PSEG Nuclear LLC
P.O. Box 236, Hancocks Bridge, New Jersey 08038-0236

FEB 27 2001

PSEG Nuclear LLC

LRN-01-0059

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Gentlemen:

TECHNICAL SPECIFICATION 6.9.1.5 ANNUAL REPORTS
SALEM AND HOPE CREEK GENERATING STATIONS
DOCKET NOS. 50-272, 50-311, AND 50-354

PSEG Nuclear LLC hereby submits the enclosed Annual Reports for the Salem and Hope Creek Generating Stations, in accordance with Technical Specifications 6.9.1.5.a and 6.9.1.5.b of Appendix A to Facility Operating Licenses Nos. DPR-70, DPR-75, and NPF-57.

Pursuant to Technical Specification 6.9.1.5.a, Enclosures 1, 2, and 3 are submitted for Salem Unit 1, Salem Unit 2, and Hope Creek, respectively. These enclosures contain 2000 data on the number of station, utility, and other personnel receiving exposures greater than 100 mrem/year and the collective exposures according to work and job function for each unit.

Enclosure 4 provides information pursuant to the requirements of Technical Specification 6.9.1.5.b of Appendix A to Facility Operating Licenses No. DPR-75. The information pertains to the Salem Unit 2 steam generator tube inspection completed in 2000.

Pursuant to the requirements of Technical Specification 6.9.1.5.b of Appendix A to Facility Operating License No. NPR-57, the following information is provided concerning the Hope Creek Safety/Relief Valves (SRVs). During 2000, the SRVs were not challenged by any overpressurization events or transients that would have required the valves to respond. SRV testing was performed on installed SRVs during 2000 and the results were provided to the NRC in Hope Creek LER 00-003-00, sent via letter LN-00-0222, dated June 5, 2000.

A001

Document Control Desk
LRN-01-0059

Should you have any questions or comments regarding this submittal, please contact us.

Sincerely,

Gabor Salamon
Manager – Licensing

RAR
Enclosures (4)

C: Mr. H. J. Miller, Administrator - Region I
U. S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Mr. R. Fretz, Licensing Project Manager - Salem
U. S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Mail Stop 08B2
Rockville, MD 20852

Mr. R. Ennis, Licensing Project Manager – Hope Creek
U. S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Mail Stop 08B1
Rockville, MD 20852

USNRC Senior Resident Inspector Office (X24)

Mr. K. Tosch, Manager IV
Bureau of Nuclear Engineering
P. O. Box 415
Trenton, NJ 08625

ENCLOSURE 1

ANNUAL REPORT

Salem 1 - Year of 2000

NUMBER OF PERSONNEL AND MAN-REM BY WORK AND JOB FUNCTION

Work & Job Function	All Personnel (> 100 mrem)			Total Man-Rem		
	Station Employees	Utility Employees	Contractors and Others	Station Employees	Utility Employees	Contractors and Others
ROUTINE MAINTENANCE						
-MAINTENANCE	3	0	2	4.176	0.033	0.456
-OPERATIONS PERSONNEL	0	0	0	1.293	0.003	0.276
-HEALTH PHYSICS	8	0	4	2.949	0.013	0.872
-SUPERVISORY PERSONNEL	1	0	0	0.680	0.067	0.191
-ENGINEERING PERSONNEL	0	0	0	0.101	0.000	0.016
INSERVICE INSPECTION						
-MAINTENANCE	0	0	0	0.000	0.000	0.000
-OPERATIONS PERSONNEL	0	0	0	0.000	0.000	0.000
-HEALTH PHYSICS	0	0	0	0.000	0.000	0.000
-SUPERVISORY PERSONNEL	0	0	0	0.000	0.000	0.000
-ENGINEERING PERSONNEL	0	0	0	0.000	0.000	0.000
SPECIAL MAINTENANCE						
-MAINTENANCE	0	0	0	0.000	0.000	0.000
-OPERATIONS PERSONNEL	0	0	0	0.000	0.000	0.000
-HEALTH PHYSICS	0	0	0	0.000	0.000	0.000
-SUPERVISORY PERSONNEL	0	0	0	0.009	0.001	0.018
-ENGINEERING PERSONNEL	0	0	0	0.000	0.000	0.001
WASTE PROCESSING						
-MAINTENANCE	0	0	0	0.000	0.000	0.000
-OPERATIONS PERSONNEL	0	0	0	0.000	0.000	0.000
-HEALTH PHYSICS	0	0	0	0.000	0.000	0.000
-SUPERVISORY PERSONNEL	0	0	0	0.000	0.000	0.000
-ENGINEERING PERSONNEL	0	0	0	0.000	0.000	0.000
REFUELING						
-MAINTENANCE	0	0	0	0.081	0.000	0.014
-OPERATIONS PERSONNEL	1	0	1	0.180	0.000	1.357
-HEALTH PHYSICS	2	0	1	0.956	0.000	0.273
-SUPERVISORY PERSONNEL	0	0	0	0.002	0.000	0.025
-ENGINEERING PERSONNEL	0	0	0	0.000	0.000	0.001
RX OPERATION & SURVEILL						
-MAINTENANCE	0	0	0	0.000	0.000	0.000
-OPERATIONS PERSONNEL	0	0	0	0.000	0.000	0.000
-HEALTH PHYSICS	0	0	0	0.000	0.000	0.000
-SUPERVISORY PERSONNEL	0	0	0	0.000	0.000	0.000
-ENGINEERING PERSONNEL	0	0	0	0.000	0.000	0.000

ANNUAL REPORT

Salem 1 - Year of 2000

NUMBER OF PERSONNEL AND MAN-REM BY WORK AND JOB FUNCTION

Work & Job Function	All Personnel (> 100 mrem)			Total Man-Rem		
	Station Employees	Utility Employees	Contractors and Others	Station Employees	Utility Employees	Contractors and Others
TOTALS						
-MAINTENANCE	3	0	2	4.257	0.033	0.470
-OPERATIONS PERSONNEL	1	0	1	1.473	0.003	1.633
-HEALTH PHYSICS	10	0	5	3.905	0.013	1.144
-SUPERVISORY PERSONNEL	1	0	0	0.691	0.067	0.234
-ENGINEERING PERSONNEL	0	0	0	0.101	0.000	0.017
GRAND TOTALS	15	0	8	10.425	0.115	3.497
TOTAL DOSE						14.038

ENCLOSURE 2

ANNUAL REPORT

Salem 2 - Year of 2000

NUMBER OF PERSONNEL AND MAN-REM BY WORK AND JOB FUNCTION

Work & Job Function	All Personnel (> 100 mrem)			Total Man-Rem		
	Station Employees	Utility Employees	Contractors and Others	Station Employees	Utility Employees	Contractors and Others
ROUTINE MAINTENANCE						
-MAINTENANCE	62	0	22	21.141	0.121	9.732
-OPERATIONS PERSONNEL	23	0	1	7.134	0.004	1.028
-HEALTH PHYSICS	42	0	36	15.019	0.000	14.055
-SUPERVISORY PERSONNEL	5	0	189	2.449	0.202	94.218
-ENGINEERING PERSONNEL	1	0	0	0.450	0.000	0.075
INSERVICE INSPECTION						
-MAINTENANCE	0	0	0	0.000	0.000	0.000
-OPERATIONS PERSONNEL	0	0	0	0.000	0.000	0.000
-HEALTH PHYSICS	0	0	0	0.000	0.000	0.000
-SUPERVISORY PERSONNEL	0	0	0	0.000	0.000	0.000
-ENGINEERING PERSONNEL	0	0	0	0.000	0.000	0.000
SPECIAL MAINTENANCE						
-MAINTENANCE	0	0	0	0.049	0.000	0.108
-OPERATIONS PERSONNEL	7	0	0	1.323	0.000	0.009
-HEALTH PHYSICS	1	0	0	0.120	0.000	0.001
-SUPERVISORY PERSONNEL	5	0	12	1.091	0.012	5.737
-ENGINEERING PERSONNEL	0	0	1	0.000	0.000	0.112
WASTE PROCESSING						
-MAINTENANCE	0	0	3	0.527	0.000	0.937
-OPERATIONS PERSONNEL	0	0	0	0.024	0.000	0.000
-HEALTH PHYSICS	0	0	0	0.006	0.000	0.016
-SUPERVISORY PERSONNEL	0	0	45	0.130	0.011	11.691
-ENGINEERING PERSONNEL	0	0	0	0.013	0.000	0.042
REFUELING						
-MAINTENANCE	0	0	3	0.844	0.000	0.635
-OPERATIONS PERSONNEL	0	0	1	0.042	0.000	0.366
-HEALTH PHYSICS	9	0	5	3.487	0.000	1.781
-SUPERVISORY PERSONNEL	0	0	2	0.053	0.000	0.844
-ENGINEERING PERSONNEL	0	0	0	0.017	0.000	0.001
RX OPERATION & SURVEILL						
-MAINTENANCE	0	0	0	0.000	0.000	0.000
-OPERATIONS PERSONNEL	0	0	0	0.000	0.000	0.000
-HEALTH PHYSICS	0	0	0	0.000	0.000	0.000
-SUPERVISORY PERSONNEL	0	0	0	0.000	0.000	0.000
-ENGINEERING PERSONNEL	0	0	0	0.000	0.000	0.000

ANNUAL REPORT

Salem 2 - Year of 2000

NUMBER OF PERSONNEL AND MAN-REM BY WORK AND JOB FUNCTION

Work & Job Function	All Personnel (> 100 mrem)			Total Man-Rem		
	Station Employees	Utility Employees	Contractors and Others	Station Employees	Utility Employees	Contractors and Others
TOTALS						
-MAINTENANCE	62	0	28	22.560	0.122	11.412
-OPERATIONS PERSONNEL	30	0	2	8.523	0.004	1.403
-HEALTH PHYSICS	52	0	41	18.632	0.000	15.853
-SUPERVISORY PERSONNEL	10	0	248	3.722	0.226	112.490
-ENGINEERING PERSONNEL	1	0	1	0.480	0.000	0.230
GRAND TOTALS	155	0	320	53.917	0.351	141.387
TOTAL DOSE						195.655

