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FEB 2 7 2003

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Nuclear LLC

LR-N03-0077

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 2002 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-70 and DPR-75. The information pertains to the Salem Unit 1 and Unit 2 steam generator tube inspections completed in 2002.

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 2002, the SRVs were not challenged by any overpressurization events or transients that would have required the valves to respond.

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Should you have any questions or comments regarding this submittal, please contact Mr. Michael G. Mosier at 856-339-5434.

Sincerely,

Gabor Salamon
Manager – Nuclear Safety and Licensing

Enclosures (4)

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ENCLOSURE 1

PUBLIC SERVICE ELECTRIC & GAS / SALEM/HOPE CREEK

ANNUAL REPORT

Salem 1 - Year of 2002

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
RX OPERATION & SURVEILL						
-MAINTENANCE	48	0	10	17.547	0.000	3.419
-OPERATIONS PERSONNEL	30	0	1	8.001	0.000	0.640
-HEALTH PHYSICS	18	0	33	5.308	0.000	11.458
-SUPERVISORY PERSONNEL	47	0	171	15.478	0.074	71.249
-ENGINEERING PERSONNEL	0	0	1	0.116	0.000	0.538
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	0	0	3	0.177	0.000	0.830
-OPERATIONS PERSONNEL	2	0	0	0.688	0.000	0.081
-HEALTH PHYSICS	0	0	0	0.055	0.000	0.000
-SUPERVISORY PERSONNEL	3	0	22	1.548	0.179	7.271
-ENGINEERING PERSONNEL	0	0	0	0.095	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	1	0.003	0.000	1.422
-ENGINEERING PERSONNEL	0	0	0	0.000	0.000	0.000
WASTE PROCESSING						
-MAINTENANCE	1	0	0	0.388	0.000	0.000
-OPERATIONS PERSONNEL	0	0	0	0.014	0.000	0.003
-HEALTH PHYSICS	7	0	4	2.617	0.000	1.509
-SUPERVISORY PERSONNEL	1	0	15	0.688	0.011	4.305
-ENGINEERING PERSONNEL	0	0	0	0.000	0.000	0.000
REFUELING						
-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 2002
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	49	0	13	18.112	0.000	4.249
-OPERATIONS PERSONNEL	32	0	1	8.702	0.000	0.724
-HEALTH PHYSICS	25	0	37	7.980	0.000	12.967
-SUPERVISORY PERSONNEL	51	0	209	17.718	0.264	84.247
-ENGINEERING PERSONNEL	0	0	1	0.211	0.000	0.538
GRAND TOTALS	157	0	261	52.723	0.264	102.725
TOTAL DOSE						155.712

ENCLOSURE 2

ANNUAL REPORT
Salem 2 - Year of 2002
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
RX OPERATION & SURVEILL						
-MAINTENANCE	38	0	6	13.210	0.000	1.770
-OPERATIONS PERSONNEL	21	0	0	6.824	0.000	0.113
-HEALTH PHYSICS	18	0	41	5.493	0.000	10.969
-SUPERVISORY PERSONNEL	27	0	168	9.420	0.225	60.142
-ENGINEERING PERSONNEL	0	0	0	0.096	0.000	0.007
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	0	0	0	0.007	0.000	0.010
-OPERATIONS PERSONNEL	4	0	0	0.919	0.000	0.023
-HEALTH PHYSICS	0	0	0	0.000	0.000	0.082
-SUPERVISORY PERSONNEL	3	0	22	0.907	0.134	7.314
-ENGINEERING PERSONNEL	0	0	0	0.054	0.000	0.000
SPECIAL MAINTENANCE						
-MAINTENANCE	1	0	1	0.506	0.000	0.249
-OPERATIONS PERSONNEL	0	0	0	0.000	0.000	0.000
-HEALTH PHYSICS	0	0	0	0.003	0.000	0.037
-SUPERVISORY PERSONNEL	0	0	43	0.330	0.006	12.059
-ENGINEERING PERSONNEL	0	0	0	0.061	0.000	0.061
WASTE PROCESSING						
-MAINTENANCE	0	0	0	0.118	0.000	0.000
-OPERATIONS PERSONNEL	0	0	0	0.019	0.000	0.000
-HEALTH PHYSICS	2	0	2	1.108	0.000	1.333
-SUPERVISORY PERSONNEL	0	0	6	0.075	0.002	1.660
-ENGINEERING PERSONNEL	0	0	0	0.000	0.000	0.000
REFUELING						
-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 2002
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	39	0	7	13.840	0.000	2.029
-OPERATIONS PERSONNEL	25	0	0	7.762	0.000	0.136
-HEALTH PHYSICS	20	0	43	6.604	0.000	12.421
-SUPERVISORY PERSONNEL	30	0	239	10.731	0.366	81.175
-ENGINEERING PERSONNEL	0	0	0	0.211	0.000	0.067
GRAND TOTALS	114	0	289	39.149	0.366	95.829
TOTAL DOSE						135.344

ENCLOSURE 3

ANNUAL REPORT
Hope Creek - Year of 2002
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
RX OPERATION & SURVEILL						
-MAINTENANCE	18	0	0	7.453	0.000	0.088
-OPERATIONS PERSONNEL	24	0	0	6.119	0.000	0.410
-HEALTH PHYSICS	21	0	0	4.503	0.000	0.111
-SUPERVISORY PERSONNEL	6	1	1	3.991	0.370	1.139
-ENGINEERING PERSONNEL	0	0	0	0.001	0.000	0.016
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	0	0	0	0.000	0.000	0.000
-OPERATIONS PERSONNEL	0	0	0	0.046	0.000	0.000
-HEALTH PHYSICS	0	0	0	0.005	0.000	0.000
-SUPERVISORY PERSONNEL	0	0	0	0.045	0.011	0.174
-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	0.000	0.000	0.000
-ENGINEERING PERSONNEL	0	0	0	0.000	0.000	0.000
WASTE PROCESSING						
-MAINTENANCE	0	0	0	0.138	0.000	0.000
-OPERATIONS PERSONNEL	0	0	0	0.026	0.000	0.001
-HEALTH PHYSICS	2	0	0	0.563	0.000	0.099
-SUPERVISORY PERSONNEL	0	0	0	0.393	0.000	0.074
-ENGINEERING PERSONNEL	0	0	0	0.000	0.000	0.000
REFUELING						
-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 2002
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	18	0	0	7.591	0.000	0.088
-OPERATIONS PERSONNEL	24	0	0	6.192	0.000	0.411
-HEALTH PHYSICS	23	0	0	5.071	0.000	0.211
-SUPERVISORY PERSONNEL	6	1	1	4.429	0.381	1.387
-ENGINEERING PERSONNEL	0	0	0	0.001	0.000	0.016
GRAND TOTALS	71	1	1	23.283	0.381	2.113
TOTAL DOSE						25.777

ENCLOSURE 4

Salem Unit 1 and Unit 2
2002 Steam Generator Tube ISI Report

Summary

In 2002, Framatome Advanced Nuclear Products (FANP) conducted eddy current examinations and primary data analysis on the Unit 1 and 2 steam generators during the 15th (1R15) and 12th (2R12) Refueling Outages. 2R12 was completed in the spring and 1R15 the fall of 2002. All inspections were performed under the supervision of the station's Steam Generator Group. Zetec Incorporated performed secondary production/resolution data analysis and Moretech Inc. provided Independent Qualified Data Analysis/Station Level III oversight. Attachment 1 lists the specifics for 1R15. Attachment 2 lists the specifics for 2R12. These attachments provide a summary of the in-service inspection results per Technical Specification 4.4.5.5.b (Unit 1) and 4.4.6.5.b (Unit 2), identify the tubes repaired during each outage, and list the NDE techniques utilized.

For each outage, eddy current data acquisition was performed with the ROGER Manipulator using a dual guide tube tool head. Primary and Secondary production data analysis was performed remotely and resolution analysis was performed at the station's off-site data room facility. Primary degradation analysis of bobbin coil data was performed manually by FANP. Secondary degradation analysis of bobbin coil data was performed using an automated system. Two-party manual analysis was performed on all rotating coil data.

Site Validation

In accordance with Rev. 5 of the EPRI PWR Steam Generator Examination Guidelines a documented review of EPRI Qualified techniques was performed to "site validate" the examination techniques. This review is documented in the following Vendor Technical Documents (VTD):

- VTD 325276, Salem 1R15 Site Validation of Eddy Current Techniques for the SG Tubing Examination
- VTD 325657, Salem 1R15 Site Validation of the High Frequency +Point Probe.
- VTD 325490, Salem 2R12 Site Validation of Eddy Current Techniques for Salem Unit 2; 2R12.

