end of the next operating cycle.

The SLB leak rates and tube burst probabilities, calculated using the actual measured EOC-4a voltage distributions using 1,000,000 Monte Carlo trials, are shown in Table 7-1. The methodology used for these calculations is documented in WCAP-14277, Revision 1 (Reference 3). The probability of leak, leak rate, and burst pressure correlations for 3/4-inch tubes presented in the latest addendum to the Electric Power Research Institute (EPRI) Alternate Repair Criteria (ARC) Database, Reference 4, were used. The SLB primary-to-secondary pressure differential applied in the analysis is 2405 psi (Reference 13). The leak rate and conditional burst probability acceptance criteria are met for all SGs.

7.2 EOC-4b Operational Assessment Leak Rate and Tube Burst Probability

The SLB leak rate and tube burst probability projections for the Cycle 4 Operational Assessment were performed using the latest update to the ARC database documented in Reference 4, the NRC approved alternate POD described in Section 6.2, and 1,000,000 Monte Carlo trials. The EOC-4b leak and burst analyses were performed using a primary-to-secondary pressure differential of 2405 psi, which credits PORV actuation prior to the pressurizer safety relief valve lift setting (Reference 13).

The EOC-4b projections considering a 155-calendar day operation cycle and using the alternate POD discussed in Section 6.2 are displayed in Table 7-2. Both the maximum projected EOC-4b leak rate of 0.152 gpm and the maximum conditional burst probability of 2.50×10^{-3} are below the allowable limits (3.0 gpm and 1.0×10^{-2}, respectively). Therefore, the operational assessment performance criteria for the EOC-4a flaw distribution are satisfied for 155 calendar days of operation until EOC-4b.

Table 7-1: Condition Monitoring Leak and Burst Results for EOC-4a							
SG	Number of Indications	Maximum Voltage	SLB Leak Rate		Conditional Burst Probability		GL 95-05 Criteria Met
			SLB Leak Rate (gpm)	SLB Leak Rate Criteria (gpm)	Conditional Probability of Burst	Conditional Probability of Burst Criteria	
1	302	2.6	1.03×10^{-2}	3.0 GPM maximum	1.21×10^{-4}	1.0×10^{-2} maximum	Yes
2	436	2.9	2.10×10^{-2}		2.25×10^{-4}		Yes
3	509	4.3	7.92×10^{-2}		1.20×10^{-3}		Yes
4	336	3.7	3.03×10^{-2}		3.61×10^{-4}		Yes

Table 7-2: Operational Assessment Leak and Burst Results for EOC-4b							
SG	Number of Indications at 155 Days	Maximum Voltage at 300 Days	SLB Leak Rate		Conditional Burst Probability		GL 95-05 Criteria Met for 155 days
			SLB Leak Rate (gpm)	SLB Leak Rate Criteria (gpm)	Conditional Probability of Burst	Conditional Probability of Burst Criteria	
1	465	4.4	8.00×10^{-2}	3.0 GPM maximum	1.14×10^{-3}	1.0×10^{-2} maximum	Yes
2	677	4.5	1.11×10^{-1}		1.62×10^{-3}		Yes
3	693	4.7	1.52×10^{-1}		2.50×10^{-3}		Yes
4	497	4.4	8.33×10^{-2}		1.17×10^{-3}		Yes

8 REFERENCES

1. NRC Generic Letter 95-05, "Voltage-Based Repair Criteria for Westinghouse Steam Generator Tubes Affected by Outside Diameter Stress Corrosion Cracking," USNRC Office of Nuclear Reactor Regulation, August 3, 1995.

2. *Steam Generator Management Program: Steam Generator Degradation Specific Management Flaw Handbook, Revision 2.* EPRI, Palo Alto, CA: 2015. 3002005426.

3. Westinghouse Report WCAP-14277, Revision 1, "SLB Leak Rate and Tube Burst Probability Analysis Methods for ODSCC at TSP Intersections," Westinghouse Nuclear Services Division, December 1996.

4. EPRI Report 1018047, Addendum 7 to NP-7480-L Database, "Steam Generator Tubing Outside Diameter Stress Corrosion Cracking at Tube Support Plates Database for Alternate Repair Limits," September 2008.

5. Letter from A. Marion, Nuclear Energy Research Institute, to B. Sheron, Nuclear Regulatory Commission, "Refining the Leak Rate Sampling Methodology for ODSCC ARC Applications (Generic Letter 95-05)," March 15, 2002.

6. Letter from W. Bateman, Nuclear Regulatory Commission, to A. Marion, Nuclear Energy Research Institute, "Refining the Leak Rate Sampling Methodology for Generic Letter 95-05 Voltage-Based Alternate Repair Criteria Application," March 27, 2002.

7. Westinghouse Letter Report WAT-D-10709, Revision 0, "Application of Implementation of Voltage Based Repair Criteria Westinghouse Steam Generator Tubes Affected by ODSCC at TSPs," January 2000.

8. Letter from B.W. Sheron, Nuclear Regulatory Commission, to A. Marion, Nuclear Energy Research Institute, February 9, 1996.

9. Westinghouse Letter LTR-CDME-08-167, Revision 0, "Software Release Letter for CycleSim Version 3.2," July 2008.

10. Westinghouse Letter LTR-CDMP-20-41, Revision 0, "Watts Bar U2R3 Steam Generator Alternate Repair Criteria Generic Letter 95-05 Probability of Detection Methodology for 90-Day Report," December 2020.

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12. USNRC Report, "Watts Bar Nuclear Plant, Unit 2 – Issuance of Amendment No. 48 Regarding Use of Alternate Probability of Detection Values for Beginning of Cycle in Support of Operational Assessment (EPID L-2020-LLA-0273), February 2021. (ADAMS Accession No. ML21027A167)

13. Email from Jeremy Mayo (TVA) to Brad Carpenter (WEC), "Subject: GL 95-05 PORV Setpoint," November 9, 2020, 6:40:02 PM. (Attached in Prime)

14. USNRC Letter, “Watts Bar Nuclear Plant, Unit 2 – Issuance of Amendment No. 54 Regarding Use of Temperature Adjustment to Voltage Growth Rate for the Generic Letter 95-05 Steam Generator Tube Repair Criteria (EPID L-2021-LLA-0026),” June 24, 2021. (ADAMS Accession No. ML21161A239)

15. TVA License Amendment Request CNL-21-011, “ Expedited Application for Approval to Use a Growth Rate Temperature Adjustment When Implementing the Generic Letter 95-05 Analysis for the Watts Bar Nuclear Plant (WBN), Unit 2 Steam Generators (WBN TS-391-21-002), February 25, 2021. (ADAMS Accession No. ML21056A623)

16. Westinghouse Document, SG-CDMP-21-1, Revision 1, “Watts Bar Unit 2 Refueling Outage 3 Generic Letter 95-05 Voltage-Based Alternate Repair Criteria Final Report,” June 2021.

17. Westinghouse Letter LTR-CDMP-21-48, Revision 0, “Watts Bar Unit 2 Cycle 4 Mid-Cycle Outage Steam Generator Alternate Repair Criteria Generic Letter 95-05 Return to Power Report,” September 2021.

18. Westinghouse Document, SG-CDMP-21-15, Revision 0, “Watts Bar Unit 2 Cycle 4a Mid-Cycle Outage F214 Steam Generator Degradation Assessment,” September 2021.

APPENDIX A

Table A-1 SG-1 WBN F214 DSI Indications

SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
1	1	5	1.43	H03	SAI(1)		X
1	1	6	1.29	H03	SAI(1)		X
1	2	6	0.43	H06			
1	2	10	0.67	H03			
1	2	17	0.31	H05			
1	2	19	0.38	H04			
1	2	25	0.42	H03		NDF	
1	2	26	0.53	H04			
1	2	34	0.65	H04			
1	2	38	0.72	H04		NDF	
1	2	44	0.48	H03			
1	2	64	0.69	H04			
1	3	20	0.38	H06			
1	3	61	0.92	H02			
1	3	95	0.6	H04			
1	3	112	0.43	H03			
1	4	14	0.73	H04	SAI		
1	4	21	0.46	H03			
1	4	21	0.84	H04		NDF	
1	4	23	0.61	H05			
1	4	24	0.68	H04		NDF	
1	4	25	0.76	H04		NDF	
1	4	25	0.55	H05			
1	4	27	0.63	H03			
1	4	27	0.79	H04			
1	4	29	0.58	H04			
1	4	30	0.79	H04		NDF	
1	4	30	0.81	H05		NDF	
1	4	32	0.96	H04		NDF	
1	4	35	0.83	H04		NDF	
1	4	37	0.63	H04			
1	4	37	0.5	H05			
1	4	40	0.4	H07			
1	4	41	0.76	H04		NDF	
1	4	41	0.8	H05		NDF	
1	4	42	1.27	H04		NDF	
1	4	43	0.88	H04		NDF	
1	4	43	0.85	H05		NDF	
1	4	43	0.88	H06			
1	4	46	0.5	H02			
1	4	47	0.63	H05			
1	4	48	1.03	H04		NDF	
1	4	49	0.69	H02			
1	4	49	1.29	H04		NDF	
1	4	49	0.75	H05			
1	4	49	0.81	H06		NDF	
1	4	50	0.96	H02	SAI		
1	4	50	1.13	H04		NDF	
1	4	51	1.09	H04		NDF	
1	4	53	0.85	H04			

