PSEG

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Nuclear Business Unit

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

Gentlemen:

Public Service Electric and Gas Company (PSE&G) 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 License 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 1999 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 DPR-70 and DPR-75. This information pertains to the Salem Unit 1 and Unit 2 steam generator tube inspections completed in 1999.

Pursuant to the requirements of Technical Specification 6.9.1.5.b of Appendix A to Facility Operating License No. NPF-57, the following information is being provided concerning the Hope Creek Safety/Relief Valves (SRVs). During 1999, 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 1999 and the results, including a discussion on SRV setpoint drift, were provided to the NRC in Hope Creek LER 99-003-00, sent via letter LR-N990143, dated March 26, 1999.

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

Sincerely,

Gabor Salamon
Manager - Licensing

Enclosures (3)

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ENCLOSURE 1

Salem 1 - Year of 1999

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

	All Personnel (> 100 mrem)			Total Man-Rem		
Work & Job Function	Station Employees	Utility Employees	Contractors and Others	Station Employees	Utility Employees	Contractors and Others
ROUTINE MAINTENANCE						
-MAINTENANCE	6	92	175	2.021	29.785	92.164
-OPERATIONS PERSONNEL	0	32	0	0.017	9.338	0.393
-HEALTH PHYSICS	2	44	37	0.500	19.644	17.568
-SUPERVISORY PERSONNEL	0	4	0	0.001	1.099	0.016
-ENGINEERING PERSONNEL	0	2	3	0.006	1.137	2.518
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	2	24	0.044	1.152	8.082
-OPERATIONS PERSONNEL	0	6	0	0.000	1.171	0.022
-HEALTH PHYSICS	0	0	0	0.000	0.112	0.005
-SUPERVISORY PERSONNEL	0	0	0	0.000	0.075	0.013
-ENGINEERING PERSONNEL	0	6	0	0.000	1.700	0.195
WASTE PROCESSING						
-MAINTENANCE	0	25	0	0.127	8.960	0.162
-OPERATIONS PERSONNEL	0	0	0	0.000	0.000	0.000
-HEALTH PHYSICS	0	0	1	0.000	0.000	0.254
-SUPERVISORY PERSONNEL	0	0	0	0.004	0.016	0.012
-ENGINEERING PERSONNEL	0	0	0	0.000	0.082	0.068
REFUELING						
-MAINTENANCE	0	0	0	0.003	0.297	0.072
-OPERATIONS PERSONNEL	0	0	4	0.000	0.096	3.915
-HEALTH PHYSICS	1	5	1	0.460	1.976	0.852
-SUPERVISORY PERSONNEL	0	0	0	0.000	0.004	0.001
-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
TOTALS						
-MAINTENANCE	6	119	199	2.194	40.194	100.480
-OPERATIONS PERSONNEL	0	38	4	0.017	10.604	4.330
-HEALTH PHYSICS	3	49	39	0.960	21.732	18.679
-SUPERVISORY PERSONNEL	0	4	0	0.004	1.193	0.041
-ENGINEERING PERSONNEL	0	8	3	0.006	2.920	2.781
GRAND TOTALS	9	218	245	3.181	76.643	126.312
TOTAL DOSE						206.136

ENCLOSURE 2

Salem 2 - Year of 1999

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

	All Personnel (> 100 mrem)			Total Man-Rem		
Work & Job Function	Station Employees	Utility Employees	Contractors and Others	Station Employees	Utility Employees	Contractor and Other
ROUTINE MAINTENANCE						
-MAINTENANCE	1	37	188	0.633	13.669	70.585
-OPERATIONS PERSONNEL	0	18	1	0.169	4.939	0.484
-HEALTH PHYSICS	0	24	33	0.180	6.305	8.613
-SUPERVISORY PERSONNEL	0	1	0	0.004	0.836	0.123
-ENGINEERING PERSONNEL	0	1	1	0.010	0.617	0.420
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	2	15	0.076	0.560	4.639
-OPERATIONS PERSONNEL	0	2	0	0.000	0.446	0.008
-HEALTH PHYSICS	0	0	0	0.000	0.002	0.019
-SUPERVISORY PERSONNEL	0	0	0	0.000	0.016	0.000
-ENGINEERING PERSONNEL	0	3	0	0.000	0.848	0.175
WASTE PROCESSING						
-MAINTENANCE	0	0	0	0.003	0.004	0.467
-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	0.003
-ENGINEERING PERSONNEL	0	0	0	0.000	0.001	0.019
REFUELING						
-MAINTENANCE	0	0	0	0.001	0.193	0.000
-OPERATIONS PERSONNEL	0	0	0	0.000	0.011	0.016
-HEALTH PHYSICS	1	0	2	0.135	0.439	0.702
-SUPERVISORY PERSONNEL	0	0	0	0.000	0.000	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
TOTALS						
-MAINTENANCE	1	39	203	0.713	14.425	75.691
-OPERATIONS PERSONNEL	0	20	1	0.170	5.396	0.507
-HEALTH PHYSICS	1	24	35	0.315	6.746	9.334
-SUPERVISORY PERSONNEL	0	1	0	0.004	0.852	0.126
-ENGINEERING PERSONNEL	0	4	1	0.010	1.466	0.614
GRAND TOTALS	2	88	240	1.212	28.885	86.271
TOTAL DOSE						116.368

ENCLOSURE 3

Hope Creek - Year of 1999

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

	All Personnel (> 100 mrem)			Total Man-Rem		
Work & Job Function	Station Employees	Utility Employees	Contractors and Others	Station Employees	Utility Employees	Contractors and Others
ROUTINE MAINTENANCE						
-MAINTENANCE	1	35	3	0.416	12.692	0.997
-OPERATIONS PERSONNEL	0	20	0	0.000	4.911	0.019
-HEALTH PHYSICS	0	22	0	0.000	6.825	0.326
-SUPERVISORY PERSONNEL	0	0	0	0.000	0.003	0.007
-ENGINEERING PERSONNEL	0	0	0	0.001	0.334	0.026
INSERVICE INSPECTION						
-MAINTENANCE	0	36	8	0.325	11.726	2.791
-OPERATIONS PERSONNEL	0	11	0	0.004	3.784	0.373
-HEALTH PHYSICS	1	17	1	0.143	4.708	0.430
-SUPERVISORY PERSONNEL	0	0	0	0.000	0.022	0.012
-ENGINEERING PERSONNEL	0	0	0	0.007	0.273	0.018
SPECIAL MAINTENANCE						
-MAINTENANCE	0	0	0	0.000	0.081	0.023
-OPERATIONS PERSONNEL	0	0	0	0.000	0.046	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	0.050	0.001
WASTE PROCESSING						
-MAINTENANCE	0	0	0	0.000	0.012	0.000
-OPERATIONS PERSONNEL	0	0	0	0.000	0.000	0.000
-HEALTH PHYSICS	0	0	0	0.000	0.017	0.018
-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	0.001	0.201	0.038
-OPERATIONS PERSONNEL	0	0	0	0.000	0.000	0.006
-HEALTH PHYSICS	0	6	2	0.006	2.217	0.509
-SUPERVISORY PERSONNEL	0	0	0	0.000	0.033	0.002
-ENGINEERING PERSONNEL	0	0	0	0.000	0.000	0.007
RX OPERATION & SURVEILL						
-MAINTENANCE	4	120	276	1.389	39.800	126.192
-OPERATIONS PERSONNEL	0	48	5	0.002	11.935	4.512
-HEALTH PHYSICS	1	32	79	0.504	11.895	26.941
-SUPERVISORY PERSONNEL	0	1	0	0.015	1.418	0.068
-ENGINEERING PERSONNEL	0	8	6	0.014	3.281	1.012
TOTALS						
-MAINTENANCE	5	191	287	2.132	64.512	130.040
-OPERATIONS PERSONNEL	0	79	5	0.006	20.676	4.910
-HEALTH PHYSICS	2	77	82	0.652	25.663	28.224
-SUPERVISORY PERSONNEL	0	1	0	0.016	1.477	0.089
-ENGINEERING PERSONNEL	0	8	6	0.022	3.938	1.064
GRAND TOTALS	7	356	380	2.829	116.266	164.326
TOTAL DOSE						283.421

ENCLOSURE 4

Salem Unit 1 and Unit 2 1999 Steam Generator Tube ISI Report

During 1999 Framatome Technologies Incorporated (FTI) conducted Eddy Current examinations on the Unit 1 and Unit 2 steam generators during 1R13 and 2R10 respectively. The dates for each outage are shown below:

- Unit 1 9/18/99 to 10/26/99
- Unit 2 4/3/99 to 5/28/99

All inspections were performed under the supervision of PSE&G's Steam Generator/Reactor Vessel Group. Zetec Incorporated performed secondary production/resolution data analysis for both outages.