Independent QDA

To ensure the resolution process was properly performed and that field calls were properly reported the station utilized experienced Independent QDA personnel per the requirements stipulated in Rev. 5 of the EPRI PWR Steam Generator Examination Guidelines. Independent QDA responsibilities are delineated in site procedures.

Abbreviations

#H or #C	Tubes Support Plate elevation Hot Leg or Cold Leg side of Steam Generator
#R#	Unit and Refueling Outage Number
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
CM	Condition Monitoring
DSI	Distorted Support Indication
ECT	Eddy Current Test
EDM	Electro-discharge machining
EPRI	Electric Power Research Institute
ETL	Expansion Transition Location (Expansion Anomaly)
ETSS	Examination Technique Specification Sheet
FANP	Framatome Advanced Nuclear Products Incorporated
FDB	Flow Distribution Baffle
FSD	Free Span Differential
FSH	Free Span History
FSI	Free Span Indication
FSS	Free Span Signal
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
MBH	Manufacturer's Burnish Mark History
MBM	Manufacturer's Burnish Mark
MBS	Manufacturer's Burnish Mark with Signal
NDE	Non Destructive Examination
NDD	No Degradation Detected
NEI	Nuclear Energy Institute
NTE	No Tube Expansion (Expansion Anomaly)

OA	Operational Assessment
OBS	Obstructed
OD	Outside Diameter
ODSCC	Outside Diameter Stress Corrosion Cracking
PAP	Plug-a-Plug
PIP	Plug-in-Plug
PLI	Possible Loose Part Indication
PLP	Possible Loose Part
POD	Probability of Detection
PSI	Possible Support Indication
PTE	Partial Tube Expansion (Expansion Anomaly)
PVN	Permeability Variation
PWSCC	Primary Water Stress Corrosion Cracking
QDA	Qualified Data Analyst
#R#	Unit and Refueling Outage Number
R1	Row 1
R2	Row 2
R3	Row 3
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

Additional explanation of eddy current analysis code related abbreviations are found in site procedures S1.SG-ST.RCE-0001, "Salem Unit 1 Steam Generator Eddy Current Examination", and S2.SG-ST.RCE-0001, "Salem Unit 2 Steam Generator Eddy Current Examination".

Attachment 1

Salem Unit 1 Refueling Outage Number 15 Summary

OVERVIEW

The scope of the inspection were delineated in Engineering Evaluation No. S-1-RC-MEE-1691, 1R15 Steam Generator Tubing Degradation Assessment. This document identified the degradation mechanisms that have affected or could affect the tubing in the unit steam generators, identified the inspection scopes and techniques to be used, and provided structural limit information that were used to assess tube integrity requirements. The base eddy current examination scope met Salem Unit 1 Technical Specification requirements and was developed and controlled in accordance with SC.SG-AP.ZZ-0001 (Q), Steam Generator Group Conduct of Operations. A summary of the base scope follows:

- With the exception of those tubes selected for rotating coil inspection per the second bullet below, a full-length bobbin coil inspection was performed on 100% of the in-service tubes in each steam generator.
- Rotating Coil (+ Point) exam of 20% of the Row 1 and Row 2 short radius U-bends in each steam generator.
- Rotating Coil (+ Point) exam of 30% of the Hot Leg (HL) Top of Tubesheet (TTS) transition regions in 11 and 13 steam generators.
- Rotating Coil (+ Point) exam of 100% of the >5 volt dented HL Tube Support Plate (TSP) intersections, based on 1R14 bobbin coil data.
- Rotating Coil (+ Point) exam of 100% of the >5 volt HL free span dings based on 1R14 bobbin coil data.
- Rotating Coil (+ Point) examination of previous tubesheet expansion anomalies

EPRI REV. 5 Technical Deviations

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. Five technical deviations were implemented for 1R15. Justification for each deviation is documented in the confirmation for each order. All deviations were reviewed and approved in accordance with station procedures. A summary of the deviations is provided below:

- 80049986 - deviated from the normalization requirements specified in Rev. 5 to provide for more consistent sizing technique for Anti-Vibration Bar (AVB) wear indications.
- 80041191 and 80050846[1] - deviated from requiring all data analysts to pass the Site Specific Performance Demonstration (SSPD).
- 80041190 and 80040845[1] - deviated from requiring production data analysts to review overcalls.
- 80049985 - deviated from the process control requirements (e.g. 3 letter codes) delineated in Rev. 5.
- 80041194 and 80050844[1] - deviated from the volumetric inspection requirements for installed FANP Inconnel-690 rolled plugs

[1] Second order documents industry review which meets the intent of SGMP Memo dated October 7, 2002 regarding Interim Guidance for Technical Justifications of Deviations from NEI 97-06 and Referenced EPRI Guidelines

Assessment of Examination Results and Technical Specification Classification

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 in site procedures for 1R15. This is documented in engineering evaluation S-1-RC-MEE-1711, 1R15 Steam Generator Condition Monitoring & Operational Assessment Evaluation. 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	SG11	SG12	SG13	SG14	TOTAL
Anti-Vibration Bar Wear	8	11	12	2	33
TOTAL TUBES PLUGGED	8	11	12	2	33
TOTAL TUBES PLUGGED CUMULATIVE	17	26	36	12	91
CUMULATIVE TUBE PLUGGING %	0.302	0.462	0.640	0.213	0.404

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-2	C-2	C-2

Anti-Vibration Bar (AVB) Wear

Tube wear at the tube/anti-vibration bar intersections has been occurring for many years in essentially all types of Westinghouse design recirculating steam generators. AVB wear has been the most significant cause of tube plugging to date in Westinghouse design Model F type steam generators. As identified in Engineering Evaluation No. S-1-RC-MEE-1691, 1R15 Steam Generator Tubing Degradation Assessment, AVB wear was considered an active degradation mechanism for the cycle.

During the baseline inspection and the two previous ISI's AVB wear was detected and sized utilizing an absolute mix per EPRI ETSS 96004.3. In an effort to obtain greater consistency in the sizing of AVB indications, for 1R15 the differential mix technique per EPRI ETSS 96004.1 was site validated and used. This required historical indications to be re-sized per technique 96004.1. This work was completed prior to 1R15 by Framatome ANP personnel and is documented in VTD 325625, AVB Resizing Bobbin Differential Depth Sizing of AVB Wear at Salem Unit 1. Changing techniques for identifying and reporting AVB wear did not result in an inspection transient.

AVB wear was detected during the bobbin coil inspections. AVB wear indications are plugged if bobbin indicates a depth ≥ 40% through wall (TW). For Operations Assessment (OA) purposes, tubes with degradation less than 40% TW may be left in service or removed from service depending on the observed growth rate of the degradation.

The criterion for calling AVB wear was based on a minimum percent TW depth of 10%. In 1R15, 1387 AVB wear indications were reported during the bobbin coil inspection.

A total of thirty-three tubes were plugged for AVB wear. The following table lists those tubes plugged for this mechanism during 1R15:

Tubes Plugged for AVB Wear			
SG	Row	Col	Indication and Location
11	39	59	AV2 @ 44%TW
11	40	54	AV3 @ 42%TW
11	41	61	AV 4 @ 41% TW & AV5 @ 40%TW
11	43	61	AV3 @ 40%TW
11	44	77	AV3 @ 41%TW
11	50	82	AV2 @ 40%TW
11	53	33	AV5 @ 43%TW
11	53	35	AV5 @ 54%TW
12	36	107	AV4 @ 47%TW & AV5 @ 43%TW
12	36	108	AV5 @ 44%TW
12	38	106	AV5 @ 48%TW
12	39	70	AV3 @ 46%TW
12	39	103	AV2 @ 46%TW
12	39	104	AV4 @ 44%TW
12	40	105	AV4 @ 41%TW
12	41	86	AV4 @ 40%TW
12	41	103	AV4 @ 49%TW
12	43	102	AV 3 @ 45%TW & AV5 @ 43%TW
12	47	97	AV4 @ 46%TW
13	30	114	AV5 @ 41%TW
13	38	18	AV5 @ 40%TW
13	39	56	AV4 @ 40%TW
13	40	84	AV2 @ 45%TW
13	41	103	AV5 @ 47% TW
13	44	61	AV6 @ 40% TW
13	45	101	AV5 @ 42% TW
13	46	46	AV4 @ 42%TW
13	47	83	AV3 @ 51%TW & AV4 @ 49%TW
13	47	98	AV4 @ 45%TW
13	56	82	AV5 @ 44%TW
13	57	77	AV3 @ 45%TW
14	28	8	AV1 @ 45%TW
14	47	81	AV3 @ 40%TW

In accordance with Section 3.3.2 of the EPRI PWR Steam Generator Examination Guidelines, Rev. 5, AVB wear is considered active during cycle 15. The following information was reviewed to make this determination:

	11 SG	12 SG	13 SG	14 SG
# Of new ≥ 20% TW indications	49	14	33	12
# Of Previous indications that grew ≥ 10%TW	105	121	216	58
# Of new or Previous indication that grew ≥ 40% TW	0	0	0	0

Intergranular Attack / Stress Corrosion Cracking (IGA/SCC)

Detection of IGA/SCC at expansion transitions, above the tubesheet, at dented (both freespan and at structures) locations and within row one and row two u-bends cannot be reliably detected using bobbin probe techniques. Rotating probe techniques were used for detection of IGA/SCC at these locations.