Table A-1 SG-1 WBN F214 DSI Indications

SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
1	4	75	1.2	H04		NDF	
1	4	83	0.9	H05		NDF	
1	4	85	0.7	H05			
1	4	87	0.9	H04			
1	4	87	0.7	H05			
1	4	89	0.9	H04		NDF	
1	4	91	1	H03			
1	4	91	0.7	H04			
1	4	92	0.8	H04			
1	4	95	0.6	H05			
1	4	96	0.5	H05			
1	4	107	1.1	H04		NDF	
1	4	113	0.7	H06			
1	5	1	0.8	H03	MAI		X
1	5	3	0.5	H06			
1	5	4	0.9	H04			
1	5	5	0.9	H04			
1	5	7	0.6	H06			
1	5	8	1.3	H04	SAI		X
1	5	10	1.1	H03	SAI(1)		X
1	5	10	0.9	H06			X
1	5	12	0.6	H02			
1	5	12	0.9	H03	SAI(1)		
1	5	15	0.9	H04			
1	5	17	0.3	H04			
1	5	26	0.3	H06			
1	5	43	0.9	H04		NDF	
1	5	47	1	H04		NDF	
1	5	48	1.4	H04		NDF	
1	5	49	0.5	H05			
1	6	10	0.4	H06			
1	6	13	0.8	H04			
1	6	18	0.6	H02			
1	6	19	1.4	H02		NDF	
1	6	19	0.9	H03			
1	6	38	0.9	H02	MAI		
1	6	38	0.6	H03	SAI		
1	6	63	0.3	H05			
1	6	66	0.8	H04		NDF	
1	6	89	0.8	H02			
1	6	99	1.5	H02	SAI		X
1	6	101	0.8	H02			
1	6	102	1.2	H02	SAI		X
1	6	103	1.1	H02		NDF	
1	6	106	2.6	H02	SAI		X
1	6	107	1.3	H02		NDF	
1	6	109	0.6	H05			
1	7	4	0.2	H02	SAI		
1	7	11	1.1	H04	SAI(1)		X
1	7	12	1.1	H04	SAI(1)		X

Note - (1) One additional duplicate DSI indicaiton at this location
(2) Two additional duplicate DSI indications at this location

Table A-1 SG-1 WBN F214 DSI Indications

SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
1	7	18	0.77	H02	SAI		
1	7	20	0.36	H06			
1	7	30	0.46	H05			
1	7	43	1.14	H04		NDF	
1	7	46	0.51	H05			
1	7	104	1.36	H02	MAI		X
1	7	105	0.6	H02			
1	8	24	0.98	H03		NDF	
1	8	44	0.42	H02	SAI		
1	8	49	0.86	H04			
1	8	67	0.45	H03			
1	8	89	0.65	H02			
1	8	100	0.46	H02			
1	9	16	0.99	H04			
1	9	20	0.42	H06			
1	9	26	0.54	H03		NDF	
1	9	32	0.57	H03			
1	9	61	0.42	H05			
1	9	61	0.35	H06			
1	9	70	1.06	H04		NDF	
1	9	70	0.62	H06			
1	9	106	0.65	H05			
1	10	5	0.53	H04			
1	10	8	0.6	H06			
1	10	16	0.35	H06			
1	10	41	0.4	H03			
1	10	43	0.51	H04			
1	10	49	0.42	H02			
1	10	94	0.71	H02			
1	11	5	0.36	H05			
1	11	6	0.41	H04			
1	11	8	0.64	H04			
1	11	9	0.51	H06			
1	11	46	0.25	H07			
1	11	59	0.36	H03			
1	12	8	0.61	H04			
1	12	12	0.49	H02			X
1	12	12	0.84	H03			X
1	12	12	1.06	H04	SAI		X
1	12	12	0.69	H07			X
1	12	13	0.4	H05			
1	12	18	0.7	H03			
1	12	45	0.92	H02	SAI		
1	12	72	1.17	H02	SAI		X
1	12	87	0.59	H03			
1	12	111	1.39	H02	MAI		X
1	13	6	0.6	H06			
1	13	38	1.09	H04		NDF	
1	13	44	0.81	H02		NDF	
1	13	44	0.81	H03			

Table A-1 SG-1 WBN F214 DSI Indications

SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
1	13	44	0.8	H06			
1	13	85	0.8	H02			
1	13	94	0.4	H05			
1	13	99	0.9	H02			
1	14	3	0.6	H04			
1	14	22	0.4	H08			
1	14	44	1.1	H02	MAI		X
1	14	49	0.6	H03			
1	14	50	0.7	H03			
1	14	68	0.5	H03			
1	14	68	0.7	H05			
1	14	82	0.8	H02		NDF	
1	15	4	0.6	H06			
1	15	6	0.6	H05			
1	15	8	0.4	H03			
1	15	49	0.7	H03			
1	15	60	0.8	H03			
1	16	4	0.5	H04			
1	16	8	0.5	H05			
1	16	11	0.3	H07			
1	16	12	0.4	H06			
1	16	12	0.3	H07			
1	16	14	0.5	H02			
1	16	20	0.5	H03			
1	16	40	0.5	H03			
1	16	43	0.6	H02			
1	16	49	0.2	H03			
1	16	60	0.6	H03			
1	16	60	0.6	H04			
1	16	62	0.6	H05			
1	16	106	0.8	H05		NDF	
1	17	14	0.5	H04			
1	17	17	0.6	H03			
1	17	18	0.4	H02			
1	17	18	0.6	H05			
1	17	34	0.6	H03			
1	17	39	0.4	H04		NDF	
1	17	44	0.6	H04			
1	17	45	0.7	H02			
1	17	49	0.7	H02	SAI		
1	17	50	0.7	H03			
1	17	57	1.1	H02		NDF	
1	17	70	0.4	H07			
1	17	94	0.9	H02	SAI		
1	18	9	0.7	H03			
1	18	12	0.7	H04			
1	18	18	0.4	H03			
1	18	21	0.5	H05			
1	18	23	1	H03	SAI		
1	18	32	0.9	H02			

Note - (1) One additional duplicate DSI indicaiton at this location
(2) Two additional duplicate DSI indications at this location

Table A-1 SG-1 WBN F214 DSI Indications							
SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
1	18	42	1.34	H02	MAI		X
1	18	42	1.2	H03		NDF	X
1	18	46	0.32	H03			
1	18	64	0.34	H05			
1	19	15	0.59	H02			
1	19	40	0.46	H06			
1	19	42	1.15	H02	SAI		X
1	19	45	0.5	H03			
1	19	67	0.91	H03		NDF	
1	20	9	0.3	H03			
1	20	14	0.65	H03			
1	20	15	0.39	H05			
1	20	43	0.71	H02	SAI		
1	20	45	0.73	C09		NDF	
1	20	67	0.71	H05			
1	20	80	0.85	H03	SAI		
1	21	15	0.46	H02			
1	21	16	0.32	H06			
1	21	32	0.59	H05			
1	22	45	0.48	H05			
1	22	66	0.78	H05			
1	22	69	0.62	H05			
1	22	88	0.7	H03			
1	23	10	1.37	H02	SAI		X
1	23	51	0.92	H02			
1	23	51	0.15	H03	SAI		
1	24	9	0.39	H05			
1	24	11	0.51	H05			
1	24	15	0.73	H03			
1	24	27	0.67	H03			X
1	24	45	0.34	H06			
1	24	108	1.26	H03	SAI		X
1	25	14	0.17	H02	MAI		
1	25	14	0.94	H03	SAI		
1	25	67	0.92	H03			
1	26	34	0.81	H05			
1	26	40	0.62	H03	MAI		
1	26	41	0.65	H04			X
1	26	93	1.22	H02	SAI		X
1	26	105	0.18	H03			
1	27	9	0.38	H07			
1	27	18	0.65	H03		NDF	
1	27	87	0.74	H03			
1	28	14	0.14	H06			
1	28	15	0.36	H03			
1	28	16	0.35	H03			
1	28	16	0.23	H06			
1	28	34	0.98	H03	SAI		
1	29	22	0.64	H03	SAI		
1	29	26	1.02	H03	MAI		X