Examination Scope

The scopes of the inspection were delineated in the 1R13 and 2R10 Steam Generator Tubing Degradation Assessments. These documents identified the degradation mechanisms that have or could affect the tubing in the applicable units steam generators, identified the inspection scope and techniques to be used, documented the review of EPRI qualified techniques against site-specific steam generator conditions and provided structural limits for those damage mechanism most likely to be found during the outages which were used to assess tube integrity requirements. Attachment 5 of this report provides the NDE Techniques utilized during 1R13 and 2R10 for detection (and sizing as applicable) of each degradation mechanism.

To ensure the resolution process was properly performed and that field calls were properly reported PSE&G utilized independent QDA Level III's during both outages per the requirements of EPRI PWR Steam Generator Examination Guidelines, Rev. 5.

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. Six technical deviations were implemented for 1R13 and nine for 2R10. All deviations were reviewed and approved by PSE&G NBU Senior management.

A summary of the eddy current scope and results for 1R13 and 2R10 follows:

Abbreviations

#H or #C	Tubes Support Plate elevation Hot Leg or Cold Leg side of Steam Generator
1R13	Unit 1 Refueling Outage 13
2R10	Unit 2 Refueling Outage 10
AV#	Anti-Vibration Bar Number designator (e.g. AV1 is Anti-Vibration Bar 1)
AVB	Anti-Vibration Bar
CDS	Computer Data Screening
CL	Cold Leg
DNI	Dent with possible indication
DSI	Distorted Support Indication
EPRI	Electric Power Research Institute
ETL	Expansion Transition Location
FDB	Flow Distribution Baffle
FSD	Free Span Differential
FTI	Framatome Technologies Incorporated
HL	Hot Leg
I-690	Inconel 690
IGA	Inter Granular Attack
ISI	In-Service Inspection
MBI	Manufacturer's Burnish Indication
MBM	Manufacturer's Burnish Mark
NBU	Nuclear Business Unit
NDE	Non Destructive Examination
NEI	Nuclear Energy Institute
NTE	No Tube Expansion
ODSCC	Outside Diameter Stress Corrosion Cracking
PLG	Plug
PSE&G	Public Service Electric & Gas
PSI	Possible Support Indication
PTE	Partial Tube Expansion
PWSCC	Primary Water Stress Corrosion Cracking
QDA	Qualified Data Analyst
R1	Row 1
R2	Row 2
RFO	Refueling Outage
RPC	Rotating Pancake Coil
SG	Steam Generator
SOD	Shallow Outside Diameter Indication
TSH	Tubesheet Hot Leg Side
TSP	Tube Support Plate
TTS	Top of Tubesheet

UNIT 1

Eddy current data acquisition was performed utilizing four SM-22 Manipulators with a dual guide tube tool head. Inspection data was transmitted to FTI's Lynchburg VA and Benicia CA data room facilities for primary production analysis and to Zetec's Issaquah WA data room facility for secondary production analysis. Resolution analysis was performed at the Salem off-site data room facility. Primary tubing degradation analysis was performed manually by FTI. FTI utilized Computerized Data Screening (CDS) for dent, ding, and sludge analysis. Zetec utilized CDS for secondary bobbin coil tubing degradation analysis. Secondary analysis for RPC data was performed manually. The table below lists the inspection scope performed during 1R13.

1R13 SG Inspection Scope

	Area	Probe	Inspections Performed	# Of Exams
1	Full Length (tube end to tube end)	Bobbin	Inspected 100% of the in-service tubes in each steam generator	22,491
2	Short Radius U-Bends (07H to 07C)	+Point™	Inspected 20% of the in-service Row 1 and Row 2 tubes in 11 and 13 steam generator.	100
3	HL TTS area @ an extent of +2", -3" in each SG	+Point™	Inspected 20% of the in-service tubes in 11 and 13 SG at the HL TTS Transition	2,276
4	Dented TSP Intersections (> 5 volts) and Free Span Bobbin Indications (Dings, >5 volts)	+Point™	Inspected 20% of >5 volt dented TSP's and 20% of >5 volts freespan dings up to 07H +2" in each steam generator	59
5	Tubesheet anomalies	+Point™	Inspected all history ETLs and PTEs in the area of interest	10
6	Distorted Support Signals (DSI)	+Point™	Inspected 100% of all bobbin signals	9
7	Free Span Bobbin Indications (MBM's & FSD's)	+Point™	MBM's or FSDs with bobbin voltage greater than 2 volts that exhibit growth or change from the baseline data, were inspected using Plus Point™ probes. Change is defined as a >0.5 voltage gain, and >15 degree phase shift towards the defect plane.	54

UNIT 2

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, and Benicia, CA, data room facilities for primary production analysis and to Zetec's Issaquah, WA, data room facility for secondary production analysis. Resolution analysis was performed at the Salem off-site data room facility. All tubing degradation analyses were performed manually. Computerized data screening (CDS) was utilized for dents, dings, and possible support ligament indications.

2R10 SG Inspection Scope

	Area	Probe	Inspections Performed	# Of Exams
1	Full Length (tube end to tube end)	Bobbin	Inspected 100% of the in-service tubes in each steam generator	12,846
2	Short Radius U-Bends (07H to 07C)	+Point™	Inspected 20% of the in-service Row 2 tubes in 21, 22 and 24 steam generators. Inspected 100% of the in-service Row 2 tubes and 20% of the Row 3 tubes and in 23 steam generator.	170
3	HL TTS area @ an extent the following extents: • +2", -3" in 21-23 SG's • +2, –5.5" in 24 SG	+Point™	Inspected 100% of the In-service tubes in each steam generator at the appropriate extent.	12,846
4	Tubesheet anomalies (Full length)	+Point™	Inspected 100% of the previous NTE's (SG24, R13C12. Inspected all Historical ETL's and	1
4a	Tubesheet anomalies (area of interest)	+Point™	PTE's.	55
5	Distorted Tubesheet Signals	+Point™	Inspected 100% of all bobbin signals.	1
6	Distorted Dented TSP Intersections (DNI)	+Point™	Inspected 100% of all bobbin signals.	14
6a	>2 Volt Dented TSP Intersections	+Point™	Inspected 100% in each SG at 01H to 04H, Inspected 20% @ 05H in SG 24.	5795
6b	>5 Volt Dented TSP Intersections	+Point™	Inspected 20% in SG24 @ 06H and 07H.	129
7	Distorted Support Signals (DSI)	+Point™	Inspected 100% of all bobbin signals.	15
8	Suspect TSP Ligament Cracks (PSI)	Bobbin & +Point™	Inspected with +Point™ 100% of all bobbin PSI calls.	20
9	Free Span Bobbin Indications (MBI's and FSI's)	+Point™	Inspected 100% of all bobbin signals.	50
10	Free Span Bobbin Indications (Dings)	+Point™	Inspected 100% of the HL >2 volt dings in each steam generator.	325

Examination Results

Unit 1

Consistent with the requirements specified in NEI 97-06, Steam Generator Program Guidelines, the Unit 1 steam generators met the structural integrity, accident induced leakage and operational leakage performance criteria specified site procedure SC.SA-AP.ZZ-0042(Q), Steam Generator Program for 1R13. The following table summarizes the number of tubes removed from service in each steam generator during 1R13 based on the applicable mode of degradation. In addition, cumulative tube plugging percentage for Salem Unit 1 is provided.