The rotating coil inspections performed during 1R15 for detection of IGA/SCC are summarized below:

- HL TTS - 30% of the tubes in 11 and 13steam generators. The inspection extent was +2 inches above to –3 inches below the top of tubesheet interface.
- 20% inspection of the Row 1 and Row 2 U-bends in each steam generator.
- 100% of the > 5-volt dented HL tube support plate intersections in each steam generator.
- 100% of the > 5-volt HL freespan dings in each steam generator (HL TTS +0. 5 inches to +2 inches beyond the 7th HL TSP).
- 100% inspection of Hot and Cold leg tubesheet expansion anomalies

There was no IGA/SCC reported during the inspections, therefore this damage mechanism is considered NON-active for cycle 15. These findings are consistent with that seen in the industry for similar design steam generators with low operating time.

OPERATING EXPERIENCE - ODSCC at the Tube Support Plate (TSP) Intersections

Per OE13898, Seabrook Station identified 15 tubes in the "D" steam generator that had 42 axial outside diameter (OD) indications by bobbin coil (and confirmed with the + point RPC) that were characterized as distorted support indications (DSIs). All axial OD indications found in the "D" steam generator were located between Rows 4 and 9, and between Columns 24 and 88. All these indications were located at the land areas of the quatrefoil tube support plates. Multiple land contact areas at some tube support locations were involved. Axial OD indications were reported on both hot leg and cold leg sections of the tubes. All cold leg indications were on tubes that also had hot leg indications. The tube support plate

elevations corresponding to the axial OD indications ranged from 2 to 6 on the hot legs and from 3 to 5 on the cold legs. No axial OD indications were found at top of tube sheet (TTS), in the u-bend areas, or at existing dings or dents. The indications appeared to be OD-originating, crack-like signals, and were confirmed by UT and + point. The maximum bobbin coil voltage was 0.91 volts, and the maximum + point voltage was 1.24 volts. Ultrasonic testing (UT) was performed on six of the tubes having axial OD indications. The UT confirmed all + point OD indications in the six tubes. At this time, these indications appear to be cracking. The flaws were sized to determine if in-situ hydrostatic testing was required. None of the flaws met the criteria of the EPRI guidelines.

PSEG Salem responded to OE13898 and documented this in SAP notification 20106474 and order 80048704. Proactive actions by Salem taken to support outage 1R15 included having Seabrook engineering send the write up that Westinghouse did on the eddy current signature of the degraded tubes. All of the Seabrook degraded tubes were found to display a unique signature or Null shift between the 06H and 06C tube support plates. This signature was easily noticed in the 150 kHz absolute strip chart. Per the Westinghouse write-up, this indicates a different material resistivity.

A review of the Salem 1R14 bobbin coil data was performed for the row 1 through 10 tubes in each steam generator to determine if a similar signature was present in the 150 kHz absolute strip charts. No tubes were found that displayed the Seabrook type eddy current signature between the 06H and 06C tube support plates. There were 3 tubes identified in S/G 14 with an eddy current signature that was not necessarily similar to Seabrook, but different than the bulk of the population reviewed. The tube numbers are R4 C75, R10 C83, and R2 C85. A review of the baseline data (1996) showed that the signature on these tubes has been the same since manufacture. The 1R15 data was reviewed and no change was noted to the signature of these tubes, and no indications were reported.

The station also received a copy of the eddy current data for the Seabrook degraded tubes that were verified by UT as being cracked. This data was incorporated into the Salem Site Specific Performance Demonstration database for training and testing of eddy current data analysis personnel.

Information incorporated into the Salem Unit #1 Data analysis-training manual included the NRC Information Notice 2002-21, the eddy current signature of the degraded tubes, and several examples of the Seabrook bobbin coil data for the cracked tubes.

During the examination a tube with the same type of signature as those displayed in the tube numbers shown above was noted in a higher row tube, R49 C54 in S/G 14. Although it is not clear if this condition can be found in higher rows, this condition was noted. These four tubes in 14-steam generator were documented in the eddy current database with a "FFO" code that means for future observation.

This will ensure the station monitors the condition of these tubes during future eddy current inspections.

Wear at Broached Tube Support Plate Intersections

As stated in the 1R15 Degradation Assessment, wear at TSP intersections was classified as a potential degradation mechanism. During the course of the inspections in 1R15, wear was detected at one of the quatrefoil contact areas for the 7th TSP on the cold leg side of tube R28C8 in SG14. This was the first occurrence of TSP wear detected at Salem Unit 1. The indication was detected with a single coil Plus-point probe, during the special interest examination of an AVB wear indication in that tube. The bobbin coil inspection did not originally detect the indication during the production analysis of the tube. Further diagnostic testing with a 3-coil probe revealed that the indication was indicative of TSP wear at one of the land areas. A profile of the indication was developed using a broached TSP mix and simulated wear scars as defined by EPRI technique 96910.1 and is contained in Attachment 2. The maximum depth was estimated at 11%TW. A review of the bobbin coil data was performed to determine if the indication was detectable in previous outages. In the current inspection, the indication was present in the bobbin coil data, however, based on the signal's response, it would not be expected to be detected without having the Plus-point data already available. The bobbin coil sized the indication at 7%TW using a broached TSP mix and simulated wear calibration curve using EPRI technique 96004.3. The signal was also present in the 1R14 bobbin coil data. An AVB wear calibration curve was used to estimate the size of the indication at 8%TW in 1R14. A review of the 1R13 bobbin coil data revealed no signal present at the subject location. This indicates that the indication most likely grew during cycle 14 to its current state, with no significant change during cycle 15. The TSP wear indication could have been left in-service since the sizing technique is qualified and the wear is very minor, but the tube was plugged during the current inspection due to an AVB wear indication >40%TW that also existed in the same tube.

Manufacturing Anomalies

Manufacturers anomalies (e.g. MBM's and FSD's) were conservatively reported during the baseline inspection. The only requirement for reporting these anomalies was the indication had to be present in channel 6 (150 kHz absolute). Emphasis was placed on making sure all manufacturing anomalies were identified so they can be tracked during future exams.

During the previous two ISI's (1R13 and 1R14) both MBM's and FSD signals were monitored for change. During these two inspections, when MBM's or FSD's were reported during production data analysis, the resolution process required historical reviews of the anomalies to determine if the signals had "changed" by more than 15 degrees or more than .5 volts since the first ISI post steam generator replacement (1R13). Confirmation of "change" required supplemental rotating coil testing. This process alone proved to be a tremendous burden to the resolution analysts that resulted in additional

resolution resources being added to each outage for what was judged to be low value added work.

Industry experience of cracking at freespan manufacturing anomalies has been limited to non-thermally treated first-generation steam generator tubing. Therefore, based on an assessment performed as a result of the 1R14 outage critique, it was determined that the evaluation of manufacturing anomalies could be streamlined during 1R15 without jeopardizing nuclear safety. The process emphasizes screening the data for "degradation" in the primary screening channel rather than monitoring all manufacturing anomalies for change. It was concluded that degradation in the freespan areas, including any degradation as a result of manufacturing anomalies, would be readily seen in this channel. This process is documented in the freespan flowchart of ETSS No. 1, 1R15 Bobbin Coil Examination.

Loose Parts

All data was analyzed for loose parts. Two tubes in 14 SG, R42C62 and R42C63, had possible loose part calls reported during the 1R14 HL TTS inspections. No detectable wear was present in the area of the loose part calls. These tubes were re-inspected during 1R15 and no change or wear associate with the possible loose part was observed. Visual inspections identified the PLP to be a small machine curl that could not be removed considering the location and condition.