Table A-1 SG-1 WBN F214 DSI Indications							
SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
1	30	10	0.6	H03			
1	30	18	0.5	H03			
1	30	46	0.4	H03			
1	30	93	0.7	H02			
1	31	68	0.4	H03			
1	32	12	0.4	H05			
1	32	15	0.7	H03		NDF	
1	32	16	0.6	H03			
1	32	92	0.8	H03			
1	32	96	0.4	C14			
1	33	13	0.8	H05		NDF	
1	33	16	0.4	H02			
1	33	18	0.6	H03			
1	33	35	0.5	H03			
1	33	98	0.5	H03			
1	33	102	0.6	H03			
1	34	13	0.5	H02			
1	34	15	0.9	H03		NDF	
1	34	17	1	H03	SAI		
1	34	20	0.6	H03			
1	34	21	0.8	H03			
1	34	22	0.6	H03			X
1	34	96	0.7	H02			
1	36	29	0.6	H02	SAI		
1	37	46	1.1	H03	SAI		X
1	38	21	0.5	H05			
1	38	25	0.5	C10		NDF	
1	39	41	0.3	H02	SAI		
1	40	23	1.2	H03	SAI		X
1	40	29	0.9	H02			
1	40	67	0.5	H03			
1	40	67	0.4	H04			
1	40	73	0.7	H03			
1	41	30	0.6	H03			
1	41	34	1.5	H03	MAI		X
1	41	73	0.6	C14			
1	42	33	1.3	H02	SAI		X
1	42	33	1.3	H03	SAI		X
1	42	37	1	H02			
1	43	31	0.6	H03			
1	43	49	0.4	H04			
1	45	30	0.5	H03			
1	46	28	1.2	H02	SAI		X
1	46	38	1	H03	SAI		X
1	46	76	0.7	H03			
1	47	74	0.7	H02			
1	48	50	0.7	H02			
1	48	66	0.6	H03			
1	49	36	0.5	H03			
1	49	40	1	H02	SAI		X
1	49	42	0.8	H03			

FOLLOWING INDICATION IS ADDI							
1	1	4	1	H03	SAI		X

Note - (1) One additional duplicate DSI indicaiton at this location
(2) Two additional duplicate DSI indications at this location

Table A-2 SG-2 WBN F214 DSI Indications

SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
2	1	9	0.73	H03			
2	1	13	0.95	H02			
2	1	14	1.26	H03	SAI		X
2	1	16	1.42	H03	SAI		X
2	1	31	0.53	H06			
2	1	53	0.99	H03			
2	1	55	0.37	H03			
2	1	57	0.91	H03			
2	1	59	0.39	H03			
2	1	79	0.55	H06			
2	2	8	1.69	H03	SAI		X
2	2	24	0.49	H03			
2	2	26	0.88	H03			
2	2	43	1.06	H03	SAI		X
2	2	47	2.86	H02	SAI		X
2	3	8	0.46	H03			
2	3	9	0.39	H03			
2	3	23	0.94	H03			
2	3	54	1.09	H03		NDF	
2	3	55	0.76	H03		NDF	
2	3	57	0.77	H02		NDF	
2	3	60	0.79	H02			
2	3	61	0.73	H02			
2	3	69	0.75	H02			
2	4	5	0.57	H02			
2	4	21	0.73	H03			
2	4	26	0.35	H03			
2	4	27	0.52	H03			
2	4	55	0.55	H03			
2	4	59	0.85	H02		NDF	
2	4	69	0.66	H02			
2	4	77	0.56	H06			
2	4	78	0.66	H06			
2	4	90	1.37	H02	SAI		X
2	4	92	0.72	H02		NDF	
2	5	14	0.45	H03			
2	5	14	0.56	H04			
2	5	16	0.47	H03			
2	5	20	0.23	H03			
2	5	40	0.23	H02			
2	5	45	0.45	H02			
2	5	50	1.17	H03	SAI(1)		X
2	5	63	0.48	H06			
2	5	67	0.61	H02			
2	5	67	0.52	H03			
2	5	69	0.54	H02			
2	5	69	0.57	H03		NDF	
2	5	88	1.12	H02		NDF	
2	5	89	1.04	H02		NDF	
2	5	94	0.71	H08		NDF	

Table A-2 SG-2 WBN F214 DSI Indications

SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
2	6	1	0.62	C14		NDF	
2	6	4	0.71	H05			
2	6	10	0.68	H05			
2	6	12	0.47	H05			
2	6	58	0.69	H03			
2	6	58	0.84	H04		NDF	
2	6	89	0.5	H02			
2	6	91	1.86	H02	SAI		X
2	7	4	0.26	H05			
2	7	9	0.36	H05			
2	7	11	0.48	H05			
2	7	14	0.36	H08			
2	7	20	0.47	H02			
2	7	23	0.73	H03			
2	7	32	0.26	H02		NDF	
2	7	32	0.44	H06			
2	7	34	0.42	H03			
2	7	48	0.59	H03			
2	7	51	0.25	H08			
2	7	57	0.48	H04			
2	7	62	0.37	H07			
2	7	64	0.61	H03			
2	7	70	0.36	H02			
2	7	73	0.73	H03		NDF	
2	7	76	0.47	H03			
2	7	76	0.74	H06			
2	7	77	0.69	H02		NDF	
2	7	77	0.44	H06			
2	7	88	0.48	H03		NDF	
2	7	89	0.49	H03			
2	7	90	0.49	H02			
2	7	91	0.86	H02			
2	7	91	1.21	H03		NDF	
2	7	92	0.83	H02		NDF	
2	7	93	0.75	H02	SAI		X
2	7	98	0.41	H03			
2	7	99	0.91	H02		NDF	
2	7	102	0.7	H02	SAI		
2	7	102	0.47	H07			
2	8	38	0.37	H04			
2	8	57	0.63	H05			
2	8	61	0.63	H05			
2	8	102	1.13	H02		NDF	
2	8	103	0.72	H02			
2	8	105	0.74	H02			
2	9	2	0.86	H03			
2	9	2	0.55	H05			
2	9	11	0.64	H02			
2	9	23	0.86	H02		NDF	
2	9	47	0.7	H02	SAI		

Note - (1) One additional duplicate DSI indicaiton at this location
(2) Two additional duplicate DSI indications at this location

Table A-2 SG-2 WBN F214 DSI Indications

SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
2	9	48	0.78	H03		NDF	
2	9	50	0.51	H05			
2	9	52	0.4	H04		NDF	
2	9	52	0.38	H05			
2	9	66	0.76	H03			
2	9	75	0.62	H03			
2	9	80	0.53	H05			
2	9	91	0.3	H05			
2	9	104	0.21	H02		NDF	
2	9	106	0.29	H08			
2	10	3	1.38	H03	MAI		X
2	10	10	0.48	H05			
2	10	16	0.58	H03			
2	10	24	0.2	H03			
2	10	30	0.7	H04			
2	10	39	0.97	H03			
2	10	47	0.98	H03			
2	10	58	0.51	H02			
2	10	58	0.48	H04			
2	10	61	0.88	H04			
2	10	112	0.72	H02	SAI		
2	11	7	0.61	H04			
2	11	9	0.78	H04			
2	11	9	0.93	H05			
2	11	9	0.34	H06			
2	11	10	0.6	H05			
2	11	11	0.65	H05			
2	11	16	0.64	H04			
2	11	18	0.45	H03			
2	11	21	1.34	H02		NDF	
2	11	22	0.99	H03			
2	11	43	0.81	H02			
2	11	45	0.83	H03	MAI		
2	11	49	1.12	H03		NDF	
2	11	57	1.24	H02		NDF	
2	11	77	0.61	H02			
2	11	87	0.88	H03	SAI		
2	11	111	1.03	H02	SAI		X
2	11	111	0.59	H03		NDF	X
2	11	112	1.24	H02		NDF	
2	11	112	0.84	H03		NDF	
2	11	113	0.88	H03		NDF	
2	12	12	0.71	H05			
2	12	21	0.66	H02			
2	12	26	0.69	H02			
2	12	36	0.43	H03			
2	12	38	0.63	H03			
2	12	38	0.42	C08		NDF	
2	12	50	0.54	H02			
2	12	50	0.37	H04		NDF	

Table A-2 SG-2 WBN F214 DSI Indications

SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
2	13	10	0.27	H05			
2	13	25	0.7	H04			
2	14	9	0.47	H05			
2	14	11	0.45	H05			
2	14	14	0.36	H07			
2	14	19	0.67	H03	SAI		
2	14	25	0.58	H03			
2	14	27	0.8	H02		NDF	
2	14	27	1.12	H04		NDF	
2	14	27	0.69	H06			
2	14	36	0.92	H02		NDF	
2	14	44	0.6	H03			
2	14	52	1.18	H03		NDF	
2	14	53	1.29	H03	SAI		X
2	14	87	0.5	H02			
2	15	13	1.22	H02	SAI		X
2	15	24	0.54	H03			
2	15	24	0.44	H05			
2	15	31	0.51	H03			
2	15	35	0.68	H03			
2	15	35	0.61	H05			
2	15	57	0.75	H02			
2	15	108	0.88	H03		NDF	
2	15	111	0.71	H02			
2	15	111	0.6	H03			
2	16	5	0.48	H03			
2	16	9	0.79	H05		NDF	
2	16	10	0.55	H05			
2	16	12	0.65	H05			
2	16	21	0.29	H05			
2	16	22	0.58	H05			
2	16	33	0.48	H02			
2	16	38	0.73	H03			
2	16	39	0.57	H05			
2	16	41	0.44	H03			
2	16	42	1.21	H05		NDF	
2	16	43	0.83	H03			
2	16	44	0.69	H03	SAI		
2	16	44	0.97	H04			
2	16	44	0.43	H05			
2	16	44	0.5	H06			
2	16	46	1.04	H06		NDF	
2	16	54	0.53	H05			
2	16	65	0.62	H03			
2	16	69	1.39	H02	SAI		X
2	16	71	0.44	H08			
2	16	90	0.64	H02			
2	16	94	0.46	H02			
2	16	97	0.49	H05		NDF	
2	16	98	0.76	H03		NDF	