ENCLOSURE 3

ANNUAL REPORT

Hope Creek - Year of 2000

NUMBER OF PERSONNEL AND MAN-REM BY WORK AND JOB FUNCTION

Work & Job Function	All Personnel (> 100 mrem)			Total Man-Rem		
	Station Employees	Utility Employees	Contractors and Others	Station Employees	Utility Employees	Contractors and Others
ROUTINE MAINTENANCE						
-MAINTENANCE	0	0	0	0.000	0.000	0.000
-OPERATIONS PERSONNEL	0	0	0	0.000	0.000	0.000
-HEALTH PHYSICS	0	0	0	0.000	0.000	0.000
-SUPERVISORY PERSONNEL	0	0	0	0.000	0.000	0.000
-ENGINEERING PERSONNEL	0	0	0	0.000	0.000	0.000
INSERVICE INSPECTION						
-MAINTENANCE	140	0	80	49.327	0.542	35.009
-OPERATIONS PERSONNEL	49	0	0	16.568	0.018	0.765
-HEALTH PHYSICS	46	0	62	18.929	0.025	22.279
-SUPERVISORY PERSONNEL	15	3	40	3.792	1.455	14.892
-ENGINEERING PERSONNEL	2	0	2	0.906	0.001	0.668
SPECIAL MAINTENANCE						
-MAINTENANCE	0	0	35	0.154	0.001	17.486
-OPERATIONS PERSONNEL	7	0	0	1.529	0.000	0.001
-HEALTH PHYSICS	0	0	0	0.001	0.000	0.090
-SUPERVISORY PERSONNEL	10	0	19	2.244	0.046	8.758
-ENGINEERING PERSONNEL	0	0	1	0.000	0.000	0.248
WASTE PROCESSING						
-MAINTENANCE	0	0	0	0.012	0.000	0.985
-OPERATIONS PERSONNEL	0	0	0	0.008	0.000	0.001
-HEALTH PHYSICS	0	0	0	0.064	0.000	0.146
-SUPERVISORY PERSONNEL	0	0	0	0.008	0.000	0.317
-ENGINEERING PERSONNEL	0	0	0	0.005	0.000	0.000
REFUELING						
-MAINTENANCE	0	0	0	0.059	0.000	0.001
-OPERATIONS PERSONNEL	0	0	0	0.000	0.000	0.000
-HEALTH PHYSICS	3	0	3	1.389	0.000	0.338
-SUPERVISORY PERSONNEL	0	0	0	0.280	0.001	0.000
-ENGINEERING PERSONNEL	0	0	0	0.000	0.000	0.000
RX OPERATION & SURVEILL						
-MAINTENANCE	0	0	0	0.000	0.000	0.000
-OPERATIONS PERSONNEL	0	0	0	0.000	0.000	0.000
-HEALTH PHYSICS	0	0	0	0.000	0.000	0.000
-SUPERVISORY PERSONNEL	0	0	0	0.000	0.000	0.000
-ENGINEERING PERSONNEL	0	0	0	0.000	0.000	0.000

ANNUAL REPORT

Hope Creek - Year of 2000

NUMBER OF PERSONNEL AND MAN-REM BY WORK AND JOB FUNCTION

Work & Job Function	All Personnel (> 100 mrem)			Total Man-Rem		
	Station Employees	Utility Employees	Contractors and Others	Station Employees	Utility Employees	Contractors and Others
TOTALS						
-MAINTENANCE	140	0	115	49.552	0.544	53.481
-OPERATIONS PERSONNEL	56	0	0	18.105	0.018	0.766
-HEALTH PHYSICS	49	0	65	20.383	0.025	22.853
-SUPERVISORY PERSONNEL	25	3	59	6.323	1.501	23.967
-ENGINEERING PERSONNEL	2	0	3	0.911	0.001	0.916
GRAND TOTALS	272	3	242	95.274	2.089	101.983
TOTAL DOSE						199.346

ENCLOSURE 4

Salem Unit 1 and Unit 2 2000 Steam Generator Tube ISI Report

In 2000, Framatome Technologies Incorporated (FTI) conducted eddy current examinations and primary data analysis on the Unit 2 steam generators during the 11th Refueling Outage. No inspections were performed on Unit 1 during 2000. The next scheduled outage for Unit 1 is in April 2001; therefore, this report only addresses Salem Unit 2. All inspections were performed under the supervision of the station's Steam Generator Group. Zetec Incorporated performed secondary production/resolution data analysis. Moretech Inc. provided Independent Qualified Data Analysis/Station Level III oversight.

OVERVIEW

Eddy current data acquisition was performed with the ROGER Manipulator using a dual guide tube tool head. Inspection data was transmitted to FTI's Lynchburg, VA, data room facilityfor primary production analysis and to Zetec's Issaquah, WA, data room facility for secondary production analysis. Resolution analysis was performed at the station's off-site data room facility. Primary analysis of bobbin coil data was performed manually by FTI. Secondary analysis of bobbin coil data was performed using an automated system. A single party automated system was also used for detection of non-degradation types of tubing indications including dents, dings, and tube support integrity. Two-party manual analysis was performed on all rotating coil data.

The scopes of the inspection were delineated in the 2R11 Steam Generator Tubing Degradation Assessment. This document identified the degradation mechanisms that have affected or could affect the tubing in the steam generators, identified the inspection scopes and techniques to be used, documented the review of EPRI qualified techniques against site-specific steam generator conditions, and provided structural limits that were used to assess tube integrity requirements. The base eddy current examination scope met Salem Unit 2 Technical Specification requirements. A summary of the base scope follows:

- Full-length bobbin coil inspection of 100% of the in-service tubes in each steam generator.
- Rotating Coil (+ Point) exam of 100% of the Row 2 short radius U-bends and 20% of the Row 3 short radius U-bends (07C-07H) in each steam generator.
- Rotating Coil (+ Point) exam of 100% of the Hot Leg (HL) WEXTEX Top of Tubesheet (TTS) transition regions in each steam generator.
- Rotating Coil (+ Point) exam of 100% of the $\geq$1 volt dented HL Tube Support Plate (TSP) intersections, based on 2R10 bobbin coil data, in the defined "critical area" for each steam generator.
- Rotating Coil (+ Point) exam of 20% of the $\geq$2 volt HL free span dings based on 2R10 bobbin coil data.
- Rotating Coil (+ Point) examination of previous Suspect Ligament Indications identified from the 2R10 bobbin coil data.
- Special Interest Rotating Coil (+ Point) examinations as delineated in the 2R10 Steam Generator Tubing Degradation Assessment or as required based on the 2R11 bobbin coil data.

Attachment 6 of this report provides a summary of the Non Destructive Examination (NDE) techniques utilized during 2R11 for detection (and sizing as applicable) of each degradation mechanism.

In accordance with Rev. 5 of the EPRI PWR Steam Generator Examination Guidelines, the station contracted Independent Qualified Data Analysts (QDA) from Moretech Inc. to verify the resolution process was properly performed and that field calls were properly reported.

Rev. 5 of the EPRI PWR Steam Generator Examination Guidelines allows utilities to deviate from specific requirements through a documented technical justification for each deviation. Seven technical deviations were implemented for 2R11. All deviations were reviewed and approved by station management. A summary of the deviations is provided below:

- 2R11-00-001 deviated from the normalization requirements specified in Rev. 5 to provide for more consistent sizing technique for Anti-Vibration Bar (AVB) wear indications.
- 2R11-00-002 deviated from the minimum required Electro-discharge machining (EDM) notches in the rotating coil calibration standard. Rev. 5 requires a 40% inside diameter (ID) axial and circumferential notch. The station's calibration standards do not contain the 40% notch described above but do contain a 20% ID axial and circumferential notch, which exceeds the 40% minimum requirement.
- 2R11-00-003 deviated from the voltage normalization requirements specified in Rev. 5 for bobbin examinations. Voltage normalization will be based on the transfer values obtained from comparisons to the Westinghouse Mother Standard rather than those specified in Rev. 5.
- 2R11-00-004 deviated from requiring all data analysts to pass the Site Specific Performance Demonstration (SSPD). Salem's contracted Level III Data Analyst assisted in the development of the training program and SSPD and, as such, is thoroughly familiar with plant specific data and steam generator tubing conditions. This individual was exempt from taking the SSPD.
- 2R11-00-005 deviated from requiring that production data analysts review overcalls. The station does not feel this requirement adds value to the analysis process. The station would rather have production analysts err on the conservative side and let the more experienced resolution analysts make the final determination.
- 2R11-00-006 deviated from the Critical Area (C-A) buffer zone tube population inspection requirements for the $\geq$1 volt dented TSP + Point exams. The station will define the buffer zone tube population as equal to 20% of the number of $\geq$1 volt dents at the highest TSP elevation that were free from active Primary Water Stress Corrosion Cracking (PWSCC) degradation during the 2R10 inspection as opposed to a 20% population of the tubes. The station feels this criterion meets the intent of Rev. 5 for establishing a buffer zone when inspecting under the C-A program.
- 2R11-00-007 deviated from the requirement to perform a 20% eddy current inspection of installed FTI Inconnel-690 rolled plugs based on material properties and industry inspection data.