Additional possible loose parts were identified at the following locations:

SG	Row	Col	Ind	Loc	Inch
11	18	62	PLP	TSH	0.31
	19	61	PLP	TSH	0.51
	26	13	PLP	TSH	0.31
	27	13	PLP	TSH	0.1
	35	61	PLP	TSH	0.27
13	21	39	PLP	TSH	0.06
	22	39	PLP	TSH	0.06
	44	63	PLP	TSH	0.12
	45	63	PLP	TSH	0.04
	45	64	PLP	TSH	0.38

PLP locations did not have any associated tube wear identified. These conditions were reviewed and approved by PSEG engineering per Framatome-ANP CR 6018246-01, CR 6018247-01, and CR 6018258-00; for SG 11, 13, and 14 respectively. PSEG documented these in the corrective action program via notifications 20118380, 20118411, and 20118412

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 has been placed on data quality in light of the IP-2 tube rupture event. Site-specific data quality parameters were monitored during the analysis process in accordance with the parameters provided in the site ETSS.

There are several conditions that can reduce the data quality. Permeability Variation(PVN) is a condition where the test coil impedance changes due to a change in the tubing material's inherent willingness to conduct magnetic flux lines. PVN is a potential data quality concern that may impact inspection techniques performance indices (e.g. POD). Permeability variation signals are not considered flaws or degradation, but can possibly mask true indications. In accordance with PSEG's data analysis guidelines, corrective actions of PVN calls is based on final disposition of the PVN call with a magnetically biased rotating coil to reduce the eddy current noise levels of the area of interest.

PVN, and other tubing conditions that may reduce the data quality are addressed accordingly in the Data Analysis Guidelines.

During the R15 inspections, only one indication of PVN was identified during the bobbin coil inspection. The location was diagnostically tested with a mag-biased Plus-point probe and no degradation was detected at the location. The data was acceptable for analysis and no further action was required.

Sludge Mapping

Sludge mapping of each steam generator was performed via an automated data analysis program utilizing the low frequency bobbin coil data. A total of 197 tubes were called with sludge. A breakdown per SG is provided below:

	11 SG	12 SG	13 SG	14 SG
No of tubes with Sludge Calls	28	43	61	65
Maximum Height Report	0.84"	0.87"	1.08"	1.91"

Tube Plug Inspections

Visual Examinations of all hot and cold leg installed tube plugs were performed during 1R15 in accordance with procedure SC.SG-TI.RCE-0002 (Q), STEAM GENERATOR TUBE PLUG VISUAL EXAMINATION. Volumetric Examinations were not performed based on technical deviation 80041194. As a result of the visual inspections one tube plug in SG 14 HL, row 4-column 69, was identified as requiring additional review and evaluation. This location had an accumulation of boron that was slightly more that other tube plugs inspected. This condition was documented on F ANP Condition Report 6018110 and PSEG Notification 20117481

In accordance with the evaluation (CR) and inspections performed by Framatome and PSEG, the conditions identified during the plug visual inspections are acceptable. The minor boron was determined to be typical, subsequent inspections determined that the tube plug was acceptable. No degradation of the tube plugs was noted in the visual inspections.

FINAL ECT SCOPE

The table below summarizes the final (base scope + special interest and/or expansions) scope performed during 1R15:

	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	22446	N/A
2	Short Radius U-Bends (07H to 07C)	+Point ™	20% of all in-service Row 1 and 2 tubes in each steam generator	196	Detection of degradation may require verification, redefinition, and expansion per Rev 5 of the EPRI PWR Examination guidelines. Expansion was not required.
3	Hot Leg Top of Tube Sheet	+Point ™	30% of the HL TTS in-service tubes in SG 11 and SG 13. Extent is +2" above TTS and - 3" below TTS	3439	Detection of degradation may require verification, redefinition, and expansion per Rev 5 of the EPRI PWR Examination guidelines. Expansion was necessary for PLP bounding inspections.
4	Tubesheet Anomalies	+Point ™	Inspect all 1R14 history ETLs and OXPs in the area of interest	13	All new ETLs and OXPs will be inspected with +Point in the area of interest. Three new tubesheet anomalies were inspected.
5	Dented HL TSP Intersections (> 5 Volt)	+Point ™	100% of the > 5 volt dented HL TSP locations from the FDB to 07H in each SG.	196	Detection of degradation may require verification, redefinition, and expansion per Rev 5 of the EPRI PWR Examination guidelines. Expansion was not required.

	Area	Probe	Inspection Criteria	# of Exams	Expansion Criteria
6	Dings in the Free Span (> 5 Volt)	+Point ™	100% of the > 5 volt dings in the HL Free Span locations from HL TTS +0.5" to 07H +2" in each SG.	51	Detection of degradation may require verification, redefinition, and expansion per Rev 5 of the EPRI PWR Examination guidelines. Expansion was not required.
7	Plugs	Visual	Visual inspection of 100% of the installed tube plugs in each steam generator, both hot and cold legs.	117 (Number is odd due to misdrilled tubesheet welded plug in cold leg)	N/A

1R15 Location and Percent Through Wall Indications

SG	ROW	COLUMN	% TW	LOCATION	
11	26	43	13	AV2	0.09
11	26	43	13	AV1	-0.15
11	26	91	10	AV5	-0.05
11	26	91	19	AV1	-0.1
11	26	91	16	AV6	0
11	27	80	25	AV2	0.05
11	28	114	18	AV1	0.15
11	29	9	21	AV5	-0.09
11	29	112	15	AV5	-0.07
11	29	112	22	AV2	0.1
11	29	114	17	AV6	-0.26
11	29	114	17	AV1	0.15
11	31	10	29	AV2	-0.03
11	31	10	28	AV6	-0.07
11	31	10	36	AV5	0
11	32	12	17	AV4	-0.1
11	32	15	11	AV2	0
11	32	31	29	AV2	-0.02
11	32	72	17	AV1	-0.07
11	32	72	19	AV4	-0.19
11	32	72	18	AV3	-0.06
11	32	84	10	AV4	-0.15
11	32	112	10	AV5	0.5
11	32	112	11	AV2	-0.36
11	33	107	16	AV6	-0.11
11	34	109	18	AV2	-0.08
11	34	111	10	AV6	-0.53
11	34	111	11	AV2	-0.78
11	35	13	17	AV6	-0.05
11	35	13	25	AV5	-0.07
11	35	44	23	AV6	0.31
11	35	44	21	AV1	-0.35
11	35	44	27	AV5	0.14

SG	ROW	COLUMN	% TW	LOCATION	
11	36	108	14	AV1	0.57
11	37	48	16	AV2	-0.05
11	37	67	18	AV1	0.15
11	37	68	23	AV2	0.05
11	37	68	16	AV5	-0.02
11	37	79	27	AV4	0.02
11	37	79	22	AV2	0.03
11	37	79	19	AV1	0.36
11	38	47	20	AV5	0.25
11	38	47	11	AV1	0.24
11	38	47	13	AV2	-0.19
11	38	47	27	AV3	-0.22
11	38	49	27	AV4	0
11	38	49	16	AV3	0
11	38	51	16	AV5	0.05
11	38	51	20	AV4	-0.09
11	38	51	10	AV2	-0.14
11	38	56	33	AV5	0.24
11	38	56	31	AV4	-0.21
11	38	56	21	AV3	-0.13
11	38	56	17	AV2	-0.67
11	38	56	26	AV1	-0.19
11	38	56	15	AV5	-0.31
11	38	56	22	AV5	0.28
11	38	56	10	AV5	-0.23
11	38	66	22	AV6	0.13
11	38	66	25	AV5	-0.18
11	38	66	21	AV2	0.2
11	38	78	19	AV6	-0.07
11	38	78	11	AV1	-0.34
11	38	78	13	AV4	0
11	38	78	34	AV5	-0.02
11	38	78	23	AV3	0
11	38	105	11	AV6	0.02
11	38	105	15	AV5	0.02
11	38	105	20	AV3	-0.1