MODES OF DEGRADATION	SG 11	SG 12	SG 13	SG 14	TOTAL
AVB WEAR	3	0	2	3	8
NTE	0	0	2	0	2
TOTAL TUBES PLUGGED CUMULATIVE	3	3	13	4	23
CUMULATIVE TUBE PLUGGING %					0.10

FTI Inconel 690 mechanical rolled tube plugs were utilized for steam generator tube plugging as a result of eddy current inspections.

Anti-Vibration Bar (AVB) Wear

Wear was identified in the U-bend region of all steam generators. This mechanism has been attributed to vibration of the tube against the anti-vibration bars. This damage mechanism has been the most significant cause of tube plugging to date in Model F type steam generators. AVB wear is easily detected with bobbin coil probes and the bobbin coil sizing uncertainty is relatively low. Eight tubes were removed from service due to AVB wear. The table below shows total population of AVB wear called during 1R13.

	11 SG	12 SG	13 SG	14 SG
AVB Wear Indications	65	60	107	66
Total Tubes with AVB Wear	36	37	64	34

Based on the growth rates observed during the cycle, tubes with AVB wear indications of 35% throughwall and greater were removed from service during. The growth rates seen during 1R13 were within the expected parameters for the 1st cycle of operation of Model F steam generators and are expected to decrease during subsequent ISI's.

Manufacturer's Burnish Marks (MBM) / Free Span Differential Signal (FSD)

Both MBM and FSD signals are the result of a light buffing of the tubes to remove small imperfections of the tubing outside diameter. The two are analogous with the exception that the FSD's are readily discernable in the differential channels whereas MBM's are called in the absolute channel. During the Unit 1 baseline inspection 37,855 MBM indications were identified. The criterion for reporting MBM's was very conservative for the baseline inspection. The only requirement for reporting MBM's was the indication be present in channel 6 (150 kHz absolute). Emphasis was placed on making sure all MBM's were identified so they can be tracked during future exams.

During 1R13 the reporting criteria for MBM's was the indication had to be greater than 0.5" in length, > 2 volts, and less than 90 degrees in 150 kHz absolute channel. Resolution analysts were required to perform historical reviews of MBM's and FSD to determine if the signals had "changed" by more than 15 degrees or more than .5 volts since the baseline. Confirmation of "change", as described above, resulted in supplemental RPC testing. None of the MBM or FSD indications were confirmed as crack-like based on RPC test results.

No Tube Expansion (NTE)

No tube expansion refers to the condition where there is no hydraulic expansion for the full depth of the tubesheet, thus a crevice condition exists. Two tubes in #13 steam generator were identified as having NTE's during 1R13, R54C60 Tubesheet Hot and R46C64 Tubesheet Cold. Westinghouse provided an evaluation that demonstrated the design requirements were met for all analyzed conditions. Both tubes were preventatively plugged during the outage.

Loose Parts

The bobbin coil data was manually analyzed for loose parts two tubes around the entire periphery and down the divider plate. One tube in 14-steam generator, Row 14 Column 4, was identified as having a possible loose part indication. The loose part was visually confirmed during the post sludge-lancing top of tubesheet inspections. The part appears to be a carbon steel turning in an irregular curled shape. The part was grabbed and manipulated from two different directions multiple times but could not be removed. Supplemental RPC inspection of this and surrounding tubes found no evidence of tube wear or degradation. These tubes were evaluated and determined acceptable for continued service. The evaluation also documented acceptance for leaving this part in the steam generator for the next operating cycle.

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.

	11 SG	12 SG	13 SG	14 SG
Technical Specification Category	C-2	C-1	C-1	C-1

Unit 2

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 site procedure SC.SA-AP.ZZ-0042(Q), Steam Generator Program for 2R10. The following table summarizes the number of tubes removed from service in each steam generator during 2R10 based on the applicable mode of degradation. In addition, cumulative tube plugging percentage for Salem Unit 2 is provided.

Modes of Degradation	SG 21	SG 22	SG23	SG24	TOTAL
PWSCC @ HL TTS (Circ)	0	1	2	1	4
PWSCC @ HL TTS (Axial)	6	11	2	20	39
AVB WEAR	1	0	1	0	2
PWSCC @ HL TSP (Axial)	1	0	0	0	1
PWSCC LOW ROW U-BENDS (Circ)	0	0	4	0	4
HL FREESPAN ODSCC	1	0	0	0	1
TOTAL INDICATIONS					51
TOTAL TUBES PLUGGED	9	10	8	20	47
TOTAL TUBES PLUGGED CUMULATIVE	166	183	144	260	753
CUMULATIVE TUBE PLUGGING %					5.6

FTI designed Inconnel 690 mechanical rolled tube plugs were utilized for steam generator tube plugging as a result of eddy current inspections.

Primary Water Stress Corrosion Cracking (PWSCC) in Hot Leg Tubesheet (TTS) and Tube Support (TSP) Regions

Axial and circumferential PWSCC was identified in the hot leg tubesheets during 2R10. All of the tubes with indications were subject to an historical review for detection, sizing, and growth rates for condition monitoring. No tubes required stabilization during 2R10.

Steam generator 21, tube R15 C13 had the only axial PWSCC indication at a tube support elevation. This indication was located at 02H in a 2.41-volt dent. The bobbin coil examination did not identify this tube support as distorted.

Anti-Vibration Bar Wear

Wear was previously identified in the U-bend region of all four-steam generators. This mechanism has been attributed to vibration of the tube against the anti-vibration bars. One tube in steam generator 21 and one tube in steam generator 23 were plugged for AVB wear during 2R10.

Low Row U-bend Indications

During the 20% +Point examination of the Row 2 U-bends in steam generator 23, an inside diameter single circumferential indication (SCI) was identified in the hot leg tangent of tube R2 C9, requiring an expansion to 100% of the Row 2 U-bends, and a 20% sample of the Row 3 U-bends in S/G 23. During the expansion threemore Row 2 tubes were identified as having similar SCI indications. Based on historical reviews, these indications are not believed to be active and may be due to geometry, but were conservatively removed from service.

Manufacturer's Burnish Marks

MBM's were identified with the bobbin coil examination. All freespan indications indicative of an MBM type signal were compared to the 1983 data for historical comparison and to identify change in the signals between the two examinations. Any changes based on the parameters of the freespan flow chart were further examined with RPC probe. None of indications were confirmed as crack-like when examined with the RPC probe. No tubes were plugged due to MBM's.

Freespan Differential Signals

R18C9 in S/G 21 had eleven (11) bobbin indications that were not evident in the 1996 data. The +Point probe identified 18 axial indications along the same axial plane between the hot leg tubesheet and the first support. The mid frequency identifies what appeared to be two axial scratches that run between this span, and these indications occur along the length of one of these scratches. This tube was removed from service.

