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SERIAL: HNP-01-069

APR 3 0 2001

United States Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, DC 20555

SHEARON HARRIS NUCLEAR POWER PLANT
DOCKET NO. 50-400/LICENSE NO. NPF-63
SPECIAL REPORT – STEAM GENERATOR TUBE INSERVICE INSPECTION RESULTS

Dear Sir or Madam:

In accordance with Harris Nuclear Plant (HNP) Technical Specification 4.4.5.5.b, Carolina Power and Light Company provides the enclosed special report. This report is a summary of the results of the steam generator tube inservice inspections performed in April 2000 during the HNP Refueling Outage Number 9.

If you have questions or need additional information regarding this report, please contact Mr. E. A. McCartney at (919) 362-2661.

Sincerely,

R. J. Field
Manager, Regulatory Affairs
Harris Nuclear Plant

ONW

Enclosure

c: Mr. J. B. Brady (NRC Senior Resident Inspector, HNP)
Mr. Rich Laufer (NRR Project Manager, HNP)
Mr. L. A. Reyes (NRC Regional Administrator, Region II)

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Shearon Harris Nuclear Power Plant

Cycle 9

Steam Generator

Inspection Summary

Table of Contents

1.0 Introduction

Steam Generator (SG) inspection and repair at the Harris Nuclear Plant (HNP) was completed for the Cycle 9 refueling outage (RFO9). Examinations of the tubing were performed with eddy current tests (ECTs) and visual examination. Tubes have been removed from service by plugging, and in some tubes mechanical stabilizers have been installed.

The examinations resulted in a total of 44 tubes being plugged: 3 in SG "A", 12 in SG "B" and 29 in SG "C". Appendix E shows the location of tubes plugged as a result of this inspection.

ECT noted loose part signals during the inspection which will be discussed further in this summary.

2.0 Original Examination Plan

2.1 Description of Steam Generator Tube Inspection Scope

The inspection scope met or exceeded the criteria established in HNP Technical Specification 3/4.4.5 and industry guidance provided in EPRI TR-107569-V1R5, "PWR Steam Generator Examination Guidelines". Qualifications of the hardware, procedures and personnel requirements met or exceeded prevailing regulations and accepted industry guidelines and good practice.

Testing scope and scope expansion logic were planned prior to the beginning of inspection activities to address Technical Specification requirements, EPRI Guidelines and to specifically address known degradation phenomena and potential new degradation.

The inspection was completed on April 30, 2000. Table 1 is the planned inspection scope and Table 2 is the summary of tubes plugged. In summary, the original inspection planned scope was:

1) 100% of all tubes with bobbin coil eddy current testing,
2) 100% of all tubes with Plus Point® rotating coil (RC) eddy current testing at the hot leg top-of-tubesheet,
3) a sample of hot leg dents, manufacturing buff marks and other benign indications with Plus Point®,
4) a 20% sample of tubes with Plus Point® in the tight radii U-bends (rows 1 and 2), and
5) a 20% sample of the pre-heater expanded tubes in SG "C".

3.0 Expansion Plan

3.1 Bobbin Expansion Plans

A comprehensive test program for RFO9 included a 100% bobbin probe examination of all open tubes. Therefore, expansion criteria was not utilized.

3.2 RC (Rotating Coil) Expansion Plans

The RC expansion plans were consistent with the EPRI Guidelines methodology, and site Technical Specifications. Some additional RC probe testing was performed to bound certain loose part indications. RC examinations were performed around loose part indications and expanded by a one-tube boundary until no further indications were reported.

The RC examinations in the Row 1 and 2 U-bend were expanded to 100% for all three SGs when a few geometry indications were revealed at the U-bends.

4.0 Examination Results

Indications of tube wall loss and tube cracking were noted from tube inspections and are attributed to corrosion and mechanical wear. Corrosion indications were located at hot leg tube expansion transitions and within the hot leg tubesheet. Tube wear was noted at support structures in the cold leg pre-heater area and at the anti-vibration bars (AVBs). Minor wear was recorded where loose parts were previously detected. Table 2 is a summary of tubes plugged and the nature of the indication. Appendixes A, B, and C are a summary of indications recorded during RFO9.

The examination results for each of the steam generators, per the HNP Technical Specifications, were classified as C-2. The classification criteria is based on bobbin examinations and classified per the following:

- C-1: Less than 5% of the total tubes inspected are degraded tubes and none of the inspected tubes are defective.
- C-2: One or more tubes, but not more than 1% of the total tubes inspected are defective, or between 5% and 10% of the total tubes inspected are degraded tubes.
- C-3: More than 10% of the total tubes inspected are degraded tubes, or more than 1% of the inspected tubes are defective.

4.1 Volumetric Indications

HNP has a Technical Specification plugging limit of 40% through wall. This plugging limit is a conservative limit which includes penalties for sizing uncertainty and cycle growth rates. One tube was plugged at HNP during RFO9 which exceeded this plugging limit. This tube had an AVB wear indication of 41%. Anti-vibration bar wear has been slow and gradual.