SG	ROW	COLUMN	% TW	LOCATION	
11	38	105	22	AV2	0.02
11	38	107	24	AV5	0.18
11	38	107	35	AV3	0.13
11	38	107	19	AV2	-0.13
11	38	107	18	AV4	0.02
11	39	16	14	AV6	-0.14
11	39	16	13	AV4	-0.05
11	39	16	22	AV5	0
11	39	17	14	AV5	0
11	39	59	44	AV2	-0.14
11	39	59	37	AV3	0.02
11	39	59	27	AV5	-0.06
11	39	59	33	AV4	0.02
11	39	59	26	AV1	-0.39
11	39	59	44	AV2	-0.14
11	39	61	14	AV4	0.21
11	39	66	35	AV3	-0.02
11	39	66	33	AV4	-0.06
11	39	66	30	AV6	0.13
11	39	74	25	AV6	0.18
11	39	74	29	AV5	0.15
11	39	74	25	AV4	-0.29
11	39	74	16	AV6	0.26
11	39	99	22	AV5	0
11	39	99	27	AV2	-0.05
11	40	18	32	AV5	0.35
11	40	18	22	AV4	0.35
11	40	18	27	AV3	-0.03
11	40	18	13	AV2	0
11	40	27	18	AV4	-0.2
11	40	37	10	AV2	0.06
11	40	43	13	AV1	-0.09
11	40	43	31	AV2	-0.08
11	40	43	30	AV3	0.36
11	40	43	23	AV4	0.13
11	40	43	18	AV6	0.16

SG	ROW	COLUMN	% TW	LOCATION	
11	40	45	12	AV5	-0.05
11	40	45	13	AV4	0
11	40	47	20	AV4	0.09
11	40	47	16	AV3	-0.09
11	40	47	23	AV2	0.06
11	40	47	38	AV5	0.2
11	40	50	24	AV6	0.03
11	40	50	29	AV5	-0.13
11	40	50	30	AV4	-0.06
11	40	50	24	AV3	-0.09
11	40	50	25	AV2	-0.08
11	40	50	28	AV1	0.06
11	40	54	27	AV6	0.02
11	40	54	23	AV5	-0.18
11	40	54	33	AV4	0.19
11	40	54	20	AV2	0
11	40	54	16	AV1	0.14
11	40	54	42	AV3	0.17
11	40	54	42	AV3	0.13
11	40	58	21	AV3	0.08
11	40	58	12	AV2	0.18
11	40	58	11	AV6	0
11	40	60	18	AV6	0.14
11	40	60	35	AV5	0
11	40	60	12	AV1	-0.16
11	40	60	11	AV1	0.29
11	40	60	28	AV4	0.08
11	40	60	21	AV2	-0.03
11	40	60	37	AV3	-0.1
11	40	62	31	AV1	-0.06
11	40	62	26	AV4	0.13
11	40	62	33	AV5	0.02
11	40	62	36	AV2	-0.19
11	40	78	10	AV6	-0.05
11	40	78	24	AV5	0.34
11	40	78	11	AV4	-0.18

SG	ROW	COLUMN	% TW	LOCATION	
11	40	78	29	AV3	-0.21
11	40	78	16	AV2	-0.06
11	40	78	10	AV1	0.13
11	40	79	17	AV5	0
11	40	79	12	AV4	0
11	40	79	18	AV2	0
11	40	79	27	AV3	-0.02
11	40	81	23	AV6	-0.05
11	40	81	34	AV3	0.02
11	40	81	35	AV2	-0.02
11	40	81	22	AV5	-0.49
11	40	84	18	AV4	0.08
11	40	84	10	AV6	0
11	40	85	24	AV2	0
11	40	89	12	AV5	-0.05
11	40	89	16	AV4	-0.11
11	40	98	23	AV5	-0.05
11	40	98	15	AV4	0.06
11	40	104	10	AV6	-0.16
11	40	104	18	AV4	-0.08
11	40	104	24	AV5	-0.05
11	40	105	14	AV4	-0.1
11	40	105	11	AV2	0.02
11	40	105	23	AV5	0
11	40	105	23	AV6	0.04
11	40	106	15	AV6	0.18
11	40	106	13	AV5	-0.1
11	41	19	28	AV6	-0.05
11	41	53	21	AV3	-0.19
11	41	53	19	AV2	-0.04
11	41	53	12	AV1	0
11	41	61	41	AV4	-0.22
11	41	61	26	AV6	0.05
11	41	61	27	AV4	0.27
11	41	61	27	AV3	-0.18
11	41	61	33	AV2	-0.02

SG	ROW	COLUMN	% TW	LOCATION	
11	41	61	24	AV1	-0.02
11	41	61	35	AV3	0.06
11	41	61	40	AV5	-0.08
11	41	61	40	AV5	-0.18
11	41	61	41	AV4	-0.22
11	41	82	21	AV4	-0.16
11	41	87	11	AV6	-0.13
11	41	90	24	AV4	0.31
11	41	90	20	AV5	-0.18
11	41	95	16	AV5	-0.1
11	41	100	14	AV2	0
11	41	100	11	AV5	-0.02
11	41	102	21	AV6	-0.06
11	41	102	22	AV2	0.06
11	41	102	24	AV5	0.03
11	41	103	31	AV5	-0.08
11	41	103	15	AV4	-0.1
11	41	103	25	AV1	0.13
11	41	103	19	AV2	0.05
11	41	105	11	AV6	-0.11
11	42	19	33	AV6	0.02
11	42	20	25	AV5	-0.05
11	42	20	21	AV2	-0.09
11	42	20	20	AV3	0.05
11	42	20	26	AV4	-0.04
11	42	33	29	AV2	0.06
11	42	33	30	AV3	-0.02
11	42	95	12	AV4	-0.11
11	42	97	14	AV1	0
11	42	97	13	AV3	-0.05
11	42	104	12	AV6	0.18
11	42	104	11	AV6	-0.13
11	43	20	20	AV5	0
11	43	23	14	AV5	0
11	43	23	33	AV4	0.41
11	43	23	16	AV3	-0.05

SG	ROW	COLUMN	% TW	LOCATION	
11	43	23	14	AV2	-0.14
11	43	25	28	AV5	0.03
11	43	25	31	AV4	0.07
11	43	25	22	AV3	0.02
11	43	34	23	AV5	-0.19
11	43	34	37	AV4	0.02
11	43	38	27	AV3	0.06
11	43	38	25	AV2	-0.03
11	43	38	14	AV1	0.14
11	43	41	32	AV6	0
11	43	41	22	AV5	-0.05
11	43	41	27	AV2	-0.13
11	43	41	34	AV4	-0.05
11	43	41	33	AV3	-0.03
11	43	43	30	AV3	-0.25
11	43	43	29	AV2	-0.06
11	43	43	33	AV5	0.02
11	43	44	27	AV5	0.05
11	43	44	18	AV3	-0.08
11	43	44	20	AV1	-0.41
11	43	44	24	AV2	-0.17
11	43	46	29	AV6	0.03
11	43	46	24	AV4	0.02
11	43	49	23	AV4	-0.09
11	43	49	12	AV3	-0.08
11	43	52	22	AV3	0.08
11	43	61	31	AV4	-0.16
11	43	61	35	AV2	-0.05
11	43	61	40	AV3	0
11	43	61	40	AV3	0
11	43	64	19	AV2	-0.47
11	43	64	35	AV3	0.08
11	43	64	18	AV4	0.06
11	43	64	34	AV5	0.03
11	43	64	18	AV1	-0.29
11	43	75	26	AV1	0

SG	ROW	COLUMN	% TW	LOCATION	
11	43	83	25	AV4	-0.34
11	43	100	15	AV2	-0.05
11	43	100	15	AV3	0.02
11	44	22	34	AV5	-0.02
11	44	22	22	AV4	-0.02
11	44	23	14	AV5	-0.1
11	44	23	27	AV4	-0.09
11	44	23	32	AV2	-0.1
11	44	41	15	AV4	-0.08
11	44	41	11	AV1	0.14
11	44	57	31	AV3	0.06
11	44	57	26	AV2	-0.46
11	44	57	18	AV1	0.11
11	44	57	38	AV4	0
11	44	59	12	AV4	-0.08
11	44	59	12	AV3	-0.19
11	44	59	14	AV2	0.05
11	44	59	12	AV1	0.37
11	44	60	15	AV4	0
11	44	67	18	AV2	0
11	44	67	29	AV3	0.08
11	44	67	34	AV4	-0.02
11	44	67	21	AV6	0
11	44	67	22	AV5	-0.07
11	44	68	25	AV6	-0.16
11	44	68	24	AV5	-0.05
11	44	68	21	AV4	-0.18
11	44	71	21	AV4	-0.1
11	44	73	28	AV6	0
11	44	73	22	AV5	-0.32
11	44	74	14	AV4	0.13
11	44	74	19	AV6	-0.11
11	44	74	31	AV3	0.02
11	44	77	41	AV3	0.07
11	44	77	32	AV4	-0.02
11	44	77	29	AV5	0.04