All of the tubes from the same heat lot as tube R18C9 were re-evaluated by the lead analyst in steam generator 21 from TSH to 01H on the bobbin coil data looking for similar indications, and none were noted.

Previous Shallow Outside Diameter (SOD) Indications

Results of the +Point examination from 2R9 categorized several tube supports with "shallow outside diameter" indications that were inspected with +Point probe during 2R10. These indications either disappeared from the data due to chemical cleaning, or exhibited no change in signal characteristics from 2R9 to 2R10. All SOD indications require no further action during subsequent refueling outages.

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

Tube Mis-encode

During 2R10, it became apparent that some tubes in steam generators 21 and 22 were incorrectly identified during the 2R9 (1996) examination. This resulted in an extensive comparison of 2R10 data to the 2R9 data for all four steam generators. This review found the condition limited to 21 and 22 steam generators. As a result of this comparison, a total of 79 tubes were found to have not been inspected during the 2R9 outage. This information was previously communicated to the USNRC during a 5/3/99 telephone conference.

Per Letter LN-N97105 Dated February 28, 1997 PSE&G submitted the Technical Specification 6.9.1.5 Annual Reports for the Salem Unit 1 and Unit 2 steam generator inspections completed during 1996. This report stated that a 100% bobbin coil inspection was performed in 21 through 24 steam generators. This report makes a correction to the referenced submittal for 21 and 22 steam generators. Since a total of 79 tubes in 21 and 22 steam generators were identified as not being inspected during 2R9, the 100% bobbin coil inspection, as previously reported, was not performed. PSE&G determined there were no changes to the overall inspection results classification (C1, C2 or C-3) for 21 and 22 steam generators. In addition, PSE&G determined there were no Technical Specification Violations due to 79 tubes not being inspected during 2R9.

Attachments

The following data management summary reports are grouped as attachments, which provide the in-service inspection results per Technical Specification 4.4.5.5.b (Unit 1) and 4.4.6.5.b (Unit 2):

- Attachment 1 – Unit 1, 1R13 - Location and % through-wall indications.
- Attachment 2 – Unit 1, 1R13 - Identification of tubes plugged.
- Attachment 3 – Unit 2, 2R10 – Location and % through-all indications.
- Attachment 4 – Unit 2, 2R10 – Identification of tubes plugged.
- Attachment 5 – 1R13 and 2R10 NDE Techniques

Attachment 1

1R13 Location and Percent Through Wall Indications

QUERY: QueryM1

ROW	COL	%TW	LOCATION	
26	91	10	AV6	+0.00
31	10	14	AV5	+0.00
		11	AV2	+0.06
38	78	17	AV5	+0.12
38	107	20	AV3	+0.00
		13	AV5	+0.08
39	59	17	AV2	-0.50
39	66	15	AV3	+0.00
		14	AV4	+0.00
		12	AV6	+0.00
40	17	23	AV5	-0.09
40	18	19	AV5	+0.04
		13	AV3	+0.00
		13	AV4	+0.10
40	43	19	AV2	+0.00
		15	AV3	+0.00
		14	AV6	+0.00
40	47	11	AV3	-0.12
40	54	30	AV3	+0.00
40	60	15	AV2	+0.00
		24	AV3	+0.00
		17	AV4	+0.00
		20	AV5	+0.00
40	62	14	AV1	-0.04
		13	AV2	+0.05
		17	AV5	+0.00
40	104	10	AV5	-0.02
41	19	11	AV6	+0.00
41	52	31	AV3	+0.00
41	61	18	AV5	-0.04
		16	AV4	+0.00
		19	AV3	+0.18
		16	AV2	+0.00
41	103	14	AV5	-0.02
42	19	15	AV6	+0.00

QUERY: QueryM1

ROW	COL	%TW	LOCATION	
42	20	12	AV5	+0.00
		12	AV4	-0.04
42	59	29	AV4	+0.96
43	23	12	AV4	+0.00
43	38	11	AV3	-0.02
43	41	10	AV4	-0.06
		13	AV3	+0.00
		10	AV2	+0.00
43	64	19	AV3	+0.00
44	21	27	AV2	+0.09
44	22	17	AV5	-0.02
44	77	12	AV3	+0.02
44	78	21	AV5	+0.00
		24	AV4	+0.00
		12	AV2	+0.00
		14	AV1	+0.00
47	25	47	AV4	+0.08
47	99	12	AV3	+0.06
48	98	27	AV3	+0.04
		35	AV4	+0.02
		17	AV5	+0.00
		25	AV6	+0.08
50	82	18	AV2	+0.45
50	95	25	AV6	+0.00
		24	AV5	+0.02
		54	AV4	-0.10
		26	AV2	+0.04
		16	AV1	-0.02
53	33	17	AV5	-0.08
53	35	12	AV5	+0.00

Total Tubes : 36
Total Records: 65

QUERY: QueryM1

ROW	COL	%TW	LOCATION	
29	112	14	AV5	+0.00
36	107	13	AV4	+0.00
36	108	21	AV1	+0.00
38	105	18	AV3	+0.00
38	106	11	AV4	+0.00
		15	AV5	+0.00
38	107	13	AV2	+0.00
39	67	13	AV4	-0.27
		24	AV3	+0.55
		16	AV1	-0.02
39	70	31	AV3	+0.14
39	103	16	AV5	+0.00
		10	AV4	+0.02
		10	AV2	+0.00
39	104	11	AV4	+0.06
		10	AV2	+0.04
39	105	26	AV5	+0.00
		11	AV4	+0.04
		14	AV2	+0.00
39	106	18	AV4	+0.00
		13	AV3	+0.00
40	47	20	AV2	+0.17
		14	AV5	+0.02
40	80	15	AV4	+0.00
		27	AV2	+0.00
		32	AV3	+0.00
40	82	17	AV3	+0.00
40	83	19	AV5	+0.00
40	88	23	AV3	+0.00
		18	AV2	-0.04
40	91	16	AV6	+0.13
		13	AV5	-0.04
		14	AV4	+0.13
		14	AV2	+0.06
40	102	27	AV3	+0.08

QUERY: QueryM1

ROW	COL	%TW	LOCATION	
40	103	13	AV4	+0.00
		15	AV2	+0.00
40	106	13	AV5	+0.00
		10	AV4	+0.00
		11	AV3	+0.00
41	86	26	AV4	+0.00
41	87	18	AV4	-0.13
41	90	10	AV2	-0.02
41	92	17	AV5	+0.25
		14	AV4	+0.02
41	103	20	AV4	+0.00
42	47	11	AV3	+0.00
42	55	17	AV5	-0.06
42	62	22	AV4	-0.09
42	99	29	AV3	+0.00
42	103	17	AV5	+0.00
		26	AV4	+0.00
47	97	22	AV4	+0.08
47	99	23	AV5	+0.00
		16	AV2	+0.00
48	25	24	AV6	+0.00
		17	AV5	-0.06
50	28	27	AV5	+0.00
56	77	14	AV4	-0.04
57	44	12	AV4	+0.02

Total Tubes : 37
Total Records: 60

QUERY: QueryM1

ROW	COL	%TW	LOCATION	
26	43	13	AV1	+0.00
27	115	18	AV2	+0.00
30	114	16	AV2	+0.00
		15	AV5	+0.00
36	80	18	AV3	+0.00
36	97	18	AV3	+0.25
36	109	14	AV2	+0.11
38	58	13	AV5	+0.00
38	60	18	AV3	-0.12
		22	AV2	+0.24
38	66	13	AV4	+0.00
38	72	14	AV3	+0.00
		14	AV2	+0.00
		12	AV4	+0.00
38	83	17	AV3	-0.09
38	93	18	AV5	+0.04
38	94	15	AV3	+0.06
		12	AV2	+0.14
38	98	24	AV3	+0.00
38	106	18	AV6	+0.19
		13	AV2	+0.13
39	47	12	AV5	+0.00
39	51	15	AV6	+0.00
39	54	17	AV3	-0.02
39	56	15	AV3	+0.00
		16	AV4	+0.02
39	58	17	AV3	+0.00
39	65	10	AV2	-0.11
		12	AV1	+0.13
39	76	20	AV2	+0.00
		25	AV6	+0.00
40	19	19	AV3	+0.00
40	62	14	AV5	+0.02
40	82	14	AV2	+0.06
		11	AV3	+0.14