Note - (1) One additional duplicate DSI indicaiton at this location
(2) Two additional duplicate DSI indications at this location

Table A-2 SG-2 WBN F214 DSI Indications

SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
2	16	101	0.77	H03		NDF	
2	17	11	0.33	H02			
2	17	14	0.7	H02			
2	17	14	0.41	H03			
2	17	14	0.51	H04			
2	17	16	0.36	H03			
2	17	16	0.85	H04			
2	17	16	0.39	H05			
2	17	20	0.58	H04			
2	17	22	0.75	H02			
2	17	22	0.5	H03			
2	17	22	0.51	H04			
2	17	23	0.71	H03			
2	17	88	0.71	H02	MAI		
2	17	88	0.48	H05			
2	17	89	1.28	H02		NDF	
2	17	89	1.4	H03		NDF	
2	17	91	0.98	H02		NDF	
2	17	92	0.6	H02	SAI		
2	17	92	0.29	H03			
2	17	101	1.24	H02		NDF	
2	17	111	0.95	H02		NDF	
2	18	28	0.34	H06			
2	18	38	0.39	H07			
2	18	45	0.45	H08			
2	18	48	0.52	H04			
2	18	57	0.66	H02			
2	18	103	0.8	H03			
2	19	12	0.34	H06			
2	19	14	0.77	H05			
2	19	18	0.31	H06			
2	19	33	0.5	H03			
2	19	60	0.35	H06			
2	19	61	1.07	H04		NDF	
2	19	63	0.67	H03			
2	19	64	1.07	H02		NDF	
2	19	64	0.38	H03			
2	19	66	1.03	H04		NDF	
2	19	67	0.4	H02	SAI		
2	19	67	1.21	H05		NDF	
2	19	99	1.16	H03	SAI		X
2	19	105	0.81	H04		NDF	
2	19	106	0.42	H03			
2	19	107	0.72	H03	SAI		
2	19	108	0.24	H07			
2	20	31	0.63	H03			
2	20	35	0.43	H06			
2	20	36	0.31	H06			
2	20	38	0.33	H06			
2	20	38	0.56	H08			

Table A-2 SG-2 WBN F214 DSI Indications

SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
2	20	56	0.29	H02			
2	20	58	0.29	H05			
2	20	80	0.73	H02			
2	20	93	0.73	H03			
2	20	105	0.57	H03			
2	21	36	0.39	H06			
2	21	73	0.83	H02			
2	22	9	0.51	H05			
2	22	12	0.7	H05			
2	22	15	0.39	H02			
2	22	16	0.55	H04			
2	22	16	0.47	H05			
2	22	18	0.74	H02			
2	22	46	1.04	H04	SAI		X
2	22	61	0.35	H04			
2	22	81	0.62	H02			
2	22	93	0.73	H03	SAI		
2	22	108	0.67	H02			
2	23	12	1.63	H02	SAI		X
2	23	20	0.35	H02			
2	23	30	0.89	H03			
2	23	82	0.62	H03			
2	23	84	0.6	H03			
2	23	95	0.4	H03			
2	23	100	0.44	H03			
2	23	109	0.64	H03			
2	24	18	0.48	H05			
2	24	49	0.64	H02			
2	24	63	0.55	H03			
2	24	89	0.25	H05			
2	24	99	1.23	H02	SAI		X
2	24	100	0.39	H03	MAI		
2	25	16	0.68	H04			
2	25	27	0.34	H03			
2	25	90	0.79	H03			
2	25	104	0.65	H03			
2	25	105	0.47	H05			
2	25	108	0.6	H02			X
2	25	108	1.04	H03	SAI		X
2	26	14	0.5	C13		NDF	
2	26	31	0.81	H02			
2	26	43	0.81	H02			
2	26	43	0.59	H04			
2	26	49	0.52	H04			
2	26	61	1.25	H02	SAI		X
2	26	65	1.33	H04		NDF	
2	26	102	0.33	H03			
2	27	34	0.54	H03	MAI		
2	27	39	0.66	H02			
2	27	48	0.41	H08			

Note - (1) One additional duplicate DSI indicaiton at this location
(2) Two additional duplicate DSI indications at this location

Table A-2 SG-2 WBN F214 DSI Indications

SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
2	27	80	0.41	H03			
2	28	11	0.31	H06			
2	28	23	0.17	H06			
2	28	29	1.08	H02	MAI		X
2	28	29	0.34	H03			X
2	28	52	0.18	H04			
2	28	62	0.75	H06			
2	28	64	0.86	H03			
2	28	65	0.53	H03			
2	28	75	0.77	H04		NDF	
2	28	99	0.68	H03			
2	29	19	0.37	H05			
2	29	69	0.43	H04	SAI		
2	29	77	1.06	H03	MAI		X
2	29	79	1	H04	SAI		
2	29	81	0.5	H01	SAI		X
2	29	91	0.55	H02			X
2	29	91	1.05	H03	SAI		X
2	29	94	0.8	H02		NDF	
2	29	94	0.44	H03			
2	29	94	0.62	H05			
2	30	31	0.56	H03			
2	30	34	0.48	H02			
2	30	63	0.43	H02	SAI		
2	30	66	1.26	H02		NDF	
2	30	81	0.97	H05			
2	30	99	0.47	H03			
2	31	14	0.46	H03			
2	31	14	0.99	H04			
2	31	34	0.37	H03			
2	31	56	0.27	H02			
2	31	59	0.17	H04			
2	31	61	0.46	H02			
2	31	62	0.57	H04			
2	31	65	0.77	H02		NDF	
2	31	65	0.41	H04			
2	31	72	2.8	H02	MAI		X
2	31	83	0.74	H02			
2	31	96	0.42	H03			
2	31	100	0.67	H03			
2	32	16	0.43	H03			
2	32	33	0.53	H03			
2	32	37	0.78	H03			
2	33	50	0.34	H03			
2	33	51	0.76	H02			
2	33	51	0.51	H03			
2	33	61	0.79	H03			
2	33	99	0.63	H02			
2	33	102	0.51	H03			
2	34	77	0.65	H02	SAI		

Table A-2 SG-2 WBN F214 DSI Indications

SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
2	34	90	0.78	H03		NDF	
2	35	36	0.45	H04			
2	36	57	0.19	H02	SAI		
2	36	61	1.33	H02	MAI		X
2	36	63	0.05	H03			
2	36	67	0.43	H08			
2	36	72	0.57	H02			
2	36	73	0.72	H04			
2	36	74	1.68	H02	SAI		X
2	36	99	0.97	H03			
2	37	74	0.71	H03			
2	37	76	0.63	H02			
2	38	51	0.75	H03			
2	38	51	0.63	H04			
2	38	55	0.71	H02	MAI		
2	38	65	0.34	H03			
2	38	76	1.05	H02	MAI		X
2	38	91	1.09	H02	SAI		X
2	39	50	0.57	H03			
2	39	62	1.42	H02	SAI		X
2	39	65	0.98	H02			
2	39	71	0.62	H02			
2	39	71	0.3	H03			
2	39	75	0.94	H02	SAI		
2	39	76	0.77	H02			
2	39	77	0.43	H04			
2	39	80	1.29	H02	MAI/SAI		X
2	39	80	0.61	H03			X
2	39	85	1.14	H04		NDF	
2	40	95	0.81	H02	MAI		
2	41	38	0.56	H06			
2	41	45	0.62	H03			
2	42	22	0.72	H02			
2	42	23	0.68	H02			
2	42	38	0.28	H03			
2	42	44	1.18	H02	SAI		X
2	42	53	0.66	H03			
2	42	84	0.28	H02			
2	42	84	0.82	H05	SAI		
2	42	87	0.57	H03			
2	43	55	0.79	H03			
2	43	56	0.84	H03			
2	43	73	0.48	H02	MAI		
2	43	73	0.24	H04			
2	43	74	1.15	H02	MAI		X
2	43	76	1.48	H02	MAI		X
2	43	76	0.54	H04			X
2	43	78	0.47	H04			
2	43	81	0.72	H02	SAI		
2	43	81	0.59	H03			

Note - (1) One additional duplicate DSI indicaiton at this location
(2) Two additional duplicate DSI indications at this location