Other volumetric indications have been evaluated on a case-by-case basis. Since HNP does not utilize a qualified depth sizing technique for volumetric indications other than wear, the characteristics and history of each such signal is evaluated. These other volumetric indications, that were in proximity to a loose part signal or previous loose part signal, were characterized by RC examination as volumetric. If a loose part was present, the indication was classified as a Loose Part Indication (LPI) and repaired by plugging and stabilizing. If a loose part was not present, but the indication is adjacent to a loose part, it would be considered a Single Volumetric Indication (SVI). There were no SVI indications from the RFO 9 inspection. All LPI indications were preventively plugged. LPI indications were stabilized if the indication was located at the 02C support or below and showed change since RFO9.

4.2 Circumferential Indications

Stress Corrosion Cracking (SCC) indications at the hot leg top-of-tube-sheet transition area have been observed at HNP since RFO6. Progression of the corrosion has been gradual.

HNP utilized an analytical, deterministic/probabilistic approach to develop screening criteria to verify that circumferential indications did not exceed safety margins. None of the circumferential indications exceeded the threshold values in the screening criteria. Therefore, in-situ pressure testing was not performed.

4.3 Axial Indications

Axial SCC near the top-of-tube-sheet transition on the hot leg side was observed in ten tubes in SG "C" and one tube in SG "B". One tube in SG "A" exhibited SCC in the tubesheet area. While HNP is qualified for Alternate Repair Criteria in the tube sheet area (F*), this option was not invoked during RFO9, and the tube was repaired (plugged).

A deterministic/probabilistic method was used to develop screening criteria to verify that axial indications did not exceed safety margins. None of the axial indications exceeded the threshold values. Therefore, in-situ pressure testing was not performed.

4.4 In-Situ Pressure Testing

In those cases where non-destructive testing indicates marginal or indeterminate ability to meet the performance criteria stated above, direct measurement of the pressure retaining ability of the tubing is performed using in-situ pressure testing. The testing methodology is consistent with prevailing industry practice. Entire tubes or portions of tubes are tested at pressures sufficient to demonstrate a pressure retaining margin consistent with the ASME Code, applicable Regulatory Guides and industry guidance. The test parameters are the result of site-specific calculations for the required pressure. The pressurization rates and hold points are procedurally controlled. Corrections in the pressure required to demonstrate margin are conservatively increased to account for tooling characteristics and for temperature. Measurement and test equipment are calibrated and controlled to appropriate quality assurance requirements. Methods are employed to determine leakage, if any, during the pressure test.

During RFO9, no tubes exceeded performance criteria described above. As such, in-situ pressure testing was not required.

4.5 Additional Evaluations

In addition to eddy current inspections, another non-destructive test was performed. This test was the remote visual examination of installed tube plugs. No indications of degradation or leakage were reported from the tube plug inspection.

Table 1
RFO9 Summary of Steam Generator Tube Inspection

	S/G A	S/G B	S/G C
	Number of Tubes/Percent of Tubes		
Bobbin - Full Length	4504/100%	4546/100%	4520/100%
Plus Point - Tight Radii U-Bends Row 1 and 2	225/100%	226/100%	221/100%
Plus Point - Expansion Transition - H/L TTS	4504/100%	4546/100%	4520/100%
Plus Point - Pre-Heater expanded tubes (two intersections per tube)	n/a	n/a	26/20%
Plus Point - Hot Leg Dents, Buff marks and benign indications	10	6	24
Plus Point - Retest of Bobbin Coil Indications - Volumetric, Loose Parts and other Diagnostic examinations.	30	63	41

Table 2
RFO9 Tubes Plugged For Indications of Tube Degradation

Indication Orientation and Location	Steam Generator		
	SG A	SG B	SG C
Axial indications below the inlet top-of-tubesheet	1	0	0
Circumferentially oriented indications near the expansion transition at the hot leg top-of-tubesheet	1[h]	1[h]	13[h]
Axially oriented indications near the expansion transition at the hot leg top-of-tubesheet	0	1	10
Preventive plugging of tubes with loose part indications	1	4[c]	5 (4[c], 1[h])
Wear at an AVB support (Exceeding Plugging Limits)	0	0	1
Volumetric indication at a miscellaneous location in a tube	0	6	0
Total Plugged - 44	**3**	**12**	**29**

h = Hot Leg Stabilizer installed
c = Cold Leg Stabilizer installed

5.0 Examination Techniques and Equipment

The hardware, qualification of techniques and qualifications of personnel met or exceeded regulatory requirements, industry guidance and prevailing industry good practice. The resolution process employed sufficient independence to preclude a systematic bias. The primary diagnostic tool used on defects was the Plus Point® rotating eddy current coil.