SG	ROW	COLUMN	% TW	LOCATION	
11	44	77	30	AV6	0.02
11	44	77	41	AV3	0.07
11	44	100	35	AV5	0
11	44	102	14	AV5	0.03
11	44	102	9	AV6	-0.06
11	45	23	13	AV2	0.21
11	45	26	19	AV3	0
11	45	26	15	AV2	-0.08
11	45	83	20	AV5	-0.26
11	45	100	11	AV6	0.11
11	47	99	14	AV3	-0.08
11	48	26	12	AV6	-0.21
11	48	26	16	AV5	-0.07
11	48	47	17	AV5	0.02
11	49	27	15	AV1	-0.03
11	49	29	17	AV4	-0.02
11	49	29	27	AV5	0.03
11	49	39	19	AV2	0
11	49	43	20	AV4	0.08
11	49	85	17	AV5	0
11	49	85	20	AV4	0.02
11	49	85	11	AV2	0.04
11	49	85	18	AV3	0.08
11	49	93	12	AV2	-0.13
11	49	93	27	AV5	0
11	49	94	18	AV6	-0.08
11	49	96	13	AV6	-0.06
11	50	82	31	AV3	0
11	50	82	40	AV2	0.39
11	50	82	13	AV6	0.02
11	50	82	23	AV5	0.04
11	50	82	33	AV4	0.02
11	50	82	40	AV2	0.39
11	50	93	26	AV6	-0.08
11	52	91	22	AV2	0
11	53	33	24	AV6	0

SG	ROW	COLUMN	% TW	LOCATION	
11	53	33	22	AV4	-0.02
11	53	33	21	AV3	0.06
11	53	33	42	AV5	-0.08
11	53	33	43	AV5	-0.08
11	53	35	32	AV2	-0.08
11	53	35	39	AV4	0
11	53	35	22	AV6	0.1
11	53	35	54	AV5	-0.04
11	53	35	54	AV5	0.03
11	53	35	39	AV4	-0.03
11	53	90	27	AV2	-0.03
11	53	90	37	AV5	-0.06
11	53	90	33	AV4	-0.05
11	53	90	23	AV1	-0.02
11	54	86	25	AV3	0.16
11	55	84	21	AV6	-0.05
11	58	72	24	AV6	0.13
11	59	56	26	AV6	0.19
11	59	58	26	AV6	0
12	21	118	14	AV1	0.26
12	23	89	21	AV6	-0.13
12	23	89	13	AV2	-0.03
12	23	91	22	AV1	-0.03
12	26	74	18	AV5	0
12	26	74	22	AV2	0
12	26	95	12	AV5	0.06
12	26	95	12	AV2	-0.15
12	26	103	20	AV2	-0.19
12	27	8	20	AV6	0.14
12	27	8	27	AV1	0.2
12	27	8	20	AV6	0.03
12	27	8	12	AV6	-0.23
12	27	115	22	AV1	0.02
12	27	115	15	AV6	-0.1
12	28	109	13	AV5	0.05
12	29	13	15	AV6	0

SG	ROW	COLUMN	% TW	LOCATION	
12	29	39	19	AV5	0
12	29	39	20	AV2	0
12	29	41	10	AV1	0.21
12	29	54	20	AV5	-0.06
12	29	54	13	AV6	0
12	29	54	22	AV1	0
12	29	77	10	AV2	-0.1
12	29	86	20	AV2	-0.06
12	29	89	12	AV2	-0.02
12	29	107	12	AV2	0
12	29	108	26	AV5	0
12	29	109	17	AV2	0
12	29	112	20	AV5	0.08
12	30	12	14	AV2	0
12	30	13	22	AV2	0
12	30	111	19	AV6	0.05
12	30	111	11	AV3	0
12	31	113	12	AV2	-0.25
12	31	113	11	AV5	0.19
12	32	109	24	AV4	0.02
12	32	110	11	AV2	-0.12
12	32	111	17	AV5	0.02
12	32	111	28	AV2	0.05
12	32	111	16	AV1	0
12	32	112	17	AV5	0.31
12	33	108	21	AV3	0
12	33	108	17	AV5	0
12	36	15	13	AV6	-0.01
12	36	15	20	AV4	0.01
12	36	107	18	AV3	-0.05
12	36	107	15	AV6	-0.12
12	36	107	47	AV4	0
12	36	107	43	AV5	0.05
12	36	107	47	AV4	0
12	36	107	43	AV5	0.05
12	36	108	44	AV5	0.05

SG	ROW	COLUMN	% TW	LOCATION	
12	36	108	39	AV1	0.02
12	36	108	44	AV5	0.05
12	36	110	19	AV3	0.03
12	38	15	14	AV3	-0.39
12	38	104	22	AV2	0.1
12	38	105	22	AV1	0.02
12	38	105	29	AV2	0.03
12	38	105	16	AV6	-0.03
12	38	105	36	AV3	0.05
12	38	106	39	AV4	0
12	38	106	48	AV5	0.09
12	38	106	23	AV1	0.1
12	38	106	48	AV5	-0.09
12	38	107	31	AV2	0.04
12	38	107	21	AV3	0.13
12	39	54	31	AV6	0.03
12	39	58	12	AV5	0.05
12	39	58	18	AV4	-0.02
12	39	58	26	AV3	0.03
12	39	63	16	AV4	-0.05
12	39	63	16	AV5	0.01
12	39	63	20	AV5	-0.06
12	39	63	21	AV4	-0.05
12	39	63	36	AV2	0.02
12	39	63	29	AV3	0.06
12	39	65	20	AV4	0.08
12	39	65	28	AV3	0.02
12	39	65	19	AV2	0
12	39	70	44	AV3	0.13
12	39	70	34	AV4	0.38
12	39	70	14	AV2	-0.02
12	39	70	46	AV3	0.13
12	39	70	27	AV5	0.02
12	39	72	12	AV5	-0.06
12	39	72	12	AV3	-0.05
12	39	73	17	AV6	-0.03

SG	ROW	COLUMN	% TW	LOCATION	
12	39	73	3	AV6	-0.01
12	39	73	22	AV6	-0.03
12	39	73	16	AV5	0.2
12	39	73	12	AV4	-0.26
12	39	73	17	AV3	-0.19
12	39	73	17	AV1	-0.09
12	39	96	15	AV2	-0.02
12	39	100	14	AV5	0.03
12	39	103	46	AV2	0.03
12	39	103	39	AV4	0.42
12	39	103	37	AV5	0.39
12	39	103	46	AV2	0.03
12	39	104	44	AV4	0.02
12	39	104	27	AV3	0
12	39	104	44	AV4	0.02
12	39	104	21	AV2	0.06
12	40	24	16	AV2	0
12	40	24	21	AV5	0
12	40	24	18	AV4	0.01
12	40	27	10	AV5	0.03
12	40	30	13	AV2	0
12	40	45	31	AV5	0
12	40	45	28	AV6	0
12	40	45	13	AV3	0
12	40	47	33	AV2	0.03
12	40	47	18	AV3	0
12	40	47	26	AV4	-0.03
12	40	47	10	AV1	0
12	40	47	26	AV5	0.02
12	40	62	33	AV3	0
12	40	62	28	AV4	0.19
12	40	69	11	AV2	-0.08
12	40	78	14	AV4	0
12	40	80	14	AV6	0.23
12	40	80	31	AV3	0.05
12	40	80	26	AV2	0.02

SG	ROW	COLUMN	% TW	LOCATION	
12	40	80	26	AV4	0.02
12	40	80	14	AV5	0.04
12	40	82	15	AV1	0
12	40	82	22	AV5	0.03
12	40	82	28	AV3	-0.04
12	40	82	15	AV4	0.15
12	40	83	30	AV6	0
12	40	83	33	AV5	0
12	40	83	15	AV1	-0.02
12	40	83	23	AV2	0.06
12	40	83	28	AV3	0.02
12	40	83	24	AV4	0.08
12	40	84	15	AV4	-0.14
12	40	87	25	AV3	0
12	40	87	13	AV1	0
12	40	87	26	AV2	0.02
12	40	87	23	AV4	-0.06
12	40	87	26	AV5	0.04
12	40	88	19	AV5	-0.18
12	40	88	21	AV2	0
12	40	88	29	AV1	0.08
12	40	88	29	AV3	0.1
12	40	91	26	AV6	0.03
12	40	91	31	AV3	0.03
12	40	91	23	AV1	0
12	40	91	35	AV5	-0.11
12	40	91	35	AV2	0.23
12	40	91	32	AV4	0.06
12	40	91	34	AV5	-0.22
12	40	91	8	AV5	0.15
12	40	94	19	AV5	-0.16
12	40	94	11	AV4	0
12	40	94	25	AV3	0.02
12	40	94	26	AV2	0.03
12	40	95	29	AV5	0
12	40	95	30	AV2	0.03