QUERY: QueryM1

ROW	COL	%TW	LOCATION	
		12	AV4	-0.04
41	103	16	AV6	+0.00
		19	AV4	+0.04
42	41	11	AV4	+0.00
42	42	11	AV2	+0.00
		12	AV4	+0.00
42	44	19	AV3	+0.06
		11	AV4	+0.06
		12	AV6	+0.00
43	41	11	AV5	+0.02
43	58	17	AV5	+0.00
		11	AV4	+0.00
		32	AV3	+0.04
		13	AV2	+0.00
43	66	26	AV4	+0.00
		10	AV2	+0.00
43	68	19	AV2	-0.10
43	72	16	AV6	+0.00
43	84	21	AV3	+0.09
		11	AV2	-0.18
43	99	23	AV4	+0.00
43	100	10	AV6	-0.02
		13	AV4	-0.09
		17	AV3	+0.02
		11	AV2	+0.00
44	61	12	AV4	+0.00
		26	AV3	-0.06
44	62	25	AV5	+0.00
		36	AV4	+0.00
44	65	24	AV3	+0.14
46	24	20	AV5	-0.11
46	46	12	AV4	+0.00
46	61	17	AV5	-0.13
		26	AV4	-0.49
46	72	35	AV3	+0.00

QUERY: QueryM1

ROW	COL	%TW	LOCATION	
		24	AV2	+0.00
46	75	18	AV2	+0.00
47	24	22	AV5	-0.02
47	25	17	AV5	+0.00
47	83	13	AV2	-0.02
47	99	22	AV6	-0.04
49	96	19	AV5	+0.00
50	28	27	AV4	+0.00
		22	AV5	-0.20
50	79	16	AV3	+0.00
		16	AV2	+0.00
50	83	12	AV6	-0.11
		13	AV4	-0.07
		19	AV3	-0.15
50	92	13	AV6	-0.06
		13	AV5	-0.06
		13	AV4	-0.02
50	95	27	AV5	+0.00
		25	AV3	+0.02
		11	AV1	+0.00
52	33	21	AV6	+0.02
52	34	19	AV6	+0.00
52	74	21	AV4	+0.00
53	33	21	AV6	+0.00
		20	AV5	+0.00
53	90	32	AV4	+0.08
		18	AV3	+0.06
54	70	16	AV2	+0.00
		13	AV3	+0.00
		21	AV4	+0.00
54	74	27	AV4	-0.06
		10	AV3	-0.02
56	82	22	AV6	+0.00
		25	AV5	+0.00
		16	AV4	+0.00

QUERY: QueryM1

ROW	COL	%TW	LOCATION	
58	47	13	AV4	+0.00
		18	AV5	+0.00

Total Tubes : 64
Total Records: 107

QUERY: QueryM1

ROW	COL	%TW	LOCATION	
24	116	15	AV1	+0.00
25	8	11	AV1	-0.18
26	8	12	AV1	-0.35
		12	AV6	-0.36
26	115	11	AV1	+0.02
28	8	26	AV1	+0.00
28	12	12	AV6	+0.00
30	9	21	AV2	+0.00
30	10	10	AV2	+0.11
31	10	16	AV2	+0.00
32	84	10	AV2	+0.12
32	109	14	AV2	-0.02
37	83	21	AV5	+0.00
38	101	14	AV3	-0.04
40	18	24	AV4	+0.00
		30	AV5	+0.00
40	48	15	AV5	+0.00
		11	AV1	-0.10
40	51	11	AV4	+0.00
		19	AV3	+0.00
40	52	20	AV5	+0.00
		10	AV6	+0.00
40	76	24	AV4	+0.22
		19	AV3	+0.13
40	81	12	AV1	+0.00
40	85	10	AV4	+0.26
		10	AV2	+0.00
43	55	15	AV2	+0.08
		15	AV3	+0.33
		12	AV5	-0.02
		17	AV6	+0.12
46	24	12	AV6	+0.00
47	24	27	AV5	-0.02
		14	AV4	+0.17
		37	AV3	-0.04

QUERY: QueryM1

ROW	COL	%TW	LOCATION	
		21	AV6	-0.02
47	25	18	AV5	-0.02
		16	AV4	+0.17
		30	AV3	+0.19
		24	AV2	+0.02
47	43	13	AV3	+0.06
47	48	16	AV5	+0.00
		16	AV3	-0.08
47	60	12	AV2	+0.00
		18	AV4	+0.00
		30	AV5	+0.00
47	72	18	AV4	+0.00
		20	AV3	+0.00
47	81	21	AV4	+0.25
		23	AV3	+0.21
		19	AV2	+0.04
		13	AV1	+0.06
47	83	22	AV3	+0.00
		17	AV5	+0.00
47	99	17	AV1	+0.02
		20	AV2	+0.00
		38	AV3	+0.06
		27	AV4	-0.02
		23	AV6	+0.04
48	25	23	AV6	-0.04
		35	AV5	+0.00
		22	AV4	+0.00
		17	AV3	-0.02
		30	AV2	+0.04
55	83	12	AV6	-0.04
56	41	13	AV5	+0.08

Total Tubes : 34
Total Records: 66

Attachment 2

Identification of Tubes Plugged During 1R13

QUERY: QueryM1

ROW	COL	LEG	OUTAGE	CODE
47	25	COLD	09/99 RFO 1R13	PLG
		HOT	09/99 RFO 1R13	PLG
48	98	COLD	09/99 RFO 1R13	PLG
		HOT	09/99 RFO 1R13	PLG
50	95	COLD	09/99 RFO 1R13	PLG
		HOT	09/99 RFO 1R13	PLG

Total Tubes : 3
Total Records: 6

QUERY: QueryM1

ROW	COL	LEG	OUTAGE	CODE

Total Tubes : 0
Total Records: 0

QUERY: QueryM1

ROW	COL	LEG	OUTAGE	CODE
44	62	COLD	09/99 RFO 1R13	PLG
		HOT	09/99 RFO 1R13	PLG
46	64	COLD	09/99 RFO 1R13	PLG
		HOT	09/99 RFO 1R13	PLG
46	72	COLD	09/99 RFO 1R13	PLG
		HOT	09/99 RFO 1R13	PLG
54	60	COLD	09/99 RFO 1R13	PLG
		HOT	09/99 RFO 1R13	PLG

Total Tubes : 4
Total Records: 8

QUERY: QueryM1

ROW	COL	LEG	OUTAGE	CODE
47	24	COLD	09/99 RFO 1R13	PLG
		HOT	09/99 RFO 1R13	PLG
47	99	COLD	09/99 RFO 1R13	PLG
		HOT	09/99 RFO 1R13	PLG
48	25	COLD	09/99 RFO 1R13	PLG
		HOT	09/99 RFO 1R13	PLG