Abbreviations

#H or #C	Tubes Support Plate elevation Hot Leg or Cold Leg side of Steam Generator
2R11	Unit 2 Refueling Outage 11
2R10	Unit 2 Refueling Outage 10
AV#	Anti-Vibration Bar Number designator (e.g. AV1 is Anti-Vibration Bar 1)
AVB	Anti-Vibration Bar
C-A	Critical Area
CL	Cold Leg
CLT	Cold Leg Thinning
DSI	Distorted Support Indication
EDM	Electro-discharge machining
EPRI	Electric Power Research Institute
ETL	Expansion Transition Location
ETSS	Examination Technique Specification Sheet
FTI	Framatome Technologies Incorporated
HL	Hot Leg
I-690	Inconel 690
ID	Inside Diameter
IGA	Inter Granular Attack
ISI	In-Service Inspection
MAI	Multiple Axial Indication
MBI	Manufacturer's Burnish Indication
MBM	Manufacturer's Burnish Mark
NDE	Non Destructive Examination
NDD	No Degradation Detected
NEI	Nuclear Energy Institute
NTE	No Tube Expansion
OBS	Obstructed
OD	Outside Diameter
ODSCC	Outside Diameter Stress Corrosion Cracking
PAP	Plug-a-Plug
PIP	Plug-in-Plug
PLI	Possible Loose Part Indication
PSI	Possible Support Indication
PTE	Partial Tube Expansion
PVN	Permeability Variation
PWSCC	Primary Water Stress Corrosion Cracking
QDA	Qualified Data Analyst
R1	Row 1
R2	Row 2
RFO	Refueling Outage
RPC	Rotating Pancake Coil

SAI	Single Axial Indication
SCC	Stress Corrosion Cracking
SG	Steam Generator
SLC	Suspect Ligament Crack
SVI	Single Volumetric Indication
TEH	Tube End Hot
TSH	Tubesheet Hot Leg Side
TSP	Tube Support Plate
TTS	Top of Tubesheet
TW	Through Wall

Assessment of Examination Results

Consistent with the requirements specified in NEI 97-06, Steam Generator Program Guidelines, the Unit 2 steam generators met the structural integrity, accident induced leakage and operational leakage performance criteria specified in site procedure SC.SA-AP.ZZ-0042 (Q), Steam Generator Program for 2R11. The following table summarizes the number of tubes removed from service in each steam generator by degradation mechanism. In addition, cumulative tube plugging levels are provided.

Modes of Degradation	SG21	SG22	SG23	SG24	TOTAL
PWSCC @ HL TTS (Axial)	15	16	3	26	60
ODSCC @ HL TTS (Axial)	2	2	0	0	4
ODSCC @ HL TTS (Volumetric)	1	1	1	0	3
Anti-Vibration Bar Wear	0	1	4	0	5
Cold Leg Thinning	1	1	1	3	6
PWSCC @ HL TSP (Axial)	2	0	0	1	3
PWSCC LOW ROW U-BENDS (Circ)	0	0	5	0	5
Loose Part Indication	0	1	0	0	1
Unacceptable Data Quality (PVN)	9	11	0	7	27
Unacceptable Data Quality (Low Row Ubends)	1	0	3	1	5
TOTAL INDICATIONS					119*
TOTAL TUBES PLUGGED	31	33	17	37	118*
TOTAL TUBES PLUGGED CUMULATIVE	197	216	161	297	871
CUMULATIVE TUBE PLUGGING %	5.81	6.38	4.75	8.76	6.43

*There were two indications on one tube.

WEXTEX Tubesheet Region

The WEXTEX transition is the region of the tube where the tube transitions from the expanded tube diameter to the nominal tube diameter and is typically located near the top of the tubesheet. The bottom of the WEXTEX transition is the first point of contact between the tube and the tubesheet. In this region, both PWSCC and ODSCC have been observed with PWSCC being the prominent damage mechanism at Salem Unit 2.

During 2R11, 100% rotating coil (+ Point) inspections of the HL TTS WEXTEX transition region were performed in each steam generator. Detection of axial and circumferential PWSCC in the WEXTEX region was qualified per EPRI ETSS 96508. Detection of axial and circumferential ODSCC in the WEXTEX region was qualified per EPRI ETSS 96402.

The inspection extent varied per SG and is shown in the table below. The (+) TTS extent encompasses the average sludge depth reported during previous outages for ODSCC flaw detection purposes. The (-) TTS extent was conservatively based on lowest reported tubesheet flaw reported during 2R10.

S/G	Extent of Inspection
21	+2" above the TTS, -5" below the TTS
22	+2" above the TTS, -7" below the TTS
23	+2" above the TTS, -5" below the TTS
24	+2" above the TTS, -5" below the TTS

The table below lists all tubesheet indications detected during 2R11. A plug on detection repair policy is implemented by the station; therefore, all tubesheet indications listed below were removed from service during 2R11. A total of 60 axial PWSCC indications in the WEXTEX region were detected by + Point. Additionally, there were 4 ODSCC axial indications and 3 OD single volumetric indications (SVI). No circumferential indications were reported in this region during 2R11. All axial and volumetric indications were sized with the best available techniques for tube integrity assessment purposes.

SG	Row	Column	Indication	Mechanism	+ Point Volts	Measurement	
						From	To
21	5	7	SAI	PWSCC	0.51	-0.69	-0.63
			SAI	PWSCC	0.34	-1.02	-0.93
			SAI	PWSCC	0.26	-2.19	-2.04
21	15	16	SAI	PWSCC	0.75	-4.89	-4.72
			SAI	PWSCC	0.43	-4.98	-4.81
21	14	18	SAI	PWSCC	2.33	-5.06	-4.73
21	38	22	SAI	PWSCC	0.69	-2.14	-1.74
			SAI	PWSCC	0.50	-0.76	-0.62
21	13	24	SAI	PWSCC	0.46	-0.31	-0.25
21	18	24	SAI	PWSCC	0.49	-1.46	-1.43
21	16	28	SAI	PWSCC	0.57	-5.01	-4.85
			SAI	PWSCC	0.46	-2.02	-1.92
21	4	29	SAI	PWSCC	0.41	-2.09	-2.00
21	13	39	SAI	ODSCC	0.21	+0.20	+0.47
21	18	39	SAI	PWSCC	0.37	-1.40	-1.34
21	9	41	SAI	PWSCC	0.50	-0.53	-0.47
21	16	51	SAI	PWSCC	0.58	-1.69	-1.56
21	22	54	SAI	PWSCC	0.45	-1.63	-1.42
21	12	58	SAI	PWSCC	0.51	-2.41	-2.32
21	14	61	SAI	PWSCC	1.69	-6.25	-6.09
21	27	65	SVI	ODSCC	0.07	+0.38	+0.53
21	29	71	SAI	ODSCC	0.18	-0.46	-0.31
21	25	87	SAI	PWSCC	1.28	+0.35[1]	+0.64
22	7	2	SAI	PWSCC	0.63	-5.86	-5.69
22	9	5	SAI	PWSCC	0.40	-0.69	-0.61
22	2	13	SAI	PWSCC	0.43	-6.07	-5.84
22	5	13	SAI	PWSCC	0.36	-0.58	-0.43
			SAI	PWSCC	0.31	-1.49	-1.41
22	30	20	SVI	ODSCC	0.15	+0.08	+0.49

[1] Bobbin review of this indication showed a dent present. + Point shows a flaw-like signal with dent evident

SG	Row	Column	Indication	Mechanism	+ Point Volts	Measurement	
						From	To
22	7	36	SAI	PWSCC	0.27	-0.84	-0.75
22	8	41	SAI	PWSCC	0.54	-1.92	-1.84
22	13	42	SAI	PWSCC	0.37	-2.51	-2.46
22	9	45	SAI	PWSCC	0.66	-2.14	-2.07
22	4	46	SAI	PWSCC	0.47	-5.36	-5.27
22	5	46	SAI	PWSCC	0.57	-4.93	-4.75
22	11	50	SAI	PWSCC	0.51	-0.64	-0.54
22	11	52	SAI	PWSCC	0.48	-1.67	-1.63
22	10	54	SAI	PWSCC	0.60	-1.87	-1.80
22	14	55	SAI	ODSCC	0.12	+0.54	+0.62
22	20	62	SAI	ODSCC	0.14	+0.13	+0.23
22	30	62	SAI	PWSCC	0.68	-4.77	-4.67
22	9	63	SAI	PWSCC	0.88	-4.65	-4.53
22	2	84	SAI	PWSCC	0.77	-1.12	-0.84
23	10	13	SVI	ODSCC	0.11	+0.04	+0.22
23	2	44	SAI	PWSCC	0.47	-0.39	-0.34
23	26	46	SAI	PWSCC	1.01	-0.86	-0.67
23	34	72	SAI	PWSCC	0.37	+0.08	+0.21
24	8	5	SAI	PWSCC	0.44	-0.39	-0.29
24	12	8	SAI	PWSCC	0.23	-0.70	-0.59
24	6	12	SAI	PWSCC	0.61	-0.29	-0.14
24	9	12	SAI	PWSCC	0.46	-0.16	-0.06
24	13	12	MAI	PWSCC	0.52	+2.82[2]	+3.01
24	20	14	SAI	PWSCC	0.46	-0.37	-0.27
24	16	20	SAI	PWSCC	0.58	-5.35	-5.18
			SAI	PWSCC	0.70	-0.37	-0.21
24	20	25	SAI	PWSCC	0.56	-0.54	-0.43
24	6	26	SAI	PWSCC	0.55	-0.40	-0.35
24	19	26	SAI	PWSCC	0.66	-0.90	-1.04
24	41	30	SAI	PWSCC	0.53	-3.37	-3.47
24	27	33	SAI	PWSCC	0.57	-0.45	-0.36
24	25	37	SAI	PWSCC	1.79	-7.33	-6.65
24	20	39	SAI	PWSCC	0.77	-0.38	-0.28
24	31	39	SAI	PWSCC	0.57	-0.55	-0.47
24	20	45	SAI	PWSCC	0.30	-3.15	-3.20
			SAI	PWSCC	0.49	-2.70	-2.77
			SAI	PWSCC	0.64	-2.55	-2.60
			SAI	PWSCC	0.32	-1.65	-1.69
			SAI	PWSCC	0.55	-0.87	-0.92
24	8	47	SAI	PWSCC	0.87	-0.78	-0.56
24	10	48	SAI	PWSCC	0.58	-1.00	-0.81
24	13	48	SAI	PWSCC	0.43	-3.13	-2.97
24	28	49	SAI	PWSCC	0.36	-1.12	-1.21
24	33	49	SAI	PWSCC	0.48	-0.44	-0.41

[2] Measurement taken from TEH rather than TSH since this tube has no WEXTEX expansion.