The eddy current examination was performed by ABB Combustion Engineering, Inc.(ABB), utilizing Zetec MIZ-30 digital data acquisition and analysis systems. The following coil types were used for the tube examinations:

Bobbin coil	A610M/ULC	.610" Diameter magnetic bias
	A600M/ULCCombo	.600" Diameter flexible probe head, magnetic bias
Rotating coil	P610MRPC2C	.610" Diameter two coil (.115" Pancake Mid-frequency, Plus point Mid-frequency
	P600MRPC2C	.600" Diameter two coil (.115" Pancake Mid-frequency, Plus point Mid-frequency
	P580MRPC2C	.580" Diameter Two Coil (.115" Pancake Mid-frequency, Plus Point Mid-frequency)
	P560MRPC2C	.560" Diameter Two Coil (.115" Pancake Mid-frequency, Plus Point Mid-frequency)
	P580MRPC1C	.580" Diameter One Coil Plus Point Mid-frequency. Mag. Bias, Non-Mag Bias
	P560MRPC1C	.560" Diameter One Coil Plus Point Mid-frequency. Mag. Bias, Non-Mag Bias

The data was independently analyzed by two groups of certified Level IIA (minimum) qualified data analysts (QDAs). Discrepancies between the two sets of evaluation results were reviewed by Lead Level III eddy current examiners representing both Primary and Secondary analysis groups. ABB performed data acquisition and primary data analysis while Duke Engineering Services (DESI) performed secondary data analysis. Both primary and secondary analysis were performed onsite or remotely via LAN/WAN at the Verner & James Company located in Redmond, Washington, and DESI located in Huntersville, North Carolina, respectively. Potentially repairable indications, as well as a sample of non-degraded tubes, were also reviewed by an independent Level III analyst.

A site-specific performance demonstration was required for all data analysts. The performance demonstration consisted of a written and practical examination. The written exam was based on knowledge of the analysis procedure, while the practical examination focused on successful completion of analysis of actual data. Data was compiled from prior outages at HNP along with other indications from similar plants that could potentially be found in HNP steam generators.

Two data management systems were used at HNP. The primary system was Zetec's Inspection Management System (IMS) that was the database of record. The second was

Westinghouse's ST-2000 System that was used to provide a second check and process other information used for on-line data review and historic review.

Appendix A
SG "A" Indication Summary

Axial Cracks at TTS

SG	ROW	COL	LOCATION	IND.	LENGTH	MAXIMUM	AVERAGE	VOLTS
				TYPE		DEPTH (%)	DEPTH (%)	(Max)
A	23	101	TTS-2.44	SAI	0.39	100	*	1.51

* Below tube to tube sheet interface in F* region

Circumferential ODSCC Indications

SG	ROW	COL	LOCATION	IND.	ARC	DEPTH	VOLTS
				TYPE	DEGREES	VOLT AVG	(Max)
A	26	49	TTS	SCI	61	0.02 (VI)	0.20

Wear Due To Loose Parts

SG	ROW	COL	LOCATION	IND.	DEPTH (%)	VOLTS
				TYPE		(Max)
A	49	83	05C+19.1	LPI	15	0.32

Loose Parts Signals

SG	ROW	COL	LOCATION	IND.	DEGREE	VOLTS
				TYPE		
A	38	96	02C+0.79	LPS	85	0.30
A	39	96	02C+0.54	LPS	85	0.37
A	39	97	02C+0.57	LPS	80	0.44
A	39	97	02C+1.08	LPS	310	1.16
A	39	97	02C+1.36	LPS	86	0.64
A	37	99	TSH+0.56	LPS	85	0.54
A	37	99	TSH+0.69	LPS	176	2.76
A	13	106	TSH+0.22	LPS	121	0.27

Appendix A
SG "A" Indication Summary - Continued

Wear at AVBs and Support Intersections

SG	ROW	COL	LOCATION	IND. TYPE	DEPTH (%)	VOLTS
A	17	79	02C	WEAR	21	0.55
A	17	80	02C	WEAR	25	0.70
A	19	84	02C	WEAR	13	0.31
A	27	29	02C	WEAR	19	0.41
A	27	84	02C	WEAR	19	0.49
A	29	82	02C	WEAR	17	0.41
A	29	85	02C	WEAR	16	0.38
A	31	85	02C	WEAR	13	0.31
A	47	42	02C	WEAR	21	0.42
A	49	48	05C	WEAR	15	0.29
A	34	59	06C	WEAR	24	0.62
A	48	35	07C	WEAR	25	0.67
A	48	36	07C	WEAR	14	0.38
A	48	45	07C	WEAR	20	0.39
A	49	32	07C	WEAR	11	0.29
A	49	33	07C	WEAR	11	0.30
A	49	35	07C	WEAR	17	0.46
A	49	36	07C	WEAR	26	0.82
A	49	37	07C	WEAR	24	0.72
A	49	38	07C	WEAR	29	0.94
A	49	39	07C	WEAR	12	1.17
A	49	40	07C	WEAR	29	0.70
A	49	44	07C	WEAR	21	0.42
A	49	45	07C	WEAR	13	1.27
A	49	46	07C	WEAR	20	0.39
A	48	38	07C+0.3	WEAR	15	0.40
A	48	72	07C+0.4	WEAR	22	0.66
A	49	43	07C+0.4	WEAR	23	2.44
A	49	43	07C-0.1	WEAR	10	0.97
A	48	72	07C-0.2	WEAR	16	0.48
A	48	38	07C-0.4	WEAR	10	0.24
A	49	33	09C	WEAR	11	0.29
A	42	59	AV1	WEAR	11	0.29
A	43	59	AV1	WEAR	12	0.28
A	31	64	AV2	WEAR	21	0.51
A	35	97	AV2	WEAR	15	0.32
A	39	64	AV3	WEAR	14	0.35
A	42	59	AV3	WEAR	15	0.38
A	46	59	AV3	WEAR	22	0.56
A	40	59	AV4	WEAR	19	0.49
A	46	59	AV4	WEAR	23	0.58