Total Tubes : 3
Total Records: 6

QUERY: QueryM1

ROW	COL	LEG	OUTAGE	CODE	REPAIR TYPE	MATERIAL	MANUF	INSTALLED	REMOVED
47	24	COLD	09/99 RFO 1R13	PLG	ROLLED	I690	FTI	10-11-1999	
		HOT	09/99 RFO 1R13	PLG	ROLLED	I690	FTI	10-11-1999	
47	99	COLD	09/99 RFO 1R13	PLG	ROLLED	I690	FTI	10-11-1999	
		HOT	09/99 RFO 1R13	PLG	ROLLED	I690	FTI	10-11-1999	
48	25	COLD	09/99 RFO 1R13	PLG	ROLLED	I690	FTI	10-11-1999	
		HOT	09/99 RFO 1R13	PLG	ROLLED	I690	FTI	10-11-1999	

Total Tubes : 3
Total Records: 6

Attachment 3

2R10 Location and Percent Through Wall Indications

QUERY: QueryM1

ROW	COL	%TW	LOCATION	
17	37	13	AV4	-0.55
17	52	15	AV4	-0.60
		15	AV3	+0.82
		14	AV3	-0.96
		13	AV2	+0.97
		15	AV2	-0.98
		16	AV1	+0.00
17	56	18	AV2	+0.00
17	63	14	AV1	+0.00
		16	AV2	+0.00
		12	AV3	+0.00
19	30	28	AV3	+0.00
		19	AV2	+0.00
		17	AV1	+0.00
19	58	19	AV4	+0.47
		18	AV2	+0.64
19	66	18	AV2	+0.00
		21	AV1	+0.00
		26	AV3	+0.00
21	29	15	AV4	+0.00
		10	AV3	+0.00
21	60	13	AV4	+1.93
		14	AV3	-0.64
		15	AV2	-0.22
23	67	27	AV1	-1.00
		26	AV2	-0.50
		21	AV3	+0.00
23	68	23	AV4	+0.00
		30	AV3	+0.00
		32	AV2	-0.50
		14	AV2	+0.50
23	70	11	AV4	+0.00
24	52	25	AV2	+1.14
		11	AV3	+1.16
24	63	40	AV1	+0.02

QUERY: QueryM1

ROW	COL	%TW	LOCATION	
		14	AV2	+0.24
		16	AV4	-0.24
24	67	12	AV2	+0.00
24	68	27	AV2	+0.00
		24	AV3	+0.00
24	70	13	AV1	+0.00
26	46	15	AV2	+0.28
26	56	32	AV4	+0.00
		24	AV3	+0.00
		18	AV2	+0.00
		25	AV1	+0.00
26	58	24	AV3	-0.66
		14	AV2	-0.60
26	59	13	AV4	+0.53
		12	AV4	-0.45
		21	AV3	+0.32
		19	AV2	+0.00
26	63	10	AV4	+0.00
26	64	26	AV1	-0.27
26	67	17	AV1	+0.06
		12	AV4	+0.00
27	44	21	AV4	+0.86
		34	AV3	+0.39
		34	AV2	-0.04
		10	AV1	-0.62
27	46	26	AV4	-0.48
		33	AV3	+0.26
		31	AV2	+0.28
27	47	31	AV4	-1.48
		38	AV3	-0.78
		19	AV2	-0.88
27	52	26	AV4	+0.00
		24	AV3	+1.21
		38	AV3	-1.14
		24	AV2	+1.06

QUERY: QueryM1

ROW	COL	%TW	LOCATION	
		30	AV2	-1.27
		25	AV1	-2.00
27	56	26	AV4	+0.00
		30	AV3	+0.00
		28	AV2	+0.00
		26	AV1	+0.00
27	64	27	AV3	+0.15
		24	AV2	+0.02
		29	AV1	-0.18
29	46	16	AV4	-0.22
		34	AV3	+0.45
		21	AV2	+0.32
		20	AV1	-0.49
29	57	11	AV4	-0.24
		17	AV3	+0.00
		13	AV2	+0.00
29	65	30	AV4	+0.00
		17	AV3	+0.00
31	64	26	AV2	+0.04
31	67	23	AV2	+0.00
32	39	19	AV4	+0.04
32	48	32	AV3	+0.00
		17	AV2	+0.00
32	49	19	AV3	+1.16
32	51	18	AV4	+1.60
		16	AV3	+1.29
		21	AV3	-1.25
		17	AV2	+1.21
32	54	15	AV3	-0.15
33	41	17	AV4	+0.56
		13	AV2	+0.00
33	55	17	AV3	+0.00
33	60	26	AV3	+0.47
		26	AV1	+0.24
34	36	15	AV3	-0.24

QUERY: QueryM1

ROW	COL	%TW	LOCATION	
		28	AV2	-0.47
		10	AV1	+0.32
34	37	24	AV2	+0.00
		18	AV3	+0.00
		10	AV4	+0.00
		18	AV1	+0.00
34	44	34	AV3	+0.00
		24	AV2	+0.00
34	45	20	AV4	-0.30
		27	AV3	-0.26
		15	AV2	+0.00
34	49	13	AV3	+1.34
		16	AV2	+1.14
		13	AV1	+0.00
34	51	22	AV1	+0.00
34	52	20	AV2	+0.97
34	65	26	AV4	-0.11
		26	AV3	-0.47
		15	AV2	-0.19
35	68	20	AV1	-0.50
		15	AV2	-0.28
35	76	17	02C	-0.02
36	41	21	AV3	+0.00
36	50	11	AV2	+1.01
36	52	19	AV2	-0.70
36	56	27	AV2	+0.00
36	58	19	AV3	-0.43
		15	AV2	+0.43
		17	AV2	-0.47
		13	AV1	+0.19
39	37	27	AV2	-0.15
		22	AV1	+0.28
39	39	10	AV3	+0.00
39	54	14	AV1	+0.00
39	61	33	AV2	+0.00

QUERY: QueryM1

ROW	COL	%TW	LOCATION	
		20	AV1	-0.70
41	58	12	AV1	+0.00

Total Tubes : 63
Total Records: 142

QUERY: QueryM1

ROW	COL	%TW	LOCATION	
16	68	12	AV2	+0.00
18	65	18	AV1	-0.07
		19	AV2	-0.69
		25	AV2	+0.72
		30	AV3	-0.02
		20	AV4	-0.69
22	62	14	AV2	-0.10
22	87	1	01C	+0.08
23	71	16	AV1	+0.00
		10	AV2	+0.02
		14	AV3	+0.28
		10	AV4	+0.35
25	9	16	AV3	-0.12
25	30	18	AV1	+1.69
		25	AV2	+0.00
		32	AV3	+0.00
25	63	16	AV3	+0.00
25	69	18	AV2	+0.00
		32	AV3	+0.00
25	71	19	AV3	+0.06
26	23	11	AV3	+0.07
26	62	30	AV1	+0.00
		22	AV2	-0.02
		22	AV3	+0.00
31	27	20	AV2	-0.11
31	28	23	AV2	+0.00
32	79	18	02C	-0.04
		5	03C	-0.17
33	16	16	03C	+0.00
33	48	39	AV2	+0.00
		34	AV3	+0.00
34	17	39	01C	+0.34
34	32	30	AV1	+0.00
		12	AV2	+0.00
		25	AV3	+0.00

QUERY: QueryM1

ROW	COL	%TW	LOCATION	
34	39	15	AV3	+0.00
34	41	14	AV3	-0.02
34	49	34	AV4	+0.00
34	50	28	AV3	-0.08
		20	AV4	+0.00
		21	AV2	+0.10
34	58	11	AV2	+0.00
35	26	11	AV2	+0.00
36	34	25	AV3	+0.00
40	36	25	AV4	+0.00
40	37	12	AV1	+0.00
		17	AV2	+0.00
40	44	19	AV1	+0.22
		29	AV2	-0.18
40	52	17	AV2	+0.00
42	41	19	02C	-0.06
42	65	32	01C	+0.34
43	37	8	02C	-0.08
43	60	35	02C	-0.06
43	61	5	02C	-0.08
43	64	14	01C	+0.35
43	65	12	02C	+0.10
44	37	12	02C	-0.12
44	38	12	01C	+0.06
44	46	7	02C	+0.16
44	56	39	02C	+0.06
44	58	12	02C	-0.05
44	59	5	02C	-0.08
44	60	10	02C	+0.02
45	41	3	02C	+0.16