SG	ROW	COLUMN	% TW	LOCATION	
12	40	95	15	AV1	-0.23
12	40	95	16	AV3	0.02
12	40	96	21	AV2	0.08
12	40	100	31	AV2	-0.14
12	40	100	32	AV3	-0.06
12	40	100	16	AV1	0.06
12	40	100	26	AV5	0.06
12	40	105	41	AV4	0.03
12	40	105	41	AV4	0.03
12	40	105	26	AV1	0.04
12	40	105	27	AV5	0.1
12	40	106	14	AV1	0.28
12	40	106	39	AV3	-0.02
12	40	106	36	AV4	-0.06
12	40	106	36	AV5	0.02
12	40	106	29	AV5	0.01
12	40	106	4	AV5	-0.02
12	41	29	12	AV5	-0.15
12	41	29	11	AV4	-0.03
12	41	29	13	AV3	0.04
12	41	85	15	AV3	0.27
12	41	86	40	AV4	-0.08
12	41	86	40	AV4	-0.08
12	41	86	17	AV1	0
12	41	86	23	AV2	0.13
12	41	86	24	AV3	-0.02
12	41	86	28	AV5	-0.02
12	41	86	21	AV6	0.19
12	41	87	18	AV6	-0.42
12	41	87	31	AV4	-0.24
12	41	87	19	AV3	0.08
12	41	87	29	AV5	0.05
12	41	90	21	AV5	0
12	41	90	11	AV4	0
12	41	90	12	AV3	0
12	41	90	24	AV2	0

SG	ROW	COLUMN	% TW	LOCATION	
12	41	90	17	AV1	0
12	41	92	27	AV5	0.32
12	41	92	28	AV4	0.02
12	41	92	23	AV3	-0.08
12	41	92	25	AV2	-0.14
12	41	93	9	AV2	0
12	41	93	17	AV4	0
12	41	94	14	AV5	-0.14
12	41	97	16	AV3	-0.03
12	41	97	17	AV6	0.06
12	41	97	18	AV4	0.05
12	41	98	26	AV6	0
12	41	98	30	AV2	0.08
12	41	100	18	AV6	0.16
12	41	100	23	AV1	-0.05
12	41	101	27	AV6	0
12	41	101	28	AV5	0
12	41	101	24	AV2	0
12	41	101	21	AV1	0
12	41	102	13	AV4	-0.05
12	41	102	14	AV6	0.02
12	41	102	26	AV5	0.11
12	41	103	49	AV4	0.06
12	41	103	38	AV5	0.09
12	41	103	49	AV4	0.06
12	42	24	11	AV1	0.22
12	42	46	29	AV5	0
12	42	47	29	AV6	0
12	42	47	10	AV1	0.04
12	42	47	11	AV2	0.2
12	42	47	30	AV3	0.09
12	42	47	22	AV4	0.07
12	42	55	25	AV2	0
12	42	55	34	AV5	0.02
12	42	55	22	AV4	0.11
12	42	55	22	AV3	0.11

SG	ROW	COLUMN	% TW	LOCATION	
12	42	62	25	AV6	0.12
12	42	62	23	AV5	0.08
12	42	62	33	AV3	-0.02
12	42	62	37	AV4	-0.02
12	42	64	21	AV2	0.09
12	42	64	21	AV3	0.05
12	42	64	35	AV5	-0.04
12	42	100	13	AV2	0.06
12	42	104	11	AV6	-0.03
12	43	27	17	AV2	-0.15
12	43	40	14	AV2	0
12	43	40	16	AV3	0
12	43	44	15	AV6	-0.03
12	43	44	14	AV4	-0.08
12	43	44	11	AV3	0.05
12	43	44	19	AV2	-0.03
12	43	45	25	AV4	-0.15
12	43	45	11	AV3	-0.27
12	43	45	18	AV5	0.22
12	43	87	13	AV6	0.14
12	43	87	13	AV4	-0.08
12	43	87	33	AV3	-0.06
12	43	87	18	AV2	0.02
12	43	87	28	AV5	0.02
12	43	102	45	AV3	0.02
12	43	102	43	AV5	0
12	43	102	17	AV6	0
12	43	102	45	AV3	0.02
12	43	102	43	AV5	0
12	43	102	32	AV1	0.04
12	44	26	14	AV6	0
12	45	100	18	AV4	-0.22
12	45	100	16	AV2	0
12	45	101	33	AV6	0
12	45	101	23	AV3	0.02
12	45	101	35	AV4	0.06

SG	ROW	COLUMN	% TW	LOCATION	
12	45	101	26	AV5	0.02
12	46	91	16	AV4	0
12	46	94	13	AV6	-0.08
12	46	94	30	AV5	0.03
12	46	97	29	AV5	0.1
12	46	99	30	AV6	0
12	46	99	11	AV2	-0.06
12	46	99	35	AV5	-0.02
12	47	24	17	AV6	0.01
12	47	24	11	AV1	0.18
12	47	87	13	AV6	0.1
12	47	95	12	AV3	0
12	47	95	15	AV4	0.02
12	47	97	19	AV6	0
12	47	97	35	AV5	0.03
12	47	97	46	AV4	0.08
12	47	97	46	AV4	0
12	47	98	16	AV6	0
12	47	98	19	AV5	0.08
12	48	25	31	AV5	-0.02
12	48	25	4	AV5	-0.01
12	48	25	28	AV6	0.03
12	48	25	6	AV6	0.03
12	48	25	37	AV6	0.04
12	48	25	35	AV5	-0.05
12	48	25	27	AV4	0.02
12	48	25	37	AV6	0.04
12	48	26	15	AV6	-0.03
12	48	79	12	AV3	0
12	48	79	19	AV2	0.06
12	48	83	16	AV2	-0.05
12	49	35	12	AV3	-0.1
12	49	78	39	AV4	0.02
12	49	78	23	AV2	-0.03
12	49	78	19	AV3	-0.12
12	49	78	20	AV6	0.26

SG	ROW	COLUMN	% TW	LOCATION	
12	49	78	39	AV4	0.02
12	49	78	34	AV5	0.02
12	49	78	37	AV4	0
12	49	78	9	AV4	0.01
12	49	95	11	AV4	-0.1
12	49	95	14	AV6	-0.03
12	49	95	16	AV5	0.02
12	49	96	23	AV5	-0.12
12	49	96	16	AV4	-0.2
12	50	67	14	AV1	0
12	50	67	33	AV2	0.13
12	50	67	30	AV3	0.36
12	50	67	19	AV4	0.28
12	50	93	14	AV6	-0.11
12	50	95	17	AV1	0.14
12	51	91	30	AV4	0
12	51	91	18	AV5	0
12	51	91	34	AV3	-0.05
12	52	80	13	AV1	0
12	52	80	26	AV2	0.08
12	52	80	13	AV3	0.11
12	52	89	18	AV5	-0.14
12	52	90	12	AV2	0.09
12	53	33	11	AV3	0.1
12	53	90	14	AV5	-0.08
12	53	90	11	AV1	-0.02
12	56	77	20	AV4	-0.23
12	57	44	14	AV4	-0.12
12	57	44	15	AV6	-0.08
12	58	58	16	AV6	0.4
12	59	59	15	AV6	0.14
13	19	80	20	AV6	-0.13
13	20	81	16	AV2	0.34
13	22	5	21	AV6	0
13	23	116	15	AV1	0.24
13	23	117	22	AV1	0.42

SG	ROW	COLUMN	% TW	LOCATION	
13	24	7	15	AV6	-0.04
13	24	7	16	AV1	0.35
13	25	7	18	AV6	0.01
13	25	38	23	AV2	0.05
13	25	115	16	AV6	-0.26
13	26	43	18	AV1	0.01
13	26	80	16	AV2	0.08
13	27	10	15	AV5	0
13	27	10	13	AV1	0
13	27	11	14	AV6	-0.18
13	27	12	14	AV6	-0.14
13	27	115	35	AV1	0.16
13	27	115	23	AV6	-0.09
13	28	52	15	AV2	0.27
13	30	11	19	AV6	0.01
13	30	46	15	AV2	0
13	30	47	13	AV2	-0.03
13	30	114	38	AV2	0
13	30	114	41	AV5	0.05
13	30	114	41	AV5	0.05
13	31	32	23	AV5	-0.07
13	31	61	11	AV5	0
13	32	15	27	AV2	-0.07
13	32	16	26	AV2	0.03
13	32	16	12	AV5	0
13	32	48	17	AV2	-0.14
13	32	101	12	AV4	0.06
13	32	108	17	AV5	0
13	32	110	19	AV6	-0.11
13	32	110	28	AV5	-0.03
13	32	111	20	AV6	-0.02
13	32	111	33	AV5	0
13	32	111	17	AV3	-0.07
13	33	15	16	AV4	-0.19
13	34	48	34	AV4	-0.22
13	34	48	25	AV1	0.13