Appendix B
SG "B" Indication Summary

Axial Cracks at TTS

SG	ROW	COL	LOCATION	IND.	LENGTH	MAXIMUM	AVERAGE	VOLTS
				TYPE		DEPTH (%)	DEPTH (%)	(Max)
B	35	60	TTS	MAI	0.11	99	66.2	0.65
B	35	60	TTS	MAI	0.11	100	69.5	0.72

Circumferential ODSCC Indications

SG	ROW	COL	LOCATION	IND.	ARC	DEPTH	VOLTS
				TYPE	DEGREES	VOLT AVG	(Max)
B	23	70	TTS	SCI	41	0.01 (VI)	0.10

Wear Due To Loose Parts

SG	ROW	COL	LOCATION	IND.	DEPTH (%)	VOLTS
				TYPE		(Max)
B	38	16	02C+0.6	LPI	4	0.08
B	39	17	02C+0.4	LPI	4	0.08
B	39	18	02C+1.0	LPI	8	0.16
B	39	18	02C+1.4	LPI	5	0.10
B	39	19	02C+0.6	LPI	10	0.20

Loose Parts Signals

SG	ROW	COL	LOCATION	IND.	DEGREE	VOLTS
				TYPE		
B	36	17	02C+0.49	LPS	33	0.55
B	37	17	02C+0.49	LPS	36	0.28
B	40	18	02C+1.10	LPS	90	0.18
B	40	18	02C+2.02	LPS	61	2.06
B	40	18	02C+2.37	LPS	85	0.43
B	40	19	02C+0.87	LPS	85	0.62
B	40	19	02C+1.62	LPS	61	1.19
B	41	20	02C+1.27	LPS	59	0.02
B	35	28	TSH+0.22	LPS	89	0.28
B	11	45	TSH+0.28	LPS	91	0.24
B	28	55	TSH+0.13	LPS	80	0.54
B	28	56	TSH+0.29	LPS	84	0.35
B	4	57	TSH+0.25	LPS	90	0.19
B	21	70	02C+1.60	LPS	184	3.94
B	16	92	TSH+0.24	LPS	118	0.32
B	40	94	02C+0.92	LPS	85	0.74
B	41	94	02C+2.04	LPS	90	0.42
B	8	95	TSH+0.13	LPS	120	0.24
B	21	109	TSH+0.27	LPS	105	0.48
B	22	109	TSH+0.24	LPS	92	0.66
B	7	112	TSH+0.00	LPS	94	0.43

Appendix B
SG "B" Indication Summary -Continued

Wear at AVBs and Support Intersections

SG	ROW	COL	LOCATION	IND. TYPE	DEPTH (%)	VOLTS
B	33	54	02C	WEAR	18	0.38
B	42	63	05C	WEAR	11	0.21
B	47	72	05C	WEAR	16	0.41
B	48	72	05C	WEAR	15	0.45
B	49	48	07C	WEAR	28	1.06
B	49	84	07C	WEAR	25	0.82
B	45	59	AV1	WEAR	30	0.99
B	30	94	AV2	WEAR	9	0.20
B	42	56	AV2	WEAR	27	0.86
B	45	63	AV2	WEAR	17	0.45
B	46	59	AV2	WEAR	27	0.69
B	41	38	AV3	WEAR	13	0.36
B	28	97	AV4	WEAR	17	0.44
B	45	59	AV4	WEAR	25	0.75
B	46	59	AV4	WEAR	25	0.59

Appendix C
SG "C" Indication Summary

Axial Cracks at TTS

SG	ROW	COL	LOCATION	IND. TYPE	LENGTH	MAXIMUM DEPTH (%)	AVERAGE DEPTH (%)	VOLTS (Max)
C	13	61	TTS	SAI	0.13	78	40.8	0.36
C	20	70	TTS	MAI	0.16	100	68.0	0.20
C	20	70	TTS	MAI	0.11	93	65.5	0.09
C	20	73	TTS	SAI	0.14	87	61.5	0.20
C	20	74	TTS	SAI	0.14	88	66.5	0.20
C	20	76	TTS	MAI	0.17	82	65.2	0.30
C	20	76	TTS	MAI	0.14	82	45.4	0.21
C	21	65	TTS	SAI	0.13	94	61.1	0.19
C	21	75	TTS	SAI	0.16	92	71.9	0.30
C	24	10	TTS	SAI	0.08	97	57.5	0.19
C	24	49	TTS	SAI	0.06	40	11.5	0.13
C	41	53	TTS	SAI	0.1	100	58.8	0.17