SG	Row	Column	Indication	Mechanism	+ Point Volts	Measurement	
						From	To
24	6	52	SAI	PWSCC	0.61	-0.48	-0.29
24	38	53	SAI	PWSCC	0.95	-0.40	-0.31
24	5	56	SAI	PWSCC	0.65	-0.95	-0.77
			SAI	PWSCC	0.48	0.70	-0.51
24	4	61	SAI	PWSCC	0.42	-0.85	-0.71
24	3	66	SAI	PWSCC	0.74	-0.65	-0.60

Axial PWSCC in the WEXTEX Region

Site qualified technique EPRI ETSS 96508.1 and 96508.2 were used for detection of this degradation mechanism. Both techniques were site qualified in order to bound the 300 kHz frequency used by the station. A total of 60 tubes were plugged for this damage mechanism. No tubes containing axial PWSCC indications required stabilization during 2R11.

Based on these results, PWSCC in the HL WEXTEX Tubesheet Region is considered to be active during cycle 12 in accordance with Section 3.3.2 of the EPRI PWR Steam Generator Examination Guidelines, Rev. 5.

Axial ODSCC at the HL TTS

Site qualified techniques EPRI ETSS 96402.1 and 96402.2 were used for detection of this degradation mechanism. Both techniques were site qualified in order to bound the 300 kHz frequency used by the station. Secondary side IGA/SCC was first reported during 2R5 (1990). No TTS ODSCC was reported during the 2R10; therefore, this mechanism was classified as potential for 2R11.

A total of four tubes were plugged for axial ODSCC at the HL TTS during 2R11. For one of the tubes in 21 SG, R29C71, the axial indication was found in a region of the tubesheet where the tubesheet expansion occurs below the secondary face. For this tube, an $\approx$ 1-inch open crevice region existed, which is considered an Expansion Transition Location (ETL) discrepancy.

Based on these results, ODSCC in the HL WEXTEX Tubesheet Region is considered to be an active damage mechanism during cycle 12 in accordance with Section 3.3.2 of the EPRI PWR Steam Generator Examination Guidelines, Rev. 5.

PWSCC at Dented HL TSP Intersections

During 2R10 both bobbin coil and + Point techniques were used for detection of dented TSP PWSCC. Bobbin coil was used for detection of axial PWSCC at $\leq$ 2 volt dented TSP intersections in accordance with EPRI ETSS 96012, whereas + Point was used for detection both axial and circumferential PWSCC in accordance with EPRI ETSS 96508.

A different approach was taken during 2R11 due to industry reporting of circumferential PWSCC at dented intersections in the 1 to 2 volt range. Since bobbin coil cannot reliably detect

circumferentially oriented flaws, the station decided not to qualify EPRI ETSS 96012 for 2R11. Instead, the station decided to inspect all ≥ 1 volt dented TSP's under the C-A program option with a qualified + Point technique. This required a re-evaluation of the 2R10 bobbin coil data to identify the 1.0 to 1.99 volt dent population since previous outage data had a 2 volt minimum reporting criteria for dents. This re-evaluation was performed on site prior to 2R11 with an automated computer screening system and the results were loaded into the site data management system for determining the 2R11 + Point inspection scope.

About 8550 dented (≥ 1 volt) TSP's were inspected as part of the base scope and 167 new dents[3] were examined with + Point technique in accordance with EPRI ETSS 96508.1 and 96508.2. Both techniques were site qualified in order to bound the 300 kHz frequency used by the station. The technical basis for defining the C-A and buffer zone were based on previous outage inspection results and industry information and are documented in the 2R11 SG Tubing Degradation Assessment. In addition to inspecting 100% of the susceptible locations in the C-A, the station opted to inspect 100% of the buffer zone rather than the 20% required by Rev. 5.

S/G	C-A	Buffer Zone
21	01H – 03H	04H
22	01H – 03H	04H
23	01H – 03H	04H
24	01H – 03H	04H

Three axial PWSCC indications were detected during the inspection. No circumferential PWSCC was detected. With the stations plug on detection repair policy, these tubes were removed from service. No expansion of the dented inspection program was required because all confirmed degradation was confined to the critical area defined above.

Axial PWSCC at Dented HL TSP Intersections

Three tubes were plugged for axial PWSCC indications at dented tube support elevations as identified in the table below:

SG	Tube ID	Indication	TSP Location	Bobbin Dent Voltage	RPC Voltage
21	R2C13	SAI	01H –0.21"	1.75	0.44
21	R5C8	SAI	01H +0.00"	2.01	1.11
24	R20C45	SAI[4]	02H +0.08"	1.31	0.43

Based on these results, PWSCC at dented HL TSP's is considered to be active during cycle 12 in accordance with Section 3.3.2 of the EPRI PWR Steam Generator Examination Guidelines, Rev. 5.

[3] New dents are ≥ 1 volt dents that were reported during the 2R11 bobbin coil dent analysis.
[4] Tube was also plugged due to an SAI indication at the HL TTS attributed to PWSCC.

Volumetric Indications

Three + Point single volumetric indications (SVI) indications were plugged during 2R11. A summary of these indications is provided below:

- Two were small OD indications just above the TSH. The tube ID's are R27C65 in 21 SG and R10C13 in 23 SG.
- R30C20 in SG22 had a small OD indication above the TSH most likely caused by loose part wear as R30C22 in this SG was plugged due to a loose part indication.

Two tubes in 24SG, R3C93 and R9C93, with current and historical SVI calls attributed to loose part wear were left in service. These SVI calls are summarized below:

- Loose part wear indications were identified just above the HL TTS in these two tubes during the 2R7 inspection. Secondary side inspections were performed that confirmed the presence of a loose part that was subsequently removed. These tubes remained in service. During 2R10 and 2R11, these indications were sized with + Point technique EPRI ETSS 96910. A special AVB wear scar standard was used for calibration purposes. The maximum through wall depth of these indications was sized at 21%.

Anti-vibration Bar (AVB) Wear

This mechanism has been attributed to vibration of the tube against the anti-vibration bars. AVB wear indications were detected by bobbin probes as part of the 100% full-length inspection. The bobbin coil is qualified to size AVB wear indications per EPRI ETSS 96004.3. AVB wear indications are plugged if bobbin indicates a depth $\geq$ 40% through wall (TW). Tubes with degradation less than 40% through wall may be left in service or removed from service depending on the observed growth rate of the degradation.

In 2R11, 478 AVB wear indications were reported during the bobbin coil inspection. A total of five tubes were plugged for this damage mechanism. These tubes had previous (2R10) indications of AVB wear in the 34%-39% TW range that grew (maximum growth was 12% TW) to a depth that exceeded the 40% TW technical specification acceptance criteria. Approximately 53 new AVB wear indications ($\geq$ 10% TW degradation) were reported. The maximum reported TW depth for the new indications was sized at 27%. The table below lists the tubes plugged for AVB wear during 2R11:

SG	Tube ID	Indication	TSP Location
22	R33C48	44%	AV2
		41%	AV3
23	R30C45	41%	AV2
23	R42C50	44%	AV4
23	R39C54	48%	AV3
		45%	AV4
23	R40C55	45%	AV3

A combination of 11 new indications of degradation (≥ 20% TW) and previous indications of degradation that displayed growth rates of 10% TW per cycle were found during 2R11.[5] The maximum growth rate observed was 27% TW, which is less than the 40% plugging limit. Based on these results, AVB wear is considered to be active during cycle 12 in accordance with Section 3.3.2 of the EPRI PWR Steam Generator Examination Guidelines, Rev. 5.

Cold Leg Thinning (CLT)

Cold leg thinning (CLT) is caused by surface wastage (corrosion) and occurs principally within the confines of the lower cold leg tube support plates on the periphery of the tube bundle. CLT indications are detected by bobbin probes as part of the 100% full-length inspection. The bobbin coil is qualified to size CLT indications, per EPRI ETSS 96001.1. CLT indications are plugged if bobbin indicates a depth of ≥ 40% through wall. Tubes with degradation less than 40% through wall may be left in service or removed from service depending on the observed growth rate of the degradation. A total of six tubes were plugged for this damage mechanism.

Sixty-one CLT indications were detected and sized by bobbin, of which 3 were ≥ 40% and plugged. Three additional tubes were plugged due to observed growth rates. Twenty-four new (≥ 1% TW) CLT indications were reported. The tubes repaired (plugged) for CL thinning are listed in the table below:

SG	Tube ID	Indication	TSP Location
21	R44C55	37%	01C
22	R31C82	38%	01C
23	R31C17	62%	01C
24	R45C46	36%	02C
24	R43C63	58%	02C
24	R32C78	41%	01C

A combination of 26 new indications of degradation (≥ 20% TW) and previous indications of degradation that displayed growth rates of 10% TW per cycle were found during 2R11.[6] In addition, one single indication in 24 SG, R32C78, displayed a growth rate≥ the repair limit (40% TW) in one cycle of operation. Based on these results, CLT is considered to be active during cycle 12 in accordance with Section 3.3.2 of the EPRI PWR Steam Generator Examination Guidelines, Rev. 5.

Inspection of Small Radius Row 2 and Row 3 U-bends

Prior to 2R10, degradation of low row U-bend tubes was limited to the Row 1 tubes at Salem Unit 2. Row 1 U-bend PWSCC was first detected in 1987 during a forced outage in SG24 for a primary to secondary leak. During this outage, tubes R1C16 and R1C37 were identified to be leaking and were removed from service. During 2R4 (1988) PWSCC was confirmed to be active in SG24. During that outage, the station plugged all Row 1 tubes. During 2R5 (1990) the station performed U-bend heat treatment of all in-service Row 2 tubes as a preventive measure against PWSCC.

[5] Population comprised of 8 new indications and 3 previous indications that displayed a growth rate of ≥ 10% TW
[6] Population comprised of 13 new indications and 13 previous indications that displayed a growth rate of ≥ 10% TW

Detection of PWSCC in short radius U-bends using a mid-range + Point probe is qualified per EPRI ETSS 96511. The low row U-bends were examined under the C-A program option. Row 2 was considered the C-A and Row 3 the buffer zone. As such, 100% of the Row 2 and 20% of the Row 3 U-bends in each steam generator were inspected with + Point. Five tubes were plugged for PWSCC in the U-bend region as shown in the table below. These tubes were all in SG 23 and were found to contain inside diameter single circumferential indication (SCI) at either the HL or CL tangent region[7] of the U-bend.