Table A-2 SG-2 WBN F214 DSI Indications							
SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
2	43	82	0.93	H02			X
2	43	82	1.06	H03	MAI		X
2	43	82	1.12	H04		NDF	X
2	43	85	1.04	H02	SAI		X
2	43	85	1.04	H03		NDF	X
2	43	87	0.54	H04			
2	44	28	0.19	H02	SAI		
2	44	55	1.04	H03	MAI		X
2	44	60	1.22	H02	MAI		X
2	44	61	0.9	H02			
2	44	79	0.36	H03	MAI		
2	44	82	1.02	H02	MAI		X
2	44	84	0.64	H02			
2	45	25	0.63	H02	SAI		
2	45	44	0.59	H02			
2	46	43	0.41	H02			
2	46	50	1.04	H03	MAI		X
2	46	73	0.59	H03			
2	46	73	0.34	H04		NDF	
2	46	85	0.6	H03		NDF	
2	47	60	0.85	H02			
2	47	73	0.33	H02			
2	47	75	0.64	H03			
2	47	79	0.45	H03			
2	47	81	0.82	H02			
2	47	81	0.83	H03	SAI		
2	47	83	0.77	H02			
2	47	87	0.69	H02	SAI		
2	48	30	1.43	H02		NDF	
2	48	37	0.53	H02			
2	48	42	0.71	H04			
2	49	35	0.78	H02			
2	49	42	1.46	H04	SAI		X
2	49	75	0.37	H03			
2	49	82	0.87	H02		NDF	
2	49	82	0.4	H03			

Note - (1) One additional duplicate DSI indicaiton at this location
(2) Two additional duplicate DSI indications at this location

Table A-3 SG-3 WBN F214 DSI Indications

SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
3	2	23	0.44	H04			
3	2	26	0.6	H04			
3	2	27	0.74	H04			
3	2	109	0.61	H02			
3	2	113	1	H03	SAI		
3	3	30	0.48	H04			
3	3	46	0.99	H03		NDF	
3	3	93	0.67	H04			
3	3	101	0.79	H02			
3	3	107	1.19	H02	SAI		X
3	3	109	1.11	H02	MAI		X
3	4	21	0.37	H05			
3	4	41	0.41	H04			
3	4	43	1.22	H03	SAI		X
3	4	51	1.01	H04	SAI		X
3	4	90	1.07	H02	SAI		X
3	4	99	2.52	H02	MAI		X
3	4	99	0.92	H03			X
3	4	102	0.65	H02			
3	4	104	0.65	H02			
3	4	106	0.9	H02			
3	5	20	1.08	H02	SAI		X
3	5	20	0.54	H04		NDF	X
3	5	21	0.87	H02		NDF	
3	5	24	0.63	H02			
3	5	26	1.34	H02		NDF	
3	5	28	1.25	H02	MAI		X
3	5	28	0.83	H04		NDF	X
3	5	29	1.22	H03	SAI		X
3	5	29	1.02	H04		NDF	X
3	5	33	0.68	H02			
3	5	34	0.6	H02			
3	5	44	0.53	H04			
3	5	47	0.52	H04			
3	5	53	0.45	H04			
3	5	55	0.77	H02	SAI		
3	5	56	0.48	H02			
3	5	57	0.56	H04			
3	5	84	0.63	H02			
3	5	85	0.43	H02			
3	5	85	0.53	H03			
3	5	86	0.4	H02			
3	5	86	1.07	H03		NDF	
3	5	88	0.59	H02			
3	5	88	0.62	H04			
3	5	91	0.81	H03			
3	5	93	0.55	H05			
3	5	94	0.66	H05			
3	5	95	1.04	H02	SAI		X
3	5	95	0.69	H03			X

Table A-3 SG-3 WBN F214 DSI Indications

SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
3	5	99	0.66	H04			
3	5	109	2.12	H02	SAI		X
3	5	110	0.29	H04			
3	6	8	0.27	H04			
3	6	9	1.77	H02	SAI		X
3	6	12	0.6	H03			
3	6	43	1.04	H02	SAI		X
3	6	44	1.59	H02		NDF	
3	6	53	0.49	H04			
3	6	70	1.4	H03	MAI		X
3	6	71	0.8	H03			
3	6	76	0.63	H04			
3	6	80	0.75	H04		NDF	
3	6	84	1.18	H04		NDF	
3	6	84	0.97	H05		NDF	
3	6	85	0.53	H02			
3	6	86	0.55	H04			
3	6	88	0.53	H02			X
3	6	88	1.42	H03	SAI		X
3	6	95	0.84	H02		NDF	
3	6	95	0.33	H04			
3	6	96	0.87	H03			
3	6	100	0.96	H02			
3	6	111	0.38	H02			
3	7	14	0.97	H02	SAI		
3	7	35	0.38	H04			
3	7	36	0.39	H04			
3	7	47	0.93	H02	MAI		
3	7	54	0.35	H04			
3	7	55	0.43	H02			
3	7	68	0.82	H02			
3	7	69	4.34	H02	MAI		X
3	7	69	0.92	H03			X
3	7	84	0.58	H05			
3	7	87	0.52	H04			
3	7	88	0.58	H04			
3	7	95	0.3	H02			
3	7	97	0.2	H08			
3	7	103	0.41	H03			
3	7	105	1.3	H03	SAI		X
3	8	7	0.74	H05			
3	8	9	0.59	H05			
3	8	14	0.99	H02			
3	8	22	0.51	H05			
3	8	38	0.88	H04			
3	8	39	0.94	H03	SAI		
3	8	44	0.54	H02			
3	8	45	0.89	H03			
3	8	51	0.98	H02		NDF	X
3	8	65	1.62	H03	SAI		X

Note - (1) One additional duplicate DSI indicaiton at this location
(2) Two additional duplicate DSI indications at this location

Table A-3 SG-3 WBN F214 DSI Indications

SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
3	8	66	0.71	H02			
3	8	69	1.49	H02	SAI		X
3	8	96	0.39	H02			
3	8	110	0.65	H03			
3	9	3	0.48	H06			
3	9	4	0.4	H02			
3	9	12	1.4	H02		NDF	
3	9	19	0.23	H05			
3	9	37	1.35	H02	SAI		X
3	9	37	0.62	H04		NDF	X
3	9	40	0.97	H02		NDF	
3	9	46	0.49	H03			
3	9	49	1.1	H02	SAI(1)		X
3	9	49	1.23	H03	SAI		X
3	9	50	0.93	H02			
3	9	52	1.05	H02	MAI		X
3	9	53	0.91	H03			
3	9	59	0.44	H05			
3	9	61	1.09	H02	SAI		X
3	9	62	0.59	H02			
3	9	64	0.78	H02			
3	9	64	0.91	H05		NDF	
3	9	69	0.86	H02			
3	9	74	0.91	H02			
3	9	83	0.62	H04			
3	9	88	0.69	H04			
3	9	102	0.55	H02			
3	9	103	0.68	H02			
3	9	105	0.88	H03			X
3	10	3	0.53	H05			
3	10	17	0.75	H02			
3	10	18	1.15	H02	SAI(2)		X
3	10	25	0.77	H04			
3	10	31	1.04	H04		NDF	
3	10	35	1.2	H02			
3	10	35	0.67	H05		NDF	
3	10	36	1.11	H03	SAI		X
3	10	37	0.91	H02		NDF	
3	10	38	0.83	H05		NDF	
3	10	41	1.23	H02	SAI		X
3	10	41	1.39	H03	MAI		X
3	10	45	0.9	H05		NDF	
3	10	47	2.04	H02	SAI		X
3	10	47	1.39	H03	MAI		X
3	10	47	1.21	H04	MAI		X
3	10	50	0.78	H02			
3	10	60	0.39	H05			
3	10	60	0.61	H07			
3	10	64	0.65	H05			
3	10	64	0.46	H06			

Table A-3 SG-3 WBN F214 DSI Indications

SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
3	10	84	0.97	H03			
3	10	90	0.53	H02			
3	10	110	0.55	H04			
3	10	110	0.76	H05			
3	11	4	0.73	H05			
3	11	6	1.12	H02	SAI		X
3	11	6	0.53	H05			X
3	11	7	0.76	H02	MAI		X
3	11	7	0.78	H03	SAI		X
3	11	7	0.61	H04	SAI		X
3	11	9	0.95	H02	MAI		
3	11	34	0.49	H02			
3	11	44	0.55	H04			
3	11	49	0.73	H02		NDF	
3	11	55	0.69	H02			
3	11	60	0.77	H02		NDF	
3	11	62	0.66	H02			
3	11	71	0.64	H03			
3	11	72	0.64	H04			
3	11	78	0.72	H04			
3	11	78	0.66	H05			
3	11	82	0.41	H02			
3	11	96	0.96	H04			
3	11	110	0.99	H02			
3	12	4	0.62	H05			
3	12	41	0.72	H02		NDF	
3	12	42	0.95	H03		NDF	
3	12	42	1.02	H04		NDF	
3	12	76	0.64	H03			
3	12	108	0.57	H02			
3	12	109	1.06	H02	MAI		X
3	12	109	0.35	H05			X
3	12	113	1.02	H02	SAI		X
3	13	3	0.83	H03			
3	13	20	1.68	H02	MAI		X
3	13	20	0.86	H03	MAI		X
3	13	20	0.54	H04	SAI		X
3	13	36	0.5	H08			
3	13	38	0.36	H05			
3	13	42	1.34	H02	MAI		X
3	13	42	1.72	H03	MAI		X
3	13	44	0.84	H04			
3	13	44	0.61	H05			
3	13	46	0.71	H05			
3	13	47	0.74	H05			
3	13	48	0.61	H03			
3	13	49	0.72	H02			X
3	13	57	0.46	H05			X
3	13	59	0.77	H02			X
3	13	59	1.57	H03	MAI		X