Circumferential ODSCC Indications

SG	ROW	COL	LOCATION	IND. TYPE	ARC DEGREES	DEPTH VOLT AVG	VOLTS (Max)
C	1	104	TTS	SCI	38	0.01 (VI)	0.12
C	2	30	TTS	SCI	73	0.02 (VI)	0.21
C	2	40	TTS	SCI	61	0.01 (VI)	0.14
C	2	46	TTS	SCI	56	0.02 (VI)	0.22
C	2	49	TTS	SCI	72	0.03 (VI)	0.24
C	4	45	TTS	SCI	40	0.01 (VI)	0.10
C	5	42	TTS	SCI	148	0.04 (VI)	0.18
C	5	82	TTS	SCI	36	0.01 (VI)	0.15
C	6	84	TTS	SCI	79	0.03 (VI)	0.27
C	12	41	TTS	SCI	100	0.04 (VI)	0.27
C	12	57	TTS	MCI	25	0.01 (VI)	0.19
C	12	57	TTS	MCI	41	0.01 (VI)	0.19
C	12	57	TTS	MCI	28	0.01 (VI)	0.10
C	24	50	TTS	SCI	29	0.01 (VI)	0.12
C	26	52	TTS	SCI	122	0.04 (VI)	0.21

Wear Due To Loose Parts

SG	ROW	COL	LOCATION	IND. TYPE	DEPTH (%)	VOLTS (Max)
C	16	85	01H+0.5	LPI	11	0.28
C	37	46	02C+0.7	LPI	7	0.15
C	39	46	02C+0.9	LPI	18	0.37
C	40	96	02C+3.9	LPI	9	0.14
C	40	96	02C+2.6	LPI	10	0.15
C	40	97	02C+4.4	LPI	5	0.07
C	40	97	02C+2.8	LPI	4	0.06

Appendix C
SG "C" Indication Summary - Continued

Loose Parts Signals

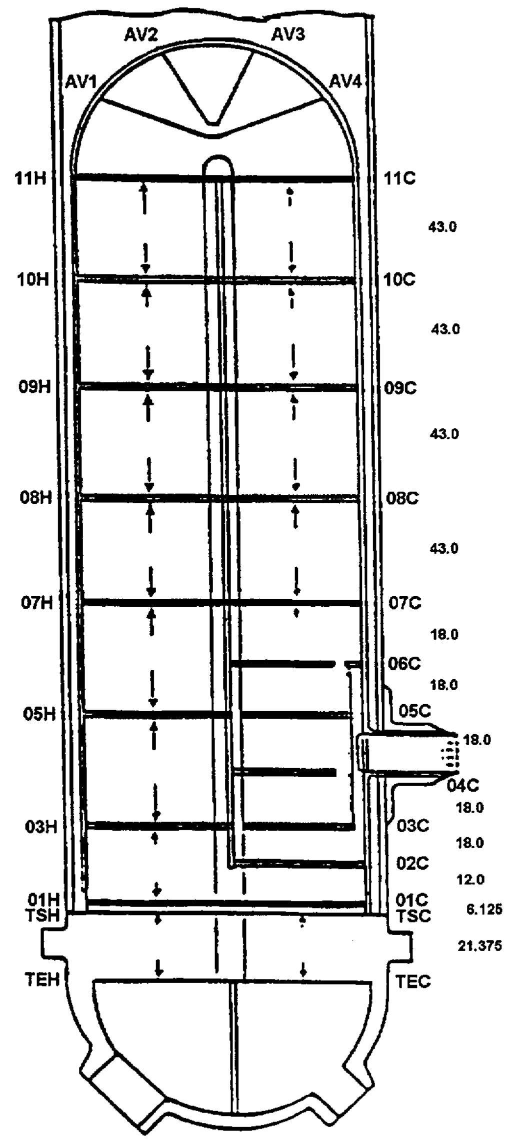
SG	ROW	COL	LOCATION	IND. TYPE	DEGREE	VOLTS
C	49	44	TSH+0.33	LPS	32	2.18
C	49	44	TSH+0.39	LPS	72	0.34
C	49	55	TSH+0.42	LPS	83	0.44
C	49	56	TSH+0.39	LPS	93	0.36
C	49	70	TSH+0.86	LPS	112	0.12
C	39	98	02C+0.52	LPS	84	0.38