SG	Tube ID	Indication	Location	Cal No.	RPC Voltage
23	R2C5	SCI	07H +14.47" (CL Tangent)	Cold 1	0.22
23	R2C7	SCI	07H +3.44" (HL Tangent)	Cold 1	0.22
23	R2C18	SCI	07H +3.62" (HL Tangent)	Cold 7	0.58
23	R2C43	SCI	07H +3.46" (HL Tangent)	Cold 60	0.33
23	R2C45	SCI	07H +3.55" (HL Tangent)	Cold 2	0.35

No indications were reported in Row 3; therefore, base scope expansions were not required. Based on these results, PWSCC in the low row U-bends is considered to be active during cycle 12 in accordance with Section 3.3.2 of the EPRI PWR Steam Generator Examination Guidelines, Rev. 5.

In addition to the standard mid-range + Point inspection, the station inspected 20% of the Row 2 tubes in 23SG with a high frequency + Point technique. This inspection was performed in response to the February 15, 2000, Indian Point 2 (IP-2) steam generator tube leakage event. At IP-2, the high frequency (800 KHz as opposed to the standard 300/400 KHz mid frequency) + Point technique resulted in better detection of PWSCC due to improved signal to noise ratio thus reducing the effects of tube deposits and geometry on the eddy current signals.

When these inspections were completed, a comparison of the high frequency and mid frequency data was performed. The results of this evaluation showed that the high frequency inspection did not result in significant improvements in signal to noise ratio. The 300 kHz frequency with the mid-range probe was preferred from the standpoints of low noise characteristics, smooth isometric plots and detectability of shallow outer surface flaws. The 400 kHz frequency had similar performance; however, the average noise values were always higher. The 600 kHz frequency with the high frequency probe produced the lowest background noise levels with the sacrifice of outer surface flaw detection. The 600 kHz frequency did not improve the signal characteristics of the ID flaws reported by the 300 kHz mid-range probe. The 800 kHz frequency was measurably noisier, produced rough isometric plots and is, therefore, not recommended for use.

Based on these results, additional testing with the high frequency probe was not performed.

Loose Parts

All bobbin coil data was analyzed for loose part wear. Only one tube in 24SG, R22C26, was identified during the bobbin screening. This indication did not confirm when tested with + Point.

One Possible Loose Part Indication (PLI) was detected during the HL + Point TTS inspection. This indication was located in SG22, R30 C22. This location is located in-bundle and secondary side foreign object search and retrieval did not specifically check in this area. A

[7] Four of the indications were reported in the HL tangent region and one in the CL tangent region.

tubesheet stabilizer was installed and the tube removed from service. Tube R30C20 in the same SG also displayed a small OD indication above the TSH (discussed in the volumetric indications section of this report) most likely caused by loose part wear and was also plugged.

Two tubes in 24SG, R3C93 and R9C93, that exhibited indications of loose part wear above the HL TTS were identified during 2R7. Secondary side inspections were performed that confirmed the presence of the loose part that was subsequently removed. These tubes remained in service. During 2R10 and 2R11, these indications were sized with + Point technique EPRI ETSS 96910. A special AVB wear scar standard was used for calibration purposes. The maximum through wall depth of these indications was sized at 21%. These tubes were left in service and will continue to be monitored for degradation during subsequent outages.

Data Quality

Data quality is an important parameter influencing the overall performance of a steam generator tube examination system as it has an effect on probability of detection of degradation, sizing uncertainties, axial and azimuthal location uncertainties and orientation uncertainties. Through these uncertainties, data quality also becomes a key factor in data repeatability from one inspection to another. Greater emphasis was placed on data quality during 2R11 in light of the IP-2 tube rupture event. Thirty-two tubes were removed from service due to data quality concerns as summarized below:

- 27 tubes removed from service due to unacceptable noise caused by tubing characteristics. This type of noise is referred to as permeability variations or PVN.
- 5 tubes removed from service due to probe skipping or stalling in the low row U-bend region. The Obstructed (OBS) code was used to identify these tubes for plugging even though these tubes were not actually obstructed. All of these tubes were capable of passing the standard 0.680" diameter single coil + Point probe; however, acceptable data quality could not be obtained.

The table below summarizes the tubes plugged for data quality concerns:

SG	Tube ID	Indication	Location
21	R4C5	PVN	04C +42.88"
21	R23C10	PVN	02C –4.65"
21	R8C18	PVN	03C +4.17"
21	R16C47	PVN	01C +36.22"
21	R22C55	PVN	04H +6.42"
21	R10C59	PVN	03H +3.67"
21	R3C63	PVN	02H +19.49"
21	R2C42	OBS	U-bend
21	R22C49	PVN	04H +2.00"
21	R3C83	PVN	05H +19.28"
22	R22C7	PVN	04H +45.15"
22	R13C13	PVN	04H –4.55"
22	R22C13	PVN	06H –27.49"
22	R27C18	PVN	04H +37.89"
22	R16C20	PVN	04H –3.49"
SG	**Tube ID**	**Indication**	**Location**
22	R22C20	PVN	05H +30.08"

22	R19C22	PVN	04H –3.13"
22	R38C39	PVN	03C +22.13"
22	R4C44	PVN	03H +34.07"
22	R18C55	PVN	02C +26.65"
22	R12C68	PVN	03C +27.60"
23	R2C3	OBS	U-bend
23	R2C80	OBS	U-bend
23	R2C93	OBS	U-bend
24	R24C10	PVN	02H +26.25"
24	R19C30	PVN	03C +18.50"
24	R45C36	PVN	04C –3.04"
24	R2C39	OBS	U-bend
24	R43C55	PVN	04C +34.04"
24	R43C57	PVN	04C +22.45"
24	R27C59	PVN	05C +36.49"
24	R25C61	PVN	04H –10.25"

Manufacturer's Burnish Marks (MBM's)

MBM's were identified during the bobbin coil examination. All free span indications indicative of an MBM type signal were compared to history data to identify any significant changes in the signal characteristics. Indications **not** exhibiting change based on the parameters of the free span flow chart were left in the eddy current database with an "MBH" code. Signal changes meeting the parameters of the free span flow chart were identified with an "MBI" code that required supplemental + Point examination for characterization. None of the indications inspected with + Point confirmed to be crack-like.

Tube Support Plate Integrity Inspections

In 2R10 and 2R11, the station implemented an eddy current inspection program to detect degradation of steam generator TSP's. A summary of this program was reported to the NRC in response to USNRC Generic Letter 97-06, Degradation of Steam Generator Internals. A secondary side inspection performed during 2R10 confirmed several missing and/or cracked TSP ligaments. The station has concluded that the majority of these are related to artifacts of original manufacturing and/or patch plate weld anomalies.

All bobbin coil data was analyzed for Possible Support Indications (PSI). The + Point technique was used for confirmation. If confirmed, the indication was reported as a Suspect Ligament Crack (SLC) in accordance with the station's eddy current data analysis guidelines. All new and previously identified SLC indications were inspected with + Point to verify that any missing ligaments were sized less than the 145-degree acceptance criteria.

Nine new bobbin PSI indications were confirmed with + Point and reported as SLC's. For these indications, historical bobbin data and previous RPC data, if available, was reviewed. Of the 9 new indications detected, 4 were traced back to the 2R1 bobbin coil data, 3 traced back to the 2R9 bobbin coil data, 1 traced back to the 2R9 RPC data (indication was not detected in the 2R9 bobbin coil data) and 1 indication was not evident in previous history data. One probable cause for the identification of "new" occurrences of this mechanism was judged to be related to the inherent limitation(s) of the inspection technique. Since the bobbin coil is a non surface-riding probe, it is typical for this type of variation (similar to dents) to be seen from outage to

outage. Inspection technique limitations were judged to not negatively impact nuclear or personnel safety as it is judged that the bobbin-coil technique would detect all TSP intersections that might exceed the 145-degree acceptance criteria. The maximum extent of missing ligament for the "new indications" was 124 degrees and this location was in the patch plate region. The remaining 8 locations were either single indications (no measurable gap) or had a maximum gap measurement of 50 degrees or less.

Including the 9 new indications, the + Point confirmed population of SLC's in the Unit 2 SG's is now 28 locations. Of the 28 total locations, 10 have missing ligaments with the largest gap measured at 124 degrees.

Free Span Ding Inspections

The + Point inspections were performed on a 20% sample of the HL $\geq$2 volt free span dings in each steam generator to identify potential PWSCC and/or ODSCC. The 20% sample of free span dings was inspected up to the 7th HL TSP (TSH +0.5" to 07H +2.0").

Sixty-three locations were inspected with + Point and no degradation was detected therefore sample expansion was not required. This damage mechanism is classified as inactive for cycle 12.

Tube Plug Inspections

During 2R11 FTI performed a remote visual inspection of installed steam generator tube plugs to identify any abnormalities that may require further actions. Plugs were visually examined for signs of leakage such as boron rings or moisture in accordance with station procedures. For the I600 ribbed plugs that were repaired by Westinghouse in 1990 (2R5) with a Plug-in-Plug (PIP), the visual inspection verified the integrity of the PIP tack welds. This inspection required these locations to be cleaned (brushed) prior to the inspections. All abnormalities such as excessive plug head stick-out, bent/damaged plug head, or excessive boron deposit (deposits which extend onto the surrounding tubesheet region) were documented and evaluated.

Six HL PIP locations in SG21 and one HL PIP location in SG23 were noted as being wet. These locations were evaluated and repaired with an FTI designed PAP. The suspected cause for this degradation is PWSCC although this was not confirmed by lab analysis. Conservatively, this damage mechanism is considered as active for cycle 12. The repaired locations are listed in the table below:

Steam Generator	Tube ID
21	R1C11
21	R1C12
21	R1C22
21	R1C25
21	R1C27
21	R1C43
23	R1C71

Technical Deviation 2R11-00-007 provided the justification for not performing a 20% volumetric (eddy current) inspection of installed FTI 690 rolled plugs based on material properties and industry inspection data.

FINAL ECT SCOPE

The table below summarizes the final (base scope + special interest and/or expansions) scope performed during 2R11.