Total Tubes : 45
Total Records: 65

QUERY: QueryM1

ROW	COL	%TW	LOCATION	
8	3	11	01C	+0.00
9	3	25	01C	+0.08
12	3	18	01C	-0.06
16	57	19	AV1	+0.00
		13	AV2	+0.00
		20	AV3	+0.00
		15	AV4	+0.00
20	31	11	AV1	+0.00
20	64	14	AV4	+0.00
21	22	15	AV2	+0.00
21	23	11	AV1	+0.00
		10	AV2	+0.00
		12	AV3	+0.00
23	40	11	AV3	+0.00
23	44	10	AV2	+0.00
23	53	13	AV1	+0.71
		17	AV2	-0.07
		28	AV3	-0.18
23	58	15	AV1	+0.00
		26	AV2	+0.00
		32	AV3	+0.00
		12	AV4	+0.00
24	48	10	AV1	+0.00
		11	AV2	+0.00
24	55	14	AV1	+1.09
		10	AV4	-2.75
24	56	21	AV1	-0.68
		18	AV2	-1.07
		18	AV3	+0.73
		24	AV3	-0.78
		18	AV4	-1.44
25	44	15	AV2	+0.00
26	44	23	AV2	+0.00
		24	AV3	+0.00
		19	AV4	+0.00

QUERY: QueryM1

ROW	COL	%TW	LOCATION	
26	45	18	AV1	+0.00
		21	AV2	+0.00
		16	AV4	+0.00
27	51	26	AV1	+0.00
		30	AV2	+0.00
		34	AV3	+0.00
		13	AV4	+0.00
27	59	26	AV1	+0.00
		12	AV2	+0.00
		12	AV4	+0.00
27	63	27	AV1	-0.15
		34	AV2	-0.11
		12	AV3	-0.11
		10	AV4	-0.96
27	64	12	AV1	-0.78
		10	AV2	+0.13
27	65	15	AV4	+1.00
28	10	4	01C	-0.09
28	45	25	AV2	+0.00
30	35	33	AV2	+0.00
		18	AV4	+0.00
30	45	38	AV2	+0.00
		17	AV3	+0.00
		37	AV2	+0.10
30	57	16	AV1	+0.27
30	63	24	AV1	+1.15
		37	AV2	+0.02
		23	AV4	+0.40
		37	AV2	+0.14
31	17	30	01C	-0.25
31	63	11	AV2	+0.00
32	41	19	AV2	+0.00
		28	AV3	+0.00
32	45	39	AV3	+0.05
		29	AV1	+0.00

QUERY: QueryM1

ROW	COL	%TW	LOCATION	
		39	AV2	+0.00
		28	AV4	+0.00
		37	AV2	-0.10
		38	AV3	+0.05
32	59	25	AV3	+0.00
		19	AV4	+0.00
32	61	13	AV1	+0.00
33	26	18	AV1	+0.00
		23	AV2	+0.00
		19	AV3	+0.00
33	52	16	AV1	+0.00
34	38	18	AV3	+0.00
34	52	17	AV4	+0.00
34	54	11	AV4	+0.00
35	53	18	AV3	-0.07
		16	AV4	-0.07
35	54	15	AV4	+0.00
36	44	17	AV4	+0.00
36	45	18	AV3	+0.00
		21	AV4	+0.00
36	63	25	AV2	+0.00
36	71	11	AV2	+0.09
37	19	29	02C	-0.16
37	42	15	AV3	+0.00
		20	AV4	+0.00
37	45	26	AV4	+0.00
37	52	31	AV4	+0.12
38	46	13	AV3	+0.00
		15	AV4	+0.00
38	47	21	AV4	+0.00
		25	AV3	+0.00
38	48	30	AV3	+0.00
39	50	18	AV1	-0.12
		21	AV2	+0.11
39	52	29	AV1	+0.00

QUERY: QueryM1

ROW	COL	%TW	LOCATION	
		23	AV2	+0.00
39	54	20	AV1	+0.00
		33	AV2	+0.00
		36	AV3	+0.00
		38	AV4	+0.00
		37	AV4	-0.05
		35	AV3	+0.02
		32	AV2	-0.05
39	58	26	AV1	+0.00
		24	AV2	+0.00
39	60	13	AV3	+0.00
		18	AV4	+0.00
40	42	33	AV2	+0.00
40	50	27	AV2	+0.00
40	51	16	AV1	+0.00
		26	AV2	+0.00
		13	AV3	+0.00
40	54	33	AV1	+0.00
		21	AV2	+0.00
		22	AV3	+0.00
		29	AV4	+0.00
40	55	20	AV1	+0.00
		37	AV2	+0.00
		39	AV3	+0.00
		39	AV3	+0.00
		37	AV2	+0.30
40	61	21	AV1	+0.00
		41	AV2	+0.00
		42	AV3	+0.00
		39	AV2	+0.22
		41	AV3	+0.13
40	66	22	AV2	+0.00
41	52	18	AV2	+0.00
		23	AV3	-0.09
41	55	28	AV1	-0.71

QUERY: QueryM1

ROW	COL	%TW	LOCATION	
		20	AV1	+0.37
		24	AV2	+0.00
41	60	17	AV2	+0.00
41	65	14	AV2	+0.00
42	50	20	AV1	+0.00
		21	AV2	+0.00
		37	AV3	+0.00
		24	AV4	+0.00
		37	AV3	-0.06
42	52	12	AV1	+0.00
42	60	14	AV3	+0.00
42	65	21	AV2	+0.00
42	67	30	AV1	-0.06
		21	AV2	+0.00
		34	AV3	+0.00
43	63	17	AV2	+0.00
44	33	11	01C	-0.18
44	36	1	01C	-0.24
45	58	18	AV4	+0.00

Total Tubes : 78
Total Records: 159

QUERY: QueryM1

ROW	COL	%TW	LOCATION	
10	3	6	01C	-0.10
15	33	15	AV3	+0.00
17	65	19	AV2	+0.00
18	55	22	AV1	+0.00
		20	AV3	+0.00
		19	AV4	+0.00
		17	AV2	+0.25
21	28	16	AV1	+0.00
		21	AV2	+0.00
		28	AV3	+0.00
		16	AV4	+0.44
22	72	23	AV2	+0.00
23	28	13	AV3	+0.00
23	33	14	AV1	+0.00
		19	AV2	+0.00
		26	AV3	+0.00
23	53	19	AV4	+0.00
23	56	11	AV3	+0.00
		19	AV4	+0.00
23	57	17	AV2	-0.38
		12	AV2	+0.26
		26	AV3	+0.00
		32	AV4	+0.00
23	59	22	AV2	+0.00
		14	AV3	-0.40
		17	AV3	+0.23
		20	AV1	+0.95
23	62	18	AV2	-0.62
		22	AV3	+0.00
		16	AV1	+0.66
		12	AV4	+0.95
23	72	28	AV4	+0.00
24	34	28	AV2	+0.00
		23	AV3	+0.00
		15	AV4	+0.00