Wear at AVBs and Support Intersections

SG	ROW	COL	LOCATION	IND. TYPE	DEPTH (%)	VOLTS
C	45	61	02C	WEAR	19	0.45
C	34	59	03C	WEAR	29	0.62
C	46	38	03C	WEAR	13	0.30
C	48	38	03C	WEAR	21	0.49
C	48	40	03C	WEAR	19	0.57
C	38	79	06C	WEAR	15	0.37
C	47	81	07C	WEAR	20	0.52
C	48	37	07C	WEAR	14	0.40
C	48	67	07C	WEAR	19	0.48
C	48	73	07C	WEAR	19	0.46
C	49	38	07C	WEAR	20	0.48
C	49	40	07C	WEAR	12	0.27
C	49	67	07C	WEAR	21	0.55
C	49	69	07C	WEAR	20	0.51
C	49	70	07C	WEAR	17	0.42
C	27	46	AV1	WEAR	16	0.44
C	28	45	AV1	WEAR	20	0.43
C	30	46	AV1	WEAR	23	0.53
C	31	45	AV1	WEAR	33	1.29
C	33	45	AV1	WEAR	16	0.47
C	40	56	AV1	WEAR	12	0.29
C	45	56	AV1	WEAR	41	1.43
C	48	59	AV1	WEAR	14	0.33
C	23	45	AV2	WEAR	23	0.68
C	25	45	AV2	WEAR	22	0.65
C	28	46	AV2	WEAR	21	0.47
C	34	44	AV2	WEAR	33	1.11
C	40	60	AV2	WEAR	14	0.33
C	41	56	AV2	WEAR	20	0.43
C	43	59	AV2	WEAR	16	0.38
C	44	59	AV2	WEAR	31	0.70
C	48	59	AV2	WEAR	14	0.34
C	49	34	AV2	WEAR	19	0.42
C	30	46	AV3	WEAR	15	0.29
C	33	43	AV3	WEAR	17	0.53
C	33	45	AV3	WEAR	13	0.37
C	34	45	AV3	WEAR	17	0.39
C	37	86	AV3	WEAR	9	0.20
C	39	59	AV3	WEAR	12	0.29
C	39	86	AV3	WEAR	29	0.81
C	40	56	AV3	WEAR	19	0.47
C	48	59	AV3	WEAR	10	0.25
C	40	19	AV4	WEAR	21	0.48
C	41	20	AV4	WEAR	31	0.91
C	45	56	AV4	WEAR	27	0.61

Appendix D
Tube Support Diagram

The model D4 SG's were built by Westinghouse and the plant started operations in 1987. There are 3 SG's each having 4578 tubes. The tubes are mill annealed Inconel 600 with dimensions of 0.75" OD x 0.043" wall thickness. Supports include carbon steel drilled supports; eight on the hot leg side and eleven on the cold leg side and anti-vibration bars in the u-bend section.



Appendix D
Data Legend and Indication Codes

Row:	Indicates the row number of a given tube
Col:	Indicates the column number of a given tube
Vlts:	Indicates the voltage response of a given indication[1]
Deg:	The measured phase angle of a given indication
CH:	Indicates the channel used to measure and evaluate a given indication
Ind. Type:	Analysis indication code, e.g. LPS = Loose Part Signal, etc.
Indication Location:	Indicates the indication location relative to known landmarks such as the top of the tube sheet, horizontal supports and anti-vibration bars (AVB's). TTS = top of the tube sheet, hot leg side.

Indication Codes

Bobbin Codes

LPI	Loose Part Indication -- A signal from a loose part which indicates a possible degraded area.
LPS	Loose Part Signal
WEAR	Wear Indication

RC Codes

SAI	Single Axial Indication
MAI	Multiple Axial Indication -- More than one indication in the same axial plane.
SCI	Single Circumferential Indication
MCI	Multiple Circumferential Indication -- More than one indication in the same circumferential plane.

1 Voltage is relative as a measurement of indication size based on an established standard.

Appendix E
Tube Plug Maps

- attached -

"SG-A Updated Plug Tube History"

"SG-B Updated Plug Tube History"

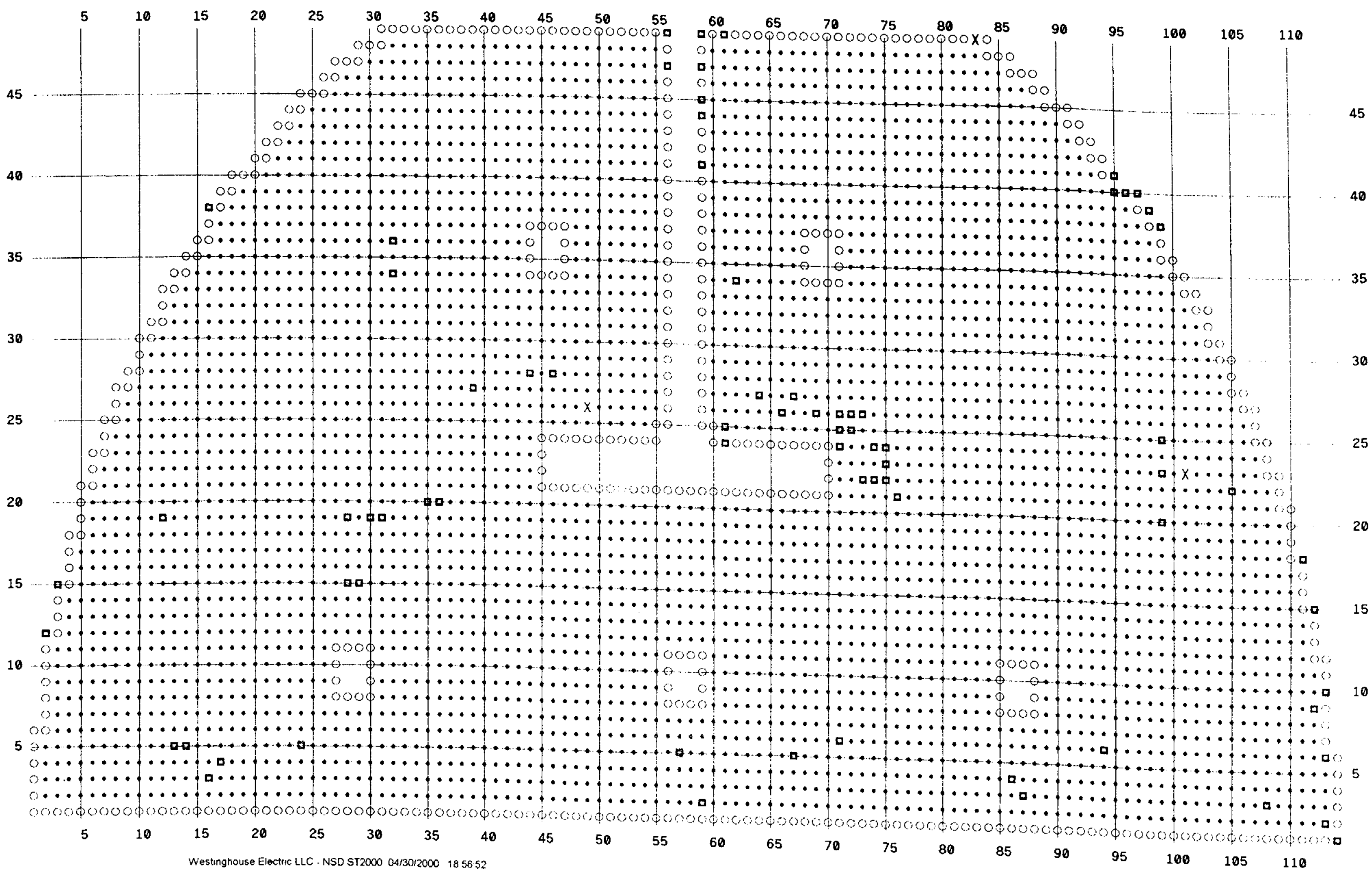
"SG-C Updated Plug Tube History"