	Area	Probe	Inspection Criteria	# of Exams	Expansion Criteria
1	Full Length (Tube end to tube end)	Bobbin	100% of all in-service tubes in each steam generator	12799	N/A
2	Short Radius U-Bends (07H to 07C)	+ Point™	100% of all in-service Row 2 tubes in each steam generator and 20% of the Row 3 tubes in each steam generator.	430	If PWSCC is found in Row 3, Inspect 100% of Row 3 and 20% of Row 4 in affected SG in this manner until a flaw free 20% sample is obtained.
3	WEXTEX HL TTS (+2, -5" in 21,23 & 24) (+2", -7"in 22)	+ Point™	100% of all in-service tubes in each steam generator	12799	If C-3 condition is identified in HL TTS, inspect 20% of CL TTS in affected SG
4	Tubesheet anomalies	+ Point™	100% full depth of NTE in SG24, R13C12. No new NTEs are expected. Inspect all history ETLs and PTEs in the area of interest	1 73	Any new NTEs will be inspected full depth. Any new ETLs will be inspected in the area of interest.
5	Distorted Tubesheet signals (DTI)	+ Point™	100% of all bobbin signals	1	N/A
6	Dented TSP Intersections (DNI)	+ Point™	100% of all bobbin signals	9	Based on bobbin detection.
7	Dented TSP Intersections (≥ 1 v)	+ Point™	100% of the ≥ 1 volt dented TSP locations at 01H, 02H, 03H and 04H in each SG. The critical area is defined as 01H, 02H and 03H. 04H is the buffer zone.	8609	If a flaw is detected @ 04H, inspect 20% at the next highest TSP location in the affected SG.
8	Distorted Support Signals (DSI)	+ Point™	100% of all bobbin signals	27	N/A
9	Cold Leg DSIs	+ Point™	100% of all bobbin DSIs	2	N/A
10	Suspected TSP Ligament Cracking (PSI)	Bobbin and + Point™	100% of all bobbin PSIs	28	N/A
11	Free Span Bobbin Indications (MBM's & FSD's)	+ Point™	100% of all bobbin signals	4	N/A
12	Free Span Bobbin Indications (Dings)	+ Point™	20% inspection of the >2 volt HL dings in each SG	63	If PWSCC or ODSCC detected in 20% sample, inspect 100% of the >2 volt HL dings in the affected SG's and evaluate the need to perform CL sampling.
13	Plugs	Visual	Visual inspection of 100% of the installed tube plugs in each steam generator.	1506	N/A

Technical Specification Classification

The categorization of each steam generator is listed in the table below and takes into consideration both the bobbin coil and RPC inspection results.

	21 SG	22 SG	23 SG	24 SG
Technical Specification Category	C-2	C-2	C-2	C-2

Attachments

The following data management summary reports are grouped as attachments, which provide the in-service inspection results per Technical Specification 4.4.6.5.b (Unit 2):

- Attachment 1 – 21SG - 2R11 Location and Percent Through Wall Indications
- Attachment 2 – 22SG - 2R11 Location and Percent Through Wall Indications
- Attachment 3 – 23SG - 2R11 Location and Percent Through Wall Indications
- Attachment 4 – 24SG - 2R11 Location and Percent Through Wall Indications
- Attachment 5 – Identification of Tubes Plugged During 2R11
- Attachment 6 – 2R11 - NDE Techniques Utilized for 2R11

Attachment 1
21 SG

2R11 Location and Percent Through Wall Indications

SG	ROW	COL	%TW	LOCATION	
21	17	25	15	AV3	+0.10
21	17	37	10	AV4	-0.30
21	17	39	14	AV1	+0.00
21	17	52	11	AV1	+0.00
21	17	52	11	AV2	-0.95
21	17	52	10	AV2	+0.97
21	17	52	13	AV4	-0.56
21	17	52	12	AV3	-0.95
21	17	52	12	AV3	+0.86
21	17	56	18	AV2	+0.00
21	17	63	11	AV4	+0.00
21	17	63	21	AV2	+0.00
21	17	63	18	AV1	+0.00
21	17	63	16	AV3	+0.00
21	19	30	22	AV1	+0.00
21	19	30	21	AV2	+0.00
21	19	30	28	AV3	+0.00
21	19	58	27	AV2	+0.44
21	19	58	23	AV4	+0.65
21	19	66	12	AV4	+0.00
21	19	66	19	AV1	-0.04
21	19	66	26	AV2	-0.04
21	19	66	29	AV3	+0.04
21	21	29	18	AV4	+0.00
21	21	29	11	AV3	+0.16
21	21	60	17	AV2	-0.42
21	21	60	18	AV3	-0.56
21	21	60	14	AV4	+1.72
21	22	60	13	AV2	+0.00
21	23	67	25	AV1	-0.97
21	23	67	26	AV2	-0.42
21	23	67	21	AV3	-0.12
21	23	68	34	AV2	-0.44
21	23	68	30	AV3	-0.02
21	23	68	20	AV4	-0.34
21	23	70	11	AV4	+0.99
21	24	41	20	AV4	+0.00
21	24	52	19	AV2	+1.19
21	24	52	10	AV3	+1.21
21	24	67	14	AV2	-0.30
21	24	68	26	AV2	+0.34
21	24	68	24	AV3	-0.12
21	24	70	10	AV1	+0.00
21	26	46	10	AV2	+0.24
21	26	56	25	AV1	+0.28
21	26	56	17	AV2	-0.04
21	26	56	25	AV3	+0.12
21	26	56	29	AV4	-0.55

SG	ROW	COL	%TW	LOCATION	
21	26	58	19	AV2	+0.00
21	26	58	26	AV3	+0.00
21	26	59	21	AV2	+0.00
21	26	59	21	AV3	-0.38
21	26	59	15	AV4	-0.53
21	26	63	11	AV4	-0.26
21	26	64	23	AV1	-0.22
21	26	64	17	AV2	+0.00
21	26	64	13	AV3	+0.00
21	26	67	18	AV1	-0.86
21	26	67	10	AV4	+0.70
21	27	44	11	AV1	-0.56
21	27	44	34	AV2	-0.06
21	27	44	32	AV3	+0.32
21	27	44	22	AV4	+0.85
21	27	45	15	AV4	+0.00
21	27	46	30	AV2	+0.00
21	27	46	31	AV3	+0.00
21	27	46	24	AV4	+0.00
21	27	47	17	AV2	-0.74
21	27	47	37	AV3	-0.75
21	27	47	36	AV4	-1.06
21	27	52	24	AV1	-1.91
21	27	52	29	AV2	-1.08
21	27	52	21	AV2	+1.26
21	27	52	37	AV3	-1.12
21	27	52	24	AV3	+1.10
21	27	52	25	AV4	+0.00
21	27	56	22	AV1	+0.00
21	27	56	22	AV2	+0.00
21	27	56	29	AV3	+0.00
21	27	56	24	AV4	+0.00
21	27	64	24	AV1	-0.16
21	27	64	25	AV2	+0.18
21	27	64	35	AV3	+0.22
21	29	46	17	AV1	-0.50
21	29	46	20	AV2	+0.00
21	29	46	33	AV3	+0.00
21	29	46	14	AV4	+0.00
21	29	57	18	AV2	+0.00
21	29	57	17	AV3	+0.00
21	29	57	13	AV4	+0.04
21	29	65	13	AV3	+0.27
21	29	65	27	AV4	+0.00
21	31	64	24	AV2	+0.08
21	31	67	12	AV2	+0.22
21	32	39	24	AV4	+0.00
21	32	48	17	AV2	-0.06
21	32	48	28	AV3	+0.08

SG	ROW	COL	%TW	LOCATION	
21	32	49	17	AV3	+1.28
21	32	51	14	AV2	+1.28
21	32	51	18	AV3	-1.24
21	32	51	16	AV3	+1.32
21	32	51	17	AV4	+1.58
21	32	54	12	AV3	-0.24
21	33	41	21	AV2	-0.10
21	33	41	23	AV3	-0.36
21	33	41	25	AV4	+0.47
21	33	55	13	AV3	+0.00
21	33	60	27	AV1	-0.14
21	33	60	28	AV3	-0.10
21	34	36	20	AV1	+0.40
21	34	36	36	AV2	-0.34
21	34	36	25	AV3	-0.22
21	34	37	19	AV1	+0.00
21	34	37	29	AV2	+0.00
21	34	37	27	AV3	+0.00
21	34	37	12	AV4	+0.00
21	34	44	34	AV3	+0.00
21	34	44	23	AV2	+0.00
21	34	44	12	AV1	+0.00
21	34	45	21	AV2	+0.00
21	34	45	26	AV3	-0.36
21	34	45	22	AV4	+0.00
21	34	49	16	AV2	+0.14
21	34	49	14	AV3	+1.40
21	34	51	23	AV1	-0.28
21	34	51	13	AV2	+0.98
21	34	51	10	AV3	+0.90
21	34	52	14	AV2	+1.01
21	34	65	12	AV2	-0.20
21	34	65	24	AV3	-0.20
21	34	65	23	AV4	-0.40
21	35	68	19	AV1	-0.56
21	35	68	15	AV2	-0.24
21	35	76	8	02C	-0.10
21	36	41	22	AV3	+0.00
21	36	43	10	AV3	+0.00
21	36	52	23	AV2	-0.90
21	36	56	22	AV2	+0.00
21	36	58	13	AV1	+0.00
21	36	58	16	AV2	+0.00
21	36	58	15	AV3	+0.00
21	39	37	20	AV1	+0.12
21	39	37	26	AV2	-0.26
21	39	54	10	AV1	+0.00
21	39	61	20	AV1	-0.58

SG	ROW	COL	%TW	LOCATION	
21	39	61	32	AV2	-0.04
21	39	61	18	AV1	-0.56
21	39	61	29	AV2	-0.52
21	41	58	10	AV1	+0.00
21	41	58	10	AV1	+0.00
21	42	31	22	AV3	+0.02
21	44	55	37	01C	-0.32