QUERY: QueryM1

ROW	COL	%TW	LOCATION	
26	34	20	AV3	+0.00
		21	AV4	+0.00
26	58	22	AV2	+0.00
		26	AV3	+0.00
		13	AV1	+0.00
26	67	19	AV1	+0.00
27	62	11	AV1	+0.70
		19	AV2	+0.00
27	68	31	AV3	-0.24
		28	AV4	+0.00
28	59	16	AV2	+0.00
		10	AV1	+0.00
31	31	36	AV3	+0.00
31	48	16	AV3	+0.00
32	64	18	AV2	+0.00
33	41	10	AV1	+0.00
33	47	19	AV2	+0.66
		26	AV3	-0.52
		22	AV4	+0.09
33	48	12	AV1	+0.26
		18	AV2	-0.05
33	49	17	AV3	+0.00
33	50	15	AV4	+0.00
		10	AV3	+0.00
33	51	32	AV2	-0.78
		16	AV3	-0.78
33	57	13	AV1	+0.00
		36	AV4	+0.00
		19	AV3	+0.00
33	58	22	AV3	+0.00
33	65	15	AV3	+0.00
33	66	31	AV2	+0.00
		15	AV3	+0.00
34	63	28	AV2	+0.00
		18	AV3	+0.00

QUERY: QueryM1

ROW	COL	%TW	LOCATION	
		18	AV4	+0.00
34	65	32	AV3	-0.44
		23	AV4	+0.36
36	63	21	AV3	+0.00
38	39	22	AV4	-0.28
38	52	37	AV4	+0.50
38	67	32	AV2	+0.00
		34	AV3	-0.31
38	68	37	AV2	+0.00
		27	AV3	+0.00
		24	AV4	+0.00
39	49	31	AV4	+0.00
		15	AV3	+0.00
39	65	30	AV1	+0.00
		23	AV2	+0.00
40	37	26	AV1	+0.00
		24	AV2	+0.00
40	56	24	AV1	+0.00
		17	AV2	+0.00
40	57	16	AV4	+0.00
41	35	13	AV1	+0.00
		18	AV2	+0.00
41	53	18	AV1	-0.25
		18	AV2	-0.25
		21	AV3	+0.34
		26	AV4	-0.08
41	57	10	AV1	+0.02
41	59	21	AV4	+0.00
42	33	10	02C	-0.20
42	53	12	AV1	+0.00
		10	AV2	+0.00
42	55	36	AV1	+0.00
		21	AV2	+0.00
42	59	2	02C	-0.09
43	59	11	02C	+0.20

QUERY: QueryM1

ROW	COL	%TW	LOCATION	
43	60	24	02C	-0.09
43	63	23	02C	+0.22
44	35	17	AV1	+0.00
44	55	10	AV4	+0.00
45	46	31	02C	-0.15
45	54	20	AV1	+0.00

Total Tubes : 61
Total Records: 111

Attachment 4

Identification of Tubes Plugged During 2R10

QUERY: QueryM1

ROW	COL	LEG	OUTAGE	CODE
4	18	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
15	13	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
16	35	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
18	9	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
20	35	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
21	28	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
22	42	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
23	34	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
24	63	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG

Total Tubes : 9
Total Records: 18

QUERY: QueryM1

ROW	COL	LEG	OUTAGE	CODE
3	34	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
4	7	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
4	71	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
6	16	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
6	71	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
7	3	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
23	73	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
24	61	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
24	66	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
26	39	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG

Total Tubes : 10
Total Records: 20

QUERY: QueryM1

ROW	COL	LEG	OUTAGE	CODE
2	6	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
2	8	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
2	9	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
2	15	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
2	41	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
18	57	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
39	62	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
40	61	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG

Total Tubes : 8
Total Records: 16

QUERY: QueryM1

ROW	COL	LEG	OUTAGE	CODE
3	12	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
5	72	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
8	7	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
12	52	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
13	52	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
16	5	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
20	52	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
20	57	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
21	52	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
22	37	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
23	47	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
27	47	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
31	13	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
31	37	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
33	27	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
36	26	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
37	22	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
37	34	COLD	04/99 2R10	PLG

QUERY: QueryM1

ROW	COL	LEG	OUTAGE	CODE
		HOT	04/99 2R10	PLG
37	35	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG
41	34	COLD	04/99 2R10	PLG
		HOT	04/99 2R10	PLG

Total Tubes : 20
Total Records: 40

Attachment 5

NDE Techniques Utilized for
1R13 and 2R10

Attachment 5
1R13 NDE TECHNIQUES

Degradation Mechanism and Orientation	SG Location	Probe	EPRI Detection Technique	Detection Qualification Category
Axial PWSCC	Tubesheet Region	+Point	96508	Site
Circ PWSCC	Tubesheet Region	+Point	96508	Site
Axial ODSCC	Tubesheet Region	+Point	96402	Site
Circ ODSCC	Tubesheet Region	+Point	96402	Site
IGA/ODSCC	Sludge Pile region	Bobbin	96008	Site
Pitting in the presence of copper	Above TTS	Bobbin	96005	Site
Axial PWSCC	Freespan with and without dent	+Point	96508	Site
Circ PWSCC	Freespan with and without dent	+Point	96508	Site
Axial PWSCC	Dented TSP	+Point	96508	Site
Circ PWSCC	Dented TSP	+Point	96508	Site
Axial ODSCC	Dented or non-dented TSP	+Point	96402	Site
Circ ODSCC	Dented or non-dented TSP	+Point	96402	Site
IGA/ODSCC	Non-dented TSP	Bobbin	96007	Site
AVB Wear FDB Wear	U-Bend HL or CL	Bobbin Bobbin	96004 96004	Site Site
Axial PWSCC	R1 & R2 U-Bend	+Point	96511	Site
Circ PWSCC	R1 & R2 U-Bend	+Point	96511	Site
Thinning	Non Dented TSP	Bobbin	96001	Site
Wear at Supports and Loose Part	Anywhere	Bobbin +Point	96004	Site
Freespan MBMS	Anywhere	Bobbin +Point	NA	Non-Qualified

Attachment 5
2R10 NDE TECHNIQUES

Degradation Mechanism and Orientation	SG Location	Probe	EPRI Detection Technique	Detection Qualification Category
Axial PWSCC	Tubesheet Region	+Point Bobbin	96508 96006	Site Qualified
Circ PWSCC	Tubesheet Region	+Point	96508	Site
Axial ODSCC	Tubesheet Region	+Point	96402	Site
Circ ODSCC	Tubesheet Region	+Point	96402	Site
IGA/ODSCC	Sludge Pile region	Bobbin	96008	Site
Pitting in the presence of copper	Above TTS	Bobbin	96005	Site
Axial PWSCC	Freespan with and without dent	+Point	96508	Qualified
Circ PWSCC	Freespan with and without dent	+Point	96508	Qualified
Axial PWSCC	Dented TSP	+Point Bobbin	96508 96012	Site Site
Circ PWSCC	Dented TSP	+Point	96508	Site
Axial ODSCC	Dented or non-dented TSP	+Point	96402	Site
Circ ODSCC	Dented or non-dented TSP	+Point	96402	Qualified
IGA/ODSCC	Non-dented TSP	Bobbin	96007	Site
AVB Wear	U-Bend	Bobbin	96004	Site
Axial PWSCC	R2 U-Bend	+Point	96511	Site
Circ PWSCC	R2 U-Bend	+Point	96511	Site
Cold Leg Thinning	Cold Leg TSP	Bobbin	96001	Site
TSP Ligament (missing or cracked)	TSP	Bobbin +Point	NA	Non-Qualified
Loose Part	Anywhere	Bobbin +Point	NA	Non-Qualified
Freespan	Anywhere	Bobbin +Point	NA	Non-Qualified
I-690 plugs	I-690 HL plugs	+ Point	NA	Non-Qualified