SG - A UPDATED PLUG TUBE HISTORY

Shearon Harris U1RFO9 CQL D4

X 3 TUBE PLUGGED THIS OUTAGE BASED ON EC RESULTS

□ 74 EXISTING PLUGGED TUBE



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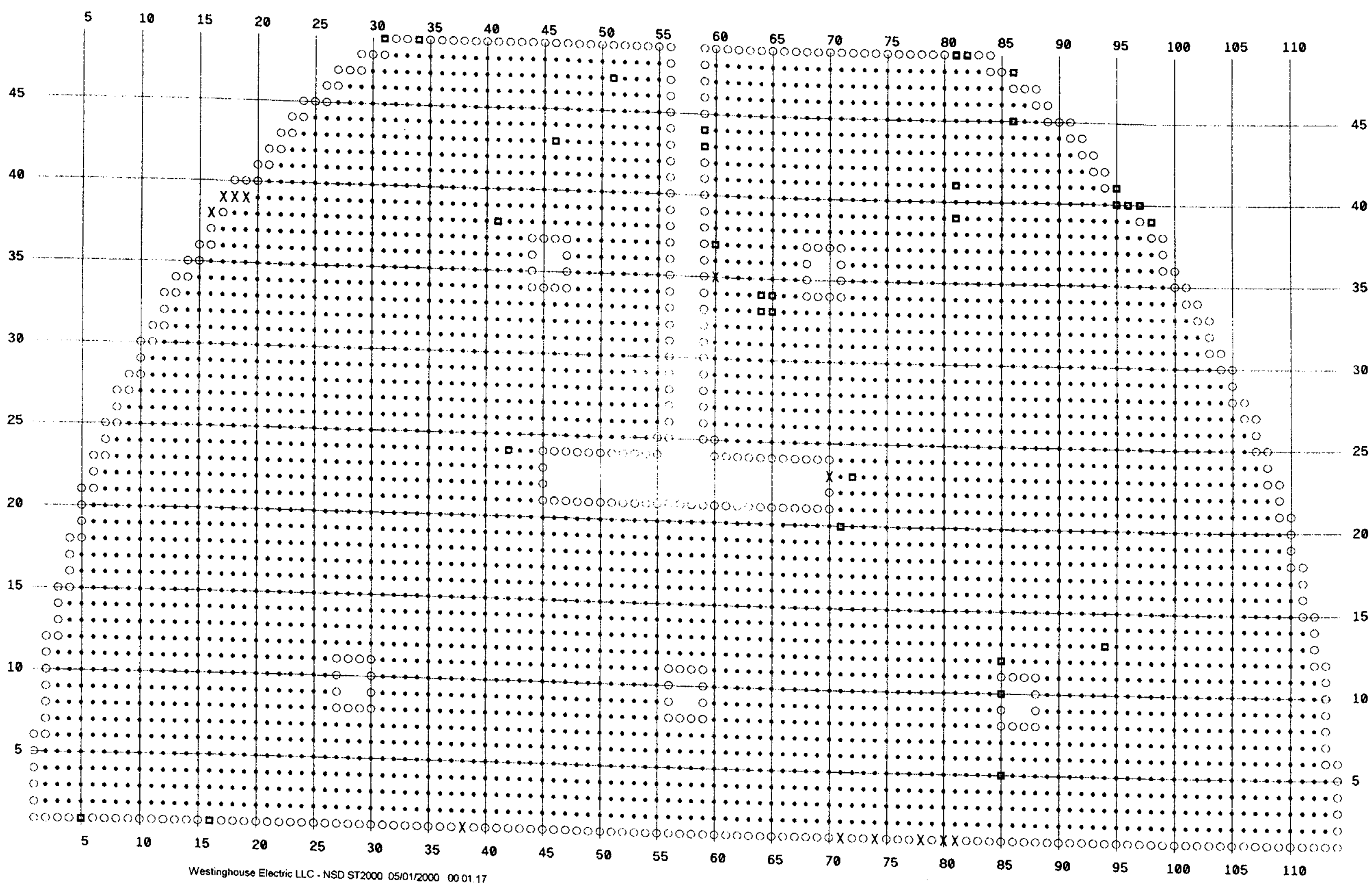
SG - B UPDATED PLUG TUBE HISTORY