Attachment 2
22 SG

2R11 Location and Percent Through Wall Indications

SG	ROW	COL	%TW	LOCATION	
22	16	68	18	AV2	-0.21
22	16	68	12	AV3	-0.08
22	16	68	14	AV4	+0.64
22	18	65	21	AV1	-1.73
22	18	65	14	AV1	+1.46
22	18	65	18	AV2	-0.98
22	18	65	21	AV4	-0.94
22	18	65	31	AV3	-0.24
22	18	65	25	AV2	+0.83
22	22	62	17	AV2	+0.00
22	22	87	14	01C	+0.10
22	23	71	16	AV1	+0.00
22	23	71	10	AV2	+0.00
22	23	71	14	AV3	+0.00
22	23	71	11	AV4	+0.00
22	25	9	18	AV3	-0.13
22	25	30	28	AV3	+0.17
22	25	30	20	AV2	+0.00
22	25	63	12	AV3	+0.00
22	25	69	16	AV2	+0.00
22	25	69	29	AV3	+0.00
22	25	71	21	AV3	+0.00
22	26	23	11	AV3	-0.11
22	26	62	28	AV1	+0.00
22	26	62	25	AV2	+0.00
22	26	62	20	AV3	+0.00
22	31	27	21	AV2	+0.00
22	31	28	22	AV2	+0.00
22	31	28	15	AV1	+0.00
22	31	82	38	01C	-0.08
22	32	79	28	02C	-0.06
22	32	79	13	03C	-0.10
22	33	16	18	03C	+0.02
22	33	48	44	AV2	-0.23
22	33	48	41	AV3	-0.25
22	33	67	10	AV2	+0.00
22	34	32	23	AV1	+0.02
22	34	32	14	AV2	+0.00
22	34	32	22	AV3	+0.00
22	34	39	13	AV3	+0.02
22	34	41	13	AV3	-0.02
22	34	47	11	AV3	+0.00
22	34	49	32	AV4	+0.00
22	34	50	22	AV2	+0.00
22	34	50	29	AV3	+0.00
22	34	50	18	AV4	+0.00
22	34	58	10	AV2	-0.06
22	35	26	10	AV2	-0.08

SG	ROW	COL	%TW	LOCATION	
22	35	26	11	AV1	-0.13
22	35	53	16	AV2	-0.04
22	36	34	25	AV3	+0.00
22	40	36	25	AV4	+0.00
22	40	37	15	AV1	+0.25
22	40	37	18	AV2	-0.02
22	40	44	28	AV2	+0.00
22	40	44	17	AV1	+0.26
22	40	52	16	AV2	+0.00
22	41	32	12	AV3	-0.32
22	41	62	27	02C	+0.12
22	42	41	8	02C	-0.06
22	42	65	21	01C	+0.35
22	43	37	31	02C	-0.08
22	43	60	15	02C	-0.08
22	43	64	24	01C	+0.39
22	43	65	24	02C	+0.08
22	44	37	14	02C	-0.13
22	44	38	8	01C	+0.06
22	44	46	26	02C	+0.14
22	44	56	20	02C	+0.06
22	44	58	6	02C	-0.17
22	44	60	11	02C	+0.02
22	44	61	22	04C	+0.15
22	45	41	1	02C	+0.16

Attachment 3
23 SG

2R11 Location and Percent Through Wall Indications

SG	ROW	COL	%TW	LOCATION	
23	6	3	11	01C	+0.18
23	8	3	12	01C	+0.04
23	9	2	15	01C	+0.19
23	9	3	27	01C	+0.08
23	11	2	7	01C	-0.02
23	12	3	19	01C	+0.00
23	16	57	17	AV1	+0.00
23	16	57	12	AV2	-0.24
23	16	57	21	AV3	-0.08
23	16	57	17	AV4	-0.95
23	20	31	13	AV1	+0.00
23	20	64	11	AV4	+0.08
23	21	22	14	AV2	+0.00
23	21	23	11	AV3	-0.04
23	23	40	12	AV3	+0.00
23	23	44	11	AV2	-0.10
23	23	53	11	AV1	+0.59
23	23	53	18	AV2	-0.02
23	23	53	27	AV3	-0.18
23	23	53	17	AV4	-0.18
23	23	58	15	AV1	-0.27
23	23	58	26	AV2	-0.23
23	23	58	32	AV3	-0.02
23	23	58	12	AV4	-0.10
23	24	48	14	AV1	-0.04
23	24	48	16	AV2	+0.00
23	24	53	17	AV3	+0.00
23	24	55	19	AV1	+1.05
23	24	55	14	AV4	-2.97
23	24	56	21	AV3	+0.71
23	24	56	11	AV2	+1.31
23	24	56	17	AV4	-1.69
23	24	56	26	AV3	-0.96
23	24	56	22	AV2	-1.27
23	24	56	21	AV1	-0.65
23	25	9	27	01C	+0.18
23	25	44	11	AV2	+0.00
23	26	44	25	AV2	+0.00
23	26	44	24	AV3	+0.00
23	26	44	21	AV4	+0.00
23	26	45	19	AV1	-0.28
23	26	45	22	AV2	-0.24
23	26	45	17	AV4	+0.47
23	26	55	18	AV1	-1.07
23	26	55	17	AV2	+0.63
23	26	55	17	AV3	+0.00
23	27	49	14	AV3	-0.15
23	27	49	13	AV1	+0.71

SG	ROW	COL	%TW	LOCATION	
23	27	51	23	AV4	-0.31
23	27	51	34	AV3	+0.02
23	27	51	33	AV2	-0.02
23	27	51	28	AV1	+0.04
23	27	59	13	AV4	+0.40
23	27	59	17	AV2	+0.23
23	27	59	29	AV1	+0.38
23	27	63	29	AV1	+0.00
23	27	63	36	AV2	+0.19
23	27	63	17	AV3	+0.31
23	27	63	17	AV4	+0.00
23	27	64	14	AV1	-0.51
23	27	64	13	AV2	+0.18
23	27	65	12	AV2	-0.02
23	27	65	14	AV4	+1.07
23	28	10	25	01C	-0.12
23	28	45	21	AV2	+0.00
23	30	35	37	AV2	+0.00
23	30	35	18	AV3	+0.00
23	30	35	24	AV4	+0.00
23	30	45	41	AV2	+0.18
23	30	45	25	AV3	+0.00
23	30	57	13	AV2	-0.17
23	30	57	16	AV1	+0.04
23	30	63	29	AV1	+1.07
23	30	63	39	AV2	+0.14
23	30	63	17	AV3	+0.28
23	30	63	15	AV4	-0.52
23	30	63	21	AV4	+0.41
23	31	15	25	01C	-0.14
23	31	17	62	01C	-0.16
23	31	63	13	AV2	-0.15
23	32	41	20	AV2	-0.02
23	32	41	30	AV3	-0.27
23	32	45	30	AV1	-0.22
23	32	45	37	AV2	+0.00
23	32	45	38	AV3	+0.00
23	32	45	30	AV4	+0.59
23	32	45	17	AV4	-0.49
23	32	59	29	AV3	+0.00
23	32	59	20	AV4	+0.00
23	32	61	14	AV1	+0.00
23	33	17	30	01C	-0.10
23	33	26	16	AV1	-0.14
23	33	26	19	AV2	+0.00
23	33	26	13	AV3	+0.00
23	33	52	15	AV1	+0.04
23	34	17	16	01C	+0.00

SG	ROW	COL	%TW	LOCATION	
23	34	38	13	AV3	+0.00
23	34	38	11	AV4	+0.00
23	34	52	20	AV4	+0.00
23	34	54	14	AV4	+0.00
23	35	22	6	02C	-0.08
23	35	53	14	AV3	-0.18
23	35	53	15	AV4	-0.10
23	35	54	12	AV4	+0.00
23	36	44	22	AV4	+0.00
23	36	45	13	AV3	+0.06
23	36	45	13	AV4	-0.42
23	36	63	26	AV2	+0.00
23	36	71	11	AV2	+0.02
23	37	19	30	02C	-0.16
23	37	42	17	AV3	+0.00
23	37	42	21	AV4	+0.00
23	37	45	14	AV3	-0.02
23	37	45	24	AV4	-0.47
23	37	52	30	AV4	+0.00
23	38	46	12	AV3	+0.00
23	38	46	15	AV4	+0.00
23	38	47	21	AV3	-0.08
23	38	47	18	AV4	-0.10
23	38	48	29	AV3	+0.00
23	39	50	16	AV1	+0.00
23	39	50	18	AV2	+0.00
23	39	52	27	AV1	+0.00
23	39	52	20	AV2	+0.00
23	39	54	17	AV1	+0.00
23	39	54	35	AV2	+0.00
23	39	54	48	AV3	+0.00
23	39	54	45	AV4	+0.00
23	39	58	26	AV1	+0.00
23	39	58	20	AV2	+0.00
23	39	60	13	AV3	+0.00
23	39	60	15	AV4	+0.00
23	40	42	17	AV1	+0.10
23	40	42	36	AV2	-0.02
23	40	42	15	AV3	+0.04
23	40	50	27	AV2	+0.22
23	40	51	15	AV1	-0.48
23	40	51	26	AV2	+0.00
23	40	51	12	AV3	+0.00
23	40	54	36	AV1	+0.00
23	40	54	27	AV2	+0.00
23	40	54	23	AV3	+0.00
23	40	54	36	AV4	+0.00
23	40	55	12	AV1	-0.45

SG	ROW	COL	%TW	LOCATION	
23	40	55	16	AV1	+0.59
23	40	55	22	AV2	-0.26
23	40	55	39	AV2	+0.35
23	40	55	45	AV3	-0.02
23	40	66	22	AV2	+0.00
23	41	52	14	AV2	+0.00
23	41	52	21	AV3	+0.00
23	41	55	29	AV1	-0.43
23	41	55	19	AV1	+0.41
23	41	55	24	AV2	+0.00
23	41	60	15	AV2	+0.04
23	41	61	19	AV1	+0.00
23	41	65	16	AV2	-0.15
23	42	50	19	AV1	+0.00
23	42	50	28	AV2	+0.00
23	42	50	44	AV3	+0.00
23	42	50	31	AV4	+0.00
23	42	52	12	AV1	+0.00
23	42	60	17	AV3	+0.00
23	42	65	22	AV2	-0.04
23	42	66	13	AV2	+0.00
23	42	66	10	AV3	-0.04
23	42	67	29	AV1	-0.04
23	42	67	25	AV2	+0.00
23	42	67	32	AV3	+0.00
23	43	63	19	AV2	+0.11
23	44	33	34	01C	-0.11
23	44	36	22	01C	-0.16
23	45	58	13	AV3	+0.00
23	45	58	18	AV4	+0.00