Note - (1) One additional duplicate DSI indicaiton at this location
(2) Two additional duplicate DSI indications at this location

Table A-3 SG-3 WBN F214 DSI Indications							
SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
3	13	59	0.52	H04			X
3	13	60	2.14	H03	MAI		X
3	13	73	1.65	H03	MAI		X
3	13	87	0.58	H03			
3	13	89	0.56	H04			
3	13	103	0.45	H02			
3	13	105	1.32	H03	MAI		X
3	13	109	1.01	H02	MAI		X
3	13	111	1	H02	MAI		
3	13	111	0.53	H04			
3	14	3	2.21	H02	MAI		X
3	14	3	1.12	H03	MAI		X
3	14	4	0.74	H03	SAI		
3	14	4	0.7	H04	MAI		
3	14	9	1.45	H02	MAI		X
3	14	16	0.78	H03			
3	14	25	0.46	H01	SAI		X
3	14	44	1.19	H03		NDF	
3	14	44	0.59	H04			
3	14	44	0.82	H05			
3	14	49	1.24	H02		NDF	X
3	14	49	0.69	H05			X
3	14	56	0.76	H02			
3	14	56	0.49	H03			
3	14	56	0.62	H04			
3	14	58	0.46	H02			
3	14	61	0.75	H02			
3	14	63	0.83	H04			
3	14	66	0.63	H05			
3	14	85	0.36	H02			
3	14	86	0.5	H05			
3	14	104	1.04	H02	SAI		X
3	14	105	0.78	H02			
3	14	109	1.03	H02	MAI		X
3	15	18	0.41	H04			X
3	15	29	0.84	H02	MAI		
3	15	65	0.41	H03			
3	15	67	0.47	H04			
3	15	67	0.49	H05			
3	15	68	2.17	H02	SAI		X
3	15	76	0.75	H02			
3	15	93	0.49	H07			
3	16	37	0.87	H02	MAI		
3	16	37	0.93	H03	SAI		
3	16	40	1.58	H03	MAI		X
3	16	46	0.71	H03			
3	16	48	0.46	H02			
3	16	68	0.63	H05			
3	16	74	0.4	H02	SAI		
3	16	74	0.91	H04			

Table A-3 SG-3 WBN F214 DSI Indications							
SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
3	16	85	0.28	H05			
3	17	7	0.96	H02			
3	17	8	0.51	H02	MAI		
3	17	9	0.72	H02			
3	17	10	1	H02	MAI		
3	17	12	1.56	H03	SAI		X
3	17	15	1.17	H02	MAI		X
3	17	38	2.88	H02	MAI		X
3	17	38	0.75	H03			X
3	17	39	0.66	H02			
3	17	39	0.6	H03			
3	17	40	1.08	H02	SAI		X
3	17	40	1.1	H03	SAI		X
3	17	55	0.91	H05		NDF	
3	17	57	0.81	H02			
3	17	65	0.66	H02	MAI		X
3	17	65	1.76	H03	MAI		X
3	17	65	0.76	H04	SAI(1)		X
3	17	67	0.37	H05			
3	17	69	0.65	H05			
3	17	76	0.97	H02	SAI		
3	17	77	1.51	H03	SAI		X
3	17	78	0.58	H05		NDF	
3	17	83	0.66	H05		NDF	
3	17	88	0.87	H02		NDF	
3	17	89	0.82	H04		NDF	
3	17	93	0.88	H03	SAI		
3	17	98	0.88	H02	SAI		
3	17	102	0.61	H02			
3	17	102	0.63	H03			
3	18	35	2.07	H02	SAI		X
3	18	37	0.53	H02			
3	18	71	0.49	H05			
3	18	96	0.98	H02			
3	18	106	1.53	H02	MAI		X
3	18	106	0.42	H03			X
3	18	106	1.19	H04	SAI		X
3	19	6	0.98	H05		NDF	
3	19	8	1.6	H02	MAI		X
3	19	11	0.22	H03	SAI		X
3	19	12	1.92	H02	MAI		X
3	19	14	1.48	H02	MAI		X
3	19	14	0.63	H03	SAI		X
3	19	17	1.37	H02	SAI		X
3	19	45	0.59	H05			
3	19	52	0.81	H02			
3	19	58	0.79	H02			
3	19	62	0.62	H02			
3	19	65	0.76	H02	MAI		
3	19	65	0.77	H04			

Note - (1) One additional duplicate DSI indicaiton at this location
(2) Two additional duplicate DSI indications at this location

Table A-3 SG-3 WBN F214 DSI Indications

SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
3	19	65	1.12	H05		NDF	
3	19	69	0.58	H05			
3	19	75	0.93	H02	MAI		
3	19	76	0.65	H03			
3	19	81	0.68	H02	SAI		
3	19	88	1.34	H04	SAI		X
3	19	90	2.06	H02	MAI		X
3	19	90	1.62	H03	MAI		X
3	20	12	1.16	H02	MAI		X
3	20	21	1.34	H02	MAI		X
3	20	22	0.79	H03			
3	21	10	0.57	H02			
3	21	21	0.9	H05			
3	21	28	0.71	H02			
3	21	40	0.92	H06			
3	21	48	0.7	H06			
3	21	52	0.9	H05			
3	21	93	1.07	H02	MAI		X
3	21	94	0.7	H02			
3	21	108	0.74	H02	SAI		
3	22	33	0.64	H03			
3	22	41	1.8	H02	SAI		X
3	22	44	0.46	H04			
3	22	58	0.94	H02			X
3	22	63	2.19	H02	SAI		X
3	22	81	1.08	H03	MAI		X
3	22	83	1.13	H02	SAI		X
3	22	107	0.4	H02	SAI		
3	23	9	0.67	H06			
3	23	25	0.52	H02			
3	23	25	0.6	H03			
3	23	45	0.38	H05			
3	23	74	0.61	H05			
3	23	88	1.32	H02	SAI		X
3	23	95	0.61	H02			
3	23	99	0.71	H02			
3	23	101	0.42	H04			
3	23	102	0.67	H04		NDF	
3	23	103	0.86	H02	SAI		
3	23	104	1.05	H02	MAI		X
3	23	105	1.21	H02	MAI		X
3	23	106	0.85	H02	MAI		
3	23	107	0.51	H03			
3	23	109	1.23	H02	MAI		X
3	24	67	0.53	H03			
3	24	73	0.53	H04	SAI		
3	24	74	0.41	H02			
3	24	74	0.52	H05			
3	24	77	1.14	H02	MAI		X
3	24	99	0.5	H05			

Table A-3 SG-3 WBN F214 DSI Indications

SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
3	24	108	0.44	H03			
3	25	11	0.53	H06			
3	25	37	0.49	H02	SAI		
3	25	37	0.65	H06			
3	25	42	1.06	H02	MAI		X
3	25	58	0.59	H02			
3	25	91	0.89	H02	MAI		
3	25	92	1.3	H02		NDF	
3	25	98	0.65	H05			
3	25	98	0.59	H06			
3	25	100	0.71	H02			
3	25	106	0.53	H06		NDF	
3	26	12	0.54	H02			
3	26	26	0.64	H02			X
3	26	43	0.38	H05			
3	26	59	1.72	H04	SAI		X
3	26	60	0.29	H06			
3	26	96	0.19	H02	SAI		
3	26	96	0.98	H03			
3	26	99	0.74	H02			X
3	26	99	1.03	H03	SAI		X
3	26	107	0.7	H02			
3	27	8	1.41	H02	MAI		X
3	27	8	0.42	H04			X
3	27	15	0.33	H02	MAI		
3	27	19	1.06	H02	SAI		X
3	28	31	0.49	H02			
3	28	37	0.24	H05			
3	28	60	1.81	H02	MAI		X
3	28	95	0.45	H02			
3	28	104	0.68	H02			
3	28	105	0.62	H01	SAI		X
3	29	11	0.93	H02			
3	29	13	0.89	H02			
3	30	25	2.57	H02	MAI		X
3	30	30	0.49	H02			
3	30	48	0.48	H01	SAI		X
3	30	58	0.9	H02			
3	30	58	0.48	H03			
3	30	63	0.46	H03			
3	30	99	0.56	H04			
3	30	99	0.69	H07			
3	31	16	0.49	H02	MAI		
3	31	16	0.29	H03	SAI		
3	31	18	1.41	H02	MAI		X
3	31	27	0.55	H04			
3	31	29	0.35	H02			
3	31	35	1.11	H04		NDF	
3	31	96	0.5	H04			
3	31	104	1.22	H02	SAI		X

Note - (1) One additional duplicate DSI indicaiton at this location
(2) Two additional duplicate DSI indications at this location