Shearon Harris U1RFO9 CQL D4

X 12 TUBE PLUGGED THIS OUTAGE
BASED ON EC RESULTS

▫ 32 EXISTING PLUGGED TUBE

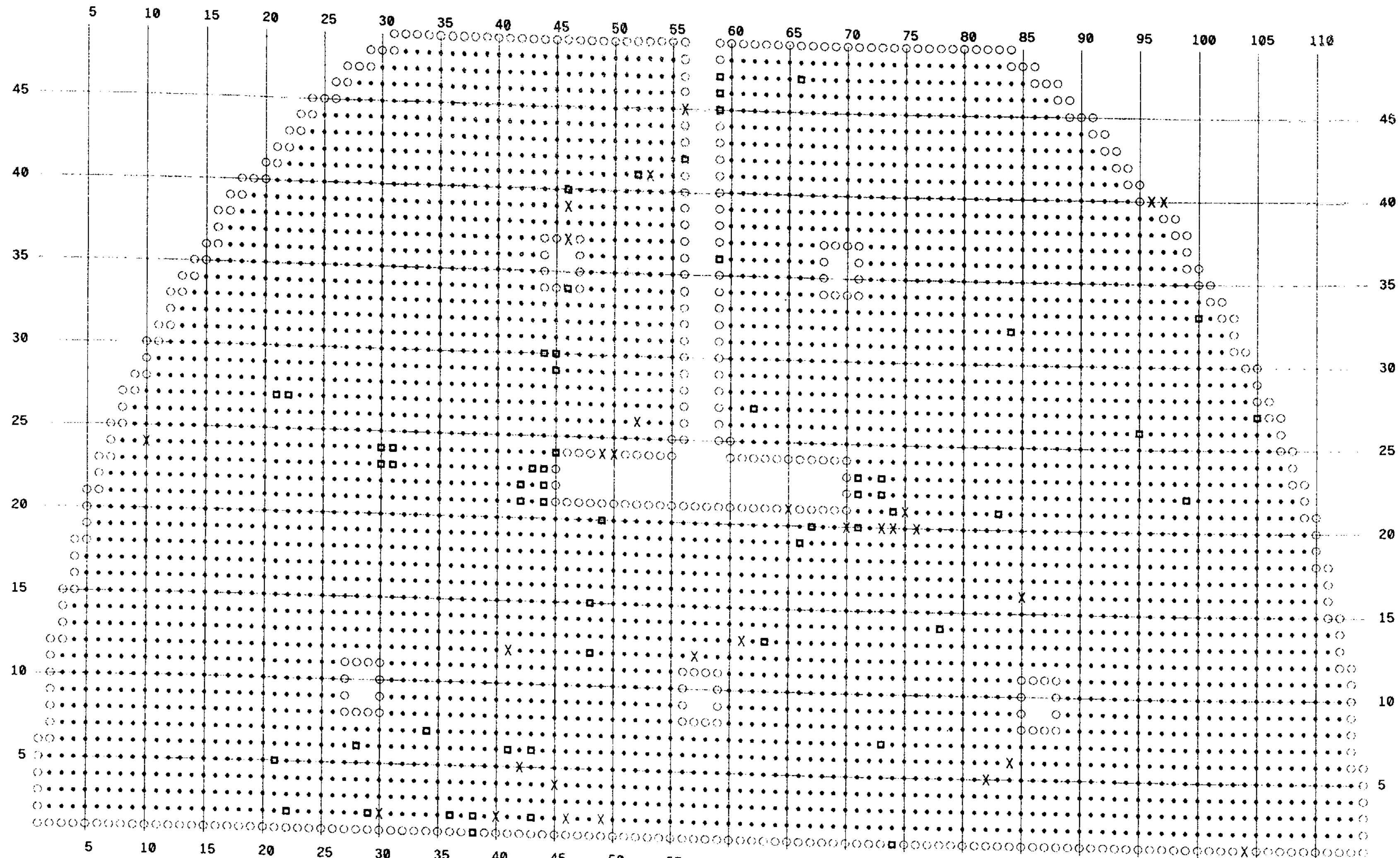


SG - C UPDATED PLUG TUBE HISTORY

Shearon Harris U1RFO9 CQL D4

X 29 TUBE PLUGGED THIS OUTAGE BASED ON EC RESULTS

▫ 58 EXISTING PLUGGED TUBE



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