Attachment 4
24 SG

2R11 Location and Percent Through Wall Indications

SG	ROW	COL	%TW	LOCATION	
24	10	3	10	01C	-0.10
24	15	33	14	AV3	+0.00
24	17	32	14	AV3	+0.19
24	17	65	23	AV2	+0.00
24	18	55	22	AV1	-0.06
24	18	55	20	AV2	-0.10
24	18	55	17	AV3	+0.02
24	18	55	20	AV4	+0.56
24	21	28	16	AV1	+0.00
24	21	28	23	AV2	+0.00
24	21	28	29	AV3	+0.00
24	21	28	16	AV4	+0.00
24	21	30	13	AV1	+0.00
24	21	30	25	AV2	+0.00
24	21	30	19	AV3	-0.69
24	21	30	19	AV3	+0.67
24	22	72	23	AV2	+0.10
24	23	28	26	AV3	+0.16
24	23	33	10	AV1	-0.38
24	23	33	23	AV2	+0.32
24	23	33	28	AV3	+0.06
24	23	53	23	AV4	-0.22
24	23	56	20	AV4	+0.25
24	23	56	10	AV3	+0.53
24	23	57	17	AV1	+0.38
24	23	57	18	AV2	-0.42
24	23	57	29	AV3	-0.81
24	23	57	31	AV4	-0.20
24	23	57	14	AV2	+0.51
24	23	59	22	AV1	+1.08
24	23	59	26	AV2	+0.63
24	23	59	17	AV3	-0.43
24	23	59	15	AV3	+0.06
24	23	62	16	AV1	-0.10
24	23	62	23	AV2	+0.26
24	23	62	27	AV3	+0.00
24	23	62	12	AV4	+0.25
24	23	72	25	AV4	+0.00
24	24	34	26	AV2	+1.00
24	24	34	24	AV3	+0.16
24	24	34	17	AV4	-0.73
24	26	34	27	AV1	+0.32
24	26	34	20	AV2	-0.22
24	26	34	24	AV3	-0.14
24	26	34	22	AV4	+0.66
24	26	58	19	AV1	-0.37
24	26	58	23	AV2	+0.92
24	26	58	22	AV3	+1.00

SG	ROW	COL	%TW	LOCATION	
24	26	58	21	AV4	+1.40
24	26	67	23	AV1	-0.16
24	26	67	21	AV2	-0.10
24	27	62	19	AV2	+0.14
24	27	62	10	AV1	+0.08
24	27	68	31	AV3	-0.61
24	27	68	29	AV4	-0.14
24	27	83	16	01C	-0.20
24	28	59	12	AV1	-0.90
24	28	59	26	AV2	-0.23
24	31	31	37	AV3	+0.00
24	31	48	17	AV3	+0.00
24	31	77	33	01C	-0.26
24	32	64	23	AV2	+0.26
24	32	78	41	01C	-0.24
24	33	41	14	AV1	-0.18
24	33	47	24	AV2	+0.56
24	33	47	36	AV3	-0.57
24	33	47	36	AV4	+0.00
24	33	48	16	AV1	+0.28
24	33	48	23	AV2	-0.12
24	33	49	20	AV3	+0.00
24	33	50	16	AV3	-0.14
24	33	50	19	AV4	-0.24
24	33	51	10	AV1	-0.75
24	33	51	33	AV2	-0.71
24	33	51	13	AV3	-0.85
24	33	57	14	AV1	+0.00
24	33	57	21	AV3	+0.67
24	33	57	33	AV4	-0.10
24	33	58	23	AV3	-0.53
24	33	65	21	AV3	-0.99
24	33	66	30	AV2	+0.16
24	33	66	11	AV3	-0.12
24	33	78	1	02C	+0.10
24	33	79	15	03C	-0.22
24	34	63	32	AV2	-0.22
24	34	63	26	AV3	-0.12
24	34	63	20	AV4	+0.99
24	34	65	32	AV3	-0.45
24	34	65	22	AV4	+0.70
24	34	78	15	01C	-0.14
24	35	78	6	01C	-0.12
24	36	63	25	AV3	+0.12
24	36	76	18	01C	-0.24
24	38	39	15	AV4	-0.20
24	38	52	30	AV4	+0.50
24	38	67	36	AV2	-0.10

SG	ROW	COL	%TW	LOCATION	
24	38	67	38	AV3	-0.44
24	38	68	38	AV2	-0.04
24	38	68	32	AV3	-0.18
24	38	68	26	AV4	-0.16
24	39	42	14	AV4	+0.44
24	39	49	16	AV3	-0.08
24	39	49	33	AV4	-0.24
24	39	65	30	AV1	-0.24
24	39	65	23	AV2	+0.08
24	39	71	20	01C	-0.26
24	40	37	30	AV1	+0.00
24	40	37	26	AV2	+0.00
24	40	56	26	AV1	-0.20
24	40	56	17	AV2	-0.26
24	40	57	17	AV4	-0.10
24	41	35	15	AV1	+0.00
24	41	35	15	AV2	+0.00
24	41	53	22	AV1	-0.20
24	41	53	24	AV2	-0.12
24	41	53	23	AV3	+0.26
24	41	53	29	AV4	+0.00
24	41	57	13	AV1	-0.06
24	41	59	21	AV4	-0.06
24	41	59	18	01C	-0.08
24	42	33	27	02C	-0.18
24	42	53	16	AV2	-0.02
24	42	53	18	AV1	-0.10
24	42	55	23	AV2	-0.18
24	42	55	38	AV1	-0.06
24	42	59	26	02C	-0.06
24	43	58	26	02C	+0.24
24	43	59	24	02C	+0.18
24	43	60	34	02C	-0.14
24	43	63	58	02C	+0.18
24	44	35	11	AV2	+0.00
24	44	35	17	AV1	+0.02
24	44	55	10	AV4	-0.06
24	44	58	30	02C	-0.30
24	44	59	23	02C	+0.12
24	45	36	18	02C	+0.06
24	45	46	36	02C	-0.10
24	45	51	5	02C	+0.10
24	45	54	22	AV1	-0.12
24	45	57	32	01C	-0.18

Attachment 5
21 –24 SG

Identification of Tubes Plugged During
2R11

SG	Row	Column
21	2	13
21	2	42
21	3	63
21	3	83
21	4	5
21	4	29
21	5	7
21	5	8
21	8	18
21	9	41
21	10	59
21	12	58
21	13	24
21	13	39
21	14	18
21	14	61
21	15	16
21	16	28
21	16	47
21	16	51
21	18	24
21	18	39
21	22	49
21	22	54
21	22	55
21	23	10
21	25	87
21	27	65
21	29	71
21	38	22
21	44	55
22	2	13
22	2	84
22	4	44
22	4	46
22	5	13
22	5	46
22	7	2
22	7	36
22	8	41
22	9	5

SG	Row	Column
22	9	45
22	9	63
22	10	54
22	11	50
22	11	52
22	12	68
22	13	12
22	13	42
22	14	55
22	16	20
22	18	55
22	19	22
22	20	62
22	22	7
22	22	13
22	22	20
22	27	18
22	30	20
22	30	22
22	30	62
22	31	82
22	33	48
22	38	39
23	2	3
23	2	5
23	2	7
23	2	18
23	2	43
23	2	44
23	2	45
23	2	80
23	2	93
23	10	13
23	26	46
23	30	45
23	31	17
23	34	72
23	39	54
23	40	55
23	42	50

SG	Row	Column
24	2	39
24	3	66
24	4	61
24	5	56
24	6	12
24	6	26
24	6	52
24	8	5
24	8	47
24	9	12
24	10	48
24	12	8
24	13	12
24	13	48
24	16	20
24	19	26
24	19	30
24	20	14
24	20	25
24	20	39
24	20	45
24	24	10
24	25	37
24	25	61
24	27	33
24	27	59
24	28	49
24	31	39
24	32	78
24	33	49
24	38	53
24	41	30
24	43	55
24	43	57
24	43	63
24	45	36
24	45	46

Attachment 6

NDE Techniques Utilized for
2R11

Attachment 6
2R11 NDE TECHNIQUES

Degradation Mechanism and Orientation	SG Location	Probe	EPRI Detection Technique
Axial PWSCC	Tubesheet Region	+ Point	96508 .1 & 96508.2
Circ PWSCC	Tubesheet Region	+ Point	96508 .1 & 96508.2
Axial ODSCC	Tubesheet Region	+ Point	96402 .1 & 96402.2
Circ ODSCC	Tubesheet Region	+ Point	96402 .1 & 96402.2
IGA/ODSCC	Sludge Pile region	Bobbin	96008 .1
Pitting in the presence of copper	Above TTS	Bobbin	96005 .1
Axial PWSCC	Freespan with and without dent	+ Point	96508 .1 & 96508.2
Circ PWSCC	Freespan with and without dent	+ Point	96508.1 & 96508.2
Axial PWSCC	Dented TSP	+ Point	96508.1 & 96508.2
Circ PWSCC	Dented TSP	+ Point	96508 .1 & 96508.2
Axial ODSCC	Dented or non-dented TSP	+ Point	96402.1 & 96402.2
Circ ODSCC	Dented or non-dented TSP	+ Point	96402.1 & 96402.2
IGA/ODSCC	Non-dented TSP	Bobbin	96007.1
AVB Wear	U-Bend	Bobbin	96004.3
Axial PWSCC	R2 U-Bend	+ Point	96511
Circ PWSCC	R2 U-Bend	+ Point	96511
Cold Leg Thinning	Cold Leg TSP	Bobbin	96001.1
TSP Ligament (missing or cracked)	TSP	Bobbin + Point	NA
Loose Part	Anywhere	Bobbin + Point	NA
Freespan	Anywhere	Bobbin + Point	NA