Table A-3 SG-3 WBN F214 DSI Indications

SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
3	32	34	0.53	H02			
3	32	86	0.54	H04			
3	32	89	1.03	H02	MAI		X
3	32	100	0.71	H02			
3	33	102	0.69	H03			
3	34	17	1.16	H02	MAI		X
3	34	31	0.34	H05			
3	34	32	0.29	H02			
3	35	55	0.9	H02			
3	35	74	0.91	H02			
3	35	74	0.83	H04			
3	36	21	0.97	H02			
3	37	52	1.45	H03	SAI		X
3	37	72	0.43	H06			
3	38	42	0.06	H01	SAI		X
3	38	47	0.6	H04			
3	38	57	0.73	H03			
3	39	44	0.74	H02			
3	39	52	0.61	H02			
3	39	54	0.78	H02			
3	40	49	0.29	H04			
3	40	50	1.18	H02	SAI		X
3	40	58	0.5	H04			
3	40	66	0.56	H03	SAI		
3	41	46	0.85	H02	SAI		
3	41	70	0.72	H02			
3	42	57	0.37	H02			
3	42	57	0.32	H03			
3	42	58	1.15	H02	MAI		X
3	42	58	0.73	H03			X
3	42	64	0.3	H02			
3	42	76	0.65	H02			
3	42	79	0.55	H03			
3	43	36	0.38	H02	MAI		
3	43	37	0.41	H02			
3	43	52	0.74	H02			
3	43	57	0.99	H02			
3	43	58	1.08	H02	MAI		X
3	43	58	1.51	H03	MAI		X
3	43	58	0.56	C06		NDF	X
3	43	58	0.76	C05		NDF	X
3	43	62	0.95	H03			
3	43	62	0.77	H04			
3	43	67	0.25	H03	SAI		
3	43	69	0.7	H02			
3	43	70	0.49	H02			
3	43	74	0.73	H03			
3	43	77	1.47	H02	MAI		X
3	43	78	0.6	H02			
3	43	80	0.86	H02			

Table A-3 SG-3 WBN F214 DSI Indications

SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
3	44	54	0.38	H05			
3	44	56	0.77	H02			
3	44	56	0.69	H04			
3	44	62	0.32	H02	SAI		
3	44	65	0.48	H04			
3	44	65	0.53	H06			
3	44	79	0.61	H02			
3	44	80	0.55	H02			
3	44	80	0.58	H03			
3	44	87	0.34	H02			
3	44	90	0.42	H04			
3	44	92	1.53	H02		NDF	
3	45	31	0.9	H02			X
3	45	32	0.61	H04			
3	45	35	0.77	H03			
3	45	74	0.33	H06			
3	45	86	0.98	H02			
3	46	56	1.94	H02	SAI		X
3	46	57	1.65	H02	MAI		X
3	46	75	1.32	H03	SAI		X
3	46	76	1.46	H02	MAI		X
3	46	77	1.2	H02	MAI		X
3	46	78	1.16	H03	MAI		X
3	46	80	0.49	H03			
3	46	85	0.83	H02			
3	46	85	0.59	H03		NDF	
3	46	86	0.78	H02	MAI		
3	46	88	1.92	H02		NDF	
3	46	89	2.09	H02		NDF	
3	47	28	1.53	H02	SAI		X
3	47	48	0.54	H02			
3	47	59	0.94	H02			
3	47	62	1.01	H02	SAI		X
3	47	78	0.59	H02			
3	47	78	0.88	H03			
3	47	80	0.81	H02			X
3	47	80	1.32	H03	MAI		X
3	47	80	0.38	H04			X
3	47	82	0.79	H03			X
3	47	83	1.43	H03	MAI/SAI		X
3	47	83	0.79	H04			X
3	47	85	1.74	H03	MAI		X
3	47	86	1.02	H02	MAI		X
3	48	47	0.5	H07			
3	48	50	0.85	H02	MAI		
3	48	59	0.05	H04	SAI		
3	48	72	0.7	H02			
3	48	86	0.87	H02		NDF	
3	49	33	0.89	H02			
3	49	46	0.23	H02			

Note - (1) One additional duplicate DSI indicaiton at this location
(2) Two additional duplicate DSI indications at this location

Table A-3 SG-3 WBN F214 DSI Indications

SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
3	49	55	0.58	C06		NDF	
3	49	73	0.45	H02			
3	49	73	0.43	H04			
3	49	74	0.53	H04			
3	49	75	0.39	H03			
3	49	76	0.51	H04			
3	49	82	0.52	H02			
3	49	82	0.45	H03			

FOLLOWING INDICATION IS ADDI							
3	9	105	0.8	H04	SAI		X

Note - (1) One additional duplicate DSI indicaiton at this location
(2) Two additional duplicate DSI indications at this location

Table A-4 SG-4 WBN F214 DSI Indications

SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
4	1	58	0.49	H02			
4	2	13	0.99	H03			
4	2	16	1.06	H03	SAI		X
4	2	55	0.31	H02			
4	2	59	0.48	H02			
4	2	59	0.44	H03			
4	2	60	0.52	H02			
4	2	92	0.31	H03			
4	2	103	0.49	H03			
4	2	109	0.3	H03			
4	3	7	0.87	H04		NDF	
4	3	7	1.03	H05		NDF	
4	3	9	0.6	H03			X
4	3	13	0.77	H03			
4	3	50	0.62	H02			
4	3	65	0.85	H02			
4	3	70	0.58	H03			
4	3	102	0.68	H03	MAI		
4	3	105	0.54	H03			
4	4	5	0.6	H03			
4	4	6	0.34	H04			
4	4	11	0.93	H03			
4	4	24	0.86	H04			
4	4	32	0.46	H04			
4	4	40	0.68	H02			
4	4	43	0.86	H04		NDF	
4	4	50	0.9	H02			
4	4	50	0.59	H03			
4	4	81	0.56	H02		NDF	
4	4	83	0.4	H02			
4	4	97	0.56	H03			
4	4	98	0.81	H02		NDF	
4	4	99	3.7	H02	SAI(1)		X
4	4	101	0.41	H02			
4	4	102	0.47	H02			
4	4	110	0.44	H03			
4	4	112	0.55	H03			
4	5	1	0.51	H02			
4	5	2	0.81	H02			
4	5	4	0.56	H03			
4	5	5	0.54	H05			
4	5	12	1.06	H03	SAI		X
4	5	15	1.16	H02	SAI		X
4	5	15	1.74	H03	SAI		X
4	5	16	0.66	H02			
4	5	16	0.71	H05			
4	5	17	1.16	H02	SAI		X
4	5	17	0.75	H03			X
4	5	17	0.64	H04			X
4	5	19	0.91	H03			

Table A-4 SG-4 WBN F214 DSI Indications

SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
4	5	21	0.95	H02			
4	5	28	0.74	H04			
4	5	54	0.63	H02			
4	5	64	0.41	H06			
4	5	70	1.28	H02		NDF	
4	5	72	0.67	H03			
4	5	73	0.71	H03			
4	5	74	1.11	H03		NDF	
4	5	79	0.75	H02	SAI		
4	5	79	0.55	H04			
4	5	80	0.88	H02		NDF	
4	5	80	0.68	H03			
4	5	80	0.84	H04		NDF	
4	5	80	0.36	H06			
4	5	81	0.5	H04			
4	5	82	0.63	H02			X
4	5	83	0.47	H02			
4	5	83	0.75	H03		NDF	
4	5	86	0.66	H02			X
4	5	92	0.4	H02			
4	5	92	0.51	C09		NDF	
4	5	97	0.26	H02			
4	5	100	0.89	H03			
4	5	103	0.86	H02			
4	5	105	0.87	H03			
4	5	107	0.75	H03			X
4	5	108	0.78	H03			
4	6	1	0.88	H02		NDF	
4	6	2	0.72	H02		NDF	
4	6	3	0.87	H02	MAI		
4	6	3	0.51	H03			
4	6	4	1.03	H02	SAI		X
4	6	4	0.45	H05			X
4	6	6	1.09	H02		NDF	
4	6	6	0.6	H05		NDF	
4	6	8	0.97	H05		NDF	
4	6	9	0.88	H05		NDF	
4	6	11	0.54	H02			
4	6	11	0.41	H04			
4	6	13	0.43	H03			
4	6	14	0.82	H02			
4	6	14	0.48	H03			
4	6	14	0.51	H04			
4	6	15	0.25	C13		NDF	
4	6	16	0.66	H02			
4	6	16	0.77	H03			
4	6	18	1.03	H02	SAI(1)		X
4	6	19	0.86	H02		NDF	
4	6	19	0.68	H03			
4	6	20	0.84	H02			X

Note - (1) One additional duplicate DSI indicaiton at this location
(2) Two additional duplicate DSI indications at this location

Table A-4 SG-4 WBN F214 DSI Indications

SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
4	6	20	1.41	H03	SAI		X
4	6	21	0.43	H02			
4	6	21	0.46	H03		NDF	
4	6	22	0.49	H02			
4	6	23	0.57	H05			
4	6	24	0.88	H04		NDF	
4	6	25	0.69	H05		NDF	
4	6	26	1	H02	MAI		
4	6	27	0.98	H04			
4	6	28	0.95	H04		NDF	
4	6	43	1.13	H03	SAI		X
4	6	71	0.76	H02		NDF	
4	6	72	0.88	H03			
4	6	78	0.88	H02	SAI		X
4	6	78	0.86	H03	SAI		X
4	6	78	1.24	H04	SAI		X
4	6	79	0.6	H02		NDF	
4	6	80	0.52	H03			
4	6	81	0.69	H02	SAI		X
4	6	81	1.2	H04	SAI		X
4	6	85	1.37	H02	SAI(1)		X
4	6	86	0.48	H04			
4	6	87	0.6	H04			
4	6	89	0.42	H04			
4	6	90	0.88	H02			
4	6	90	0.58	H05			
4	6	91	0.56	H04			
4	6	92	0.48	H04			
4	6	93	0.6	H04			
4	6	94	1.23	H02		NDF	
4	6	94	0.3	H03			
4	6	94	0.89	H04		NDF	
4	6	97	1.39	H02		NDF	
4	6	97	0.7	H03			
4	6	111	0.42	H03			
4	7	33	2.07	H03	SAI		X
4	7	37	1.41	H03	SAI		X
4	7	40	0.5	H02			
4	7	40	0.67	H03			
4	7	100	0.6	H02			
4	7	102	0.94	H03			
4	7	106	0.65	H04			
4	7	112	0.49	H02			
4	7	112	0.81	H03			
4	8	75	0.66	H05			
4	8	83	0.58	C09		NDF	
4	8	95	0.82	H05			
4	8	100	0.17	H03			
4	9	2	0.55	H02			
4	9	6	0.63	H04			

Table A-4 SG-4 WBN F214 DSI Indications

SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
4	9	11	0.66	H03			
4	9	76	0.79	H05		NDF	
4	9	86	0.85	H04		NDF	
4	9	96	0.84	H05			
4	9	100	0.68	H03			
4	9	102	0.44	H05			
4	9	104	0.52	H02			
4	9	104	0.54	H03			
4	9	105	0.85	H02			
4	9	105	0.89	H05			
4	9	107	0.83	H04		NDF	
4	9	107	0.81	H06			
4	9	111	0.63	H03			
4	9	112	0.36	H05			
4	9	113	0.46	H05			
4	10	2	0.46	H03			
4	10	4	1.04	H03	MAI		X
4	10	5	1.6	H02	SAI(1)		X
4	10	5	0.65	H03			X
4	10	5	0.99	H04	SAI		X
4	10	7	1.76	H02	MAI		X
4	10	7	0.61	C09		NDF	X
4	10	33	0.83	H02			
4	10	33	0.84	H03		NDF	
4	10	34	0.57	H02			
4	10	34	0.74	H03			
4	10	36	0.49	H02			X
4	10	36	1.11	H04	MAI		X
4	10	41	0.38	H02			
4	10	63	1	H02	MAI		
4	10	77	0.9	H03	SAI		X
4	10	79	0.54	H05			X
4	10	88	0.53	H05			X
4	10	112	0.88	H02			
4	10	112	0.67	H03			
4	11	55	0.43	H05			
4	11	89	1.03	H03		NDF	X
4	11	107	0.55	H04			
4	11	108	1.48	H03	SAI(1)		X
4	11	108	0.8	H04			X
4	11	109	1.04	H02	SAI(1)		X
4	11	109	1.79	H03	SAI		X
4	11	113	1	H02	SAI(1)		X
4	11	113	1.07	H03	SAI(1)		X
4	12	20	0.44	H02			
4	12	42	1.14	H02	SAI		X
4	12	42	1.03	H04	MAI		X
4	12	43	0.48	H02			
4	12	44	1.52	H03	SAI		X
4	12	61	1.08	H05		NDF	

Note - (1) One additional duplicate DSI indicaiton at this location
(2) Two additional duplicate DSI indications at this location

Table A-4 SG-4 WBN F214 DSI Indications

SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
4	12	94	0.3	H05			
4	13	5	0.42	H04			
4	13	41	0.35	H04			
4	13	59	0.26	H02			
4	14	4	0.56	H04			
4	14	40	0.46	C13		NDF	
4	14	93	0.54	C13		NDF	
4	15	19	0.2	H02			
4	15	78	1.08	H02		NDF	
4	15	78	0.28	H08			
4	15	87	0.42	H05		NDF	
4	15	88	0.27	H05			
4	15	90	0.83	H05			
4	16	4	1.27	H03	MAI		X
4	16	5	0.69	H03			
4	16	17	0.22	H02			
4	16	23	0.43	H06			
4	16	80	0.78	H02			
4	16	84	0.59	H04			
4	16	85	0.5	H05			
4	16	90	0.41	H02			
4	16	92	0.88	H02			
4	16	92	0.15	H05			
4	16	94	0.16	H02			
4	16	95	0.21	H02			
4	16	111	0.66	H02			
4	16	111	0.59	H03			
4	17	20	0.91	H02			
4	17	40	0.39	H02			
4	18	74	0.61	H02			
4	18	81	0.27	C11		NDF	
4	18	85	0.35	C06		NDF	
4	18	94	0.43	H04			
4	18	96	0.39	H05			
4	19	12	0.55	H03			
4	19	23	0.78	H02			
4	19	31	0.44	H03			
4	19	39	1.41	H03	SAI(2)		X
4	19	39	1.02	H04	SAI		X
4	20	13	0.61	H03			X
4	20	20	0.39	H04			
4	20	75	0.57	H02			
4	20	81	0.9	H02			
4	21	12	0.96	H02			
4	21	91	0.45	C02		NDF	
4	21	95	0.7	H04		NDF	
4	22	6	1.11	H04		NDF	
4	22	11	0.58	H02			
4	22	13	0.6	H02			
4	22	13	0.94	H03			

Table A-4 SG-4 WBN F214 DSI Indications

SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
4	22	19	0.29	H03			
4	23	12	0.95	H02	MAI		
4	23	40	0.46	H02			
4	23	50	0.55	H02			
4	23	92	0.2	H02			
4	24	41	1.05	H02	SAI		X
4	24	88	0.57	H05			
4	24	97	0.44	H04			
4	24	104	0.87	H03			
4	24	105	0.89	H02			
4	25	7	0.98	H02			
4	25	33	0.6	H02			
4	25	33	0.67	H04			
4	25	33	0.46	H05			
4	25	92	0.18	H05			
4	25	98	0.37	H06			
4	26	86	0.61	H02			
4	26	89	0.97	H02			
4	26	92	0.22	H06			
4	26	96	0.44	H02			
4	26	101	0.61	H03			
4	26	101	0.39	H05			
4	27	10	0.4	H03			
4	27	12	1.42	H02	MAI		X
4	27	12	0.68	H06			X
4	27	12	0.33	C12		NDF	X
4	27	86	0.21	H02			
4	28	12	0.36	H02			
4	28	31	0.79	H02			
4	28	62	0.55	C05		NDF	
4	28	94	0.31	H02			X
4	28	96	0.35	H02			
4	28	96	0.5	H04			
4	28	101	1.99	H02	SAI		X
4	30	17	0.27	H02			
4	30	29	1.12	H02	MAI		X
4	30	36	0.66	H02			
4	30	104	0.39	H02			
4	31	13	0.43	H03			
4	31	16	1.07	H02	MAI		X
4	31	25	0.45	H02			
4	31	29	0.54	H02			X
4	31	29	0.31	H03			X
4	31	58	0.07	H03	SAI		
4	31	102	0.62	H02			
4	32	38	0.57	H02			
4	33	39	0.24	H07			
4	33	46	1.09	H02	SAI		X
4	34	37	0.29	H06			
4	34	101	0.35	H03			

Note - (1) One additional duplicate DSI indicaiton at this location
(2) Two additional duplicate DSI indications at this location

Table A-4 SG-4 WBN F214 DSI Indications

SG	Row	Col	Volt	Location	Comments		
					SAI/MAI	NDF	PLUG
4	34	102	0.57	H02			
4	35	14	0.69	H03	SAI		
4	35	33	0.18	H03			
4	35	38	0.82	H02			
4	35	101	0.59	H03			
4	36	93	0.49	H03			
4	36	98	0.26	H02			
4	38	18	0.66	H03			
4	38	25	0.18	H02			
4	38	97	0.79	H03		NDF	
4	38	98	1.09	H03		NDF	
4	39	53	0.4	H02			
4	41	27	0.74	H02			
4	41	57	0.66	H05			
4	42	32	0.32	H02	MAI		
4	43	27	0.37	H06			
4	43	90	0.48	H02			
4	43	93	1.18	H02		NDF	
4	43	93	1.29	H03		NDF	
4	43	93	0.82	H04			
4	43	93	0.67	H05			
4	44	56	0.47	C13		NDF	
4	44	76	0.97	H02	SAI		
4	44	88	0.49	H05			
4	44	90	0.44	H02			
4	44	90	0.27	H04			
4	44	90	0.51	H05			
4	45	26	0.77	H04		NDF	
4	45	58	0.81	C06		NDF	
4	45	90	0.4	H05			
4	46	53	0.37	H02	SAI		
4	47	29	0.36	H02			
4	48	41	0.69	H02			
4	48	41	0.54	H03			
4	49	76	0.29	H06			
4	49	83	1.21	H02		NDF	

Note - (1) One additional duplicate DSI indicaiton at this location
(2) Two additional duplicate DSI indications at this location