SG	ROW	COLUMN	% TW	LOCATION	
13	34	111	17	AV5	0.13
13	34	111	16	AV6	-0.11
13	34	111	19	AV1	0
13	35	81	15	AV4	-0.05
13	36	80	34	AV3	-0.14
13	36	80	24	AV4	-0.16
13	36	80	19	AV5	0.08
13	36	87	19	AV2	0
13	36	87	17	AV3	-0.06
13	36	87	18	AV6	-0.06
13	36	88	19	AV3	-0.06
13	36	88	28	AV4	0.1
13	36	88	17	AV6	-0.14
13	36	88	18	AV1	0.03
13	36	89	20	AV4	-0.1
13	36	97	23	AV3	0
13	36	97	18	AV2	0
13	36	109	15	AV2	0.06
13	36	109	17	AV2	-0.11
13	36	109	14	AV1	0.31
13	36	109	15	AV1	0.1
13	36	110	20	AV6	0
13	37	58	20	AV2	0.02
13	37	58	30	AV3	-0.03
13	37	58	19	AV5	-0.03
13	37	100	28	AV5	0
13	37	100	18	AV2	-0.01
13	37	100	33	AV3	0
13	38	18	35	AV4	-0.1
13	38	18	25	AV3	-0.07
13	38	18	22	AV2	0
13	38	18	40	AV5	0.02
13	38	18	40	AV5	-0.02
13	38	19	16	AV5	0.1
13	38	19	21	AV3	0.31
13	38	19	26	AV4	-0.05

SG	ROW	COLUMN	% TW	LOCATION	
13	38	26	17	AV3	-0.1
13	38	28	19	AV4	0.01
13	38	28	20	AV3	-0.01
13	38	39	16	AV4	-0.35
13	38	39	19	AV3	0.3
13	38	39	17	AV2	0
13	38	39	28	AV5	0.02
13	38	53	20	AV2	-0.16
13	38	58	17	AV6	0
13	38	58	24	AV5	-0.17
13	38	60	31	AV4	-0.05
13	38	60	21	AV5	0.03
13	38	60	19	AV6	-0.1
13	38	60	32	AV3	-0.11
13	38	60	36	AV2	0.08
13	38	66	12	AV2	-0.06
13	38	66	28	AV5	0.01
13	38	66	34	AV4	0.01
13	38	66	24	AV3	0.01
13	38	68	31	AV5	-0.13
13	38	68	15	AV4	-0.08
13	38	68	17	AV2	0.03
13	38	69	17	AV2	0
13	38	70	22	AV5	-0.08
13	38	70	32	AV4	-0.4
13	38	72	33	AV4	0.11
13	38	72	30	AV3	0.11
13	38	72	29	AV2	0.08
13	38	81	17	AV6	-0.05
13	38	82	16	AV3	0.1
13	38	83	21	AV5	-0.03
13	38	83	27	AV3	-0.11
13	38	85	18	AV3	-0.02
13	38	85	17	AV4	0.02
13	38	86	20	AV1	0.1
13	38	86	25	AV3	-0.02

SG	ROW	COLUMN	% TW	LOCATION	
13	38	86	30	AV5	-0.11
13	38	86	27	AV6	-0.26
13	38	86	30	AV4	0.03
13	38	86	26	AV2	0.01
13	38	91	20	AV2	0
13	38	91	29	AV5	-0.03
13	38	93	22	AV2	-0.08
13	38	93	36	AV5	0.06
13	38	93	25	AV4	-0.3
13	38	94	30	AV2	0.1
13	38	94	35	AV3	0.06
13	38	94	17	AV4	0
13	38	94	15	AV6	-0.14
13	38	98	25	AV2	0.08
13	38	98	27	AV3	-0.1
13	38	101	12	AV3	-0.19
13	38	106	15	AV3	0
13	38	106	32	AV6	0
13	38	106	26	AV5	0
13	38	106	29	AV4	0
13	38	106	38	AV2	0
13	39	20	18	AV5	0
13	39	22	18	AV2	-0.07
13	39	22	16	AV4	-0.14
13	39	22	15	AV3	0.31
13	39	23	15	AV5	0
13	39	33	22	AV3	-0.01
13	39	33	20	AV4	0.01
13	39	33	33	AV5	0.01
13	39	33	24	AV2	-0.01
13	39	35	21	AV3	0
13	39	38	23	AV3	-0.31
13	39	38	23	AV2	0.05
13	39	38	26	AV5	-0.26
13	39	47	23	AV3	-0.1
13	39	47	35	AV5	0.08

SG	ROW	COLUMN	% TW	LOCATION	
13	39	47	23	AV6	0.3
13	39	47	24	AV4	0.01
13	39	47	33	AV2	-0.01
13	39	51	35	AV6	-0.08
13	39	51	20	AV5	0.21
13	39	51	29	AV3	-0.02
13	39	51	24	AV4	-0.03
13	39	51	31	AV2	0.14
13	39	53	15	AV4	-0.08
13	39	54	27	AV3	0.05
13	39	56	14	AV6	-0.18
13	39	56	24	AV2	-0.02
13	39	56	32	AV5	0.05
13	39	56	31	AV1	0.06
13	39	56	35	AV3	0
13	39	56	40	AV4	0
13	39	56	40	AV4	0
13	39	58	34	AV1	-0.06
13	39	58	22	AV2	-0.03
13	39	58	35	AV3	-0.06
13	39	58	28	AV4	-0.03
13	39	58	18	AV6	-0.16
13	39	58	30	AV5	0.01
13	39	65	14	AV4	-0.13
13	39	65	14	AV3	-0.11
13	39	65	30	AV2	-0.07
13	39	65	18	AV1	0
13	39	66	10	AV1	-0.02
13	39	66	17	AV5	0.02
13	39	66	24	AV6	0.01
13	39	66	20	AV4	-0.01
13	39	66	27	AV3	0.01
13	39	66	34	AV2	0.01
13	39	70	18	AV2	-0.14
13	39	70	19	AV3	0.21
13	39	70	34	AV4	0.34

SG	ROW	COLUMN	% TW	LOCATION	
13	39	70	27	AV5	0.03
13	39	76	27	AV6	-0.1
13	39	76	18	AV4	0.29
13	39	76	24	AV3	0.29
13	39	76	35	AV2	-0.19
13	39	76	15	AV1	-0.08
13	39	76	14	AV5	0.05
13	39	80	25	AV2	-0.05
13	40	19	18	AV3	-0.03
13	40	62	12	AV1	0.05
13	40	62	22	AV2	-0.05
13	40	62	29	AV3	0.02
13	40	62	33	AV4	-0.05
13	40	62	32	AV5	-0.03
13	40	82	19	AV1	0
13	40	82	31	AV4	0
13	40	82	24	AV5	-0.02
13	40	82	21	AV6	-0.26
13	40	82	33	AV3	0.31
13	40	82	35	AV2	0.1
13	40	84	45	AV2	-0.32
13	40	84	15	AV4	-0.24
13	40	84	23	AV5	-0.19
13	40	84	45	AV2	-0.32
13	40	100	17	AV5	-0.06
13	41	20	16	AV3	0
13	41	20	34	AV4	0.1
13	41	31	27	AV4	-0.1
13	41	31	24	AV5	-0.01
13	41	85	34	AV2	0.26
13	41	85	30	AV3	-0.06
13	41	85	32	AV5	-0.01
13	41	92	27	AV3	0.01
13	41	92	17	AV4	0.01
13	41	96	17	AV2	-0.1
13	41	96	28	AV3	0

SG	ROW	COLUMN	% TW	LOCATION	
13	41	103	25	AV6	0
13	41	103	25	AV4	0
13	41	103	26	AV2	0
13	41	103	47	AV5	0.02
13	41	103	47	AV5	0.02
13	41	104	12	AV6	0
13	41	104	20	AV4	0
13	41	104	21	AV3	0
13	41	104	29	AV2	0
13	42	33	32	AV4	0.19
13	42	33	27	AV3	0.05
13	42	33	13	AV2	-0.08
13	42	41	28	AV6	0.14
13	42	41	19	AV5	0.14
13	42	41	31	AV4	-0.18
13	42	41	24	AV2	0.11
13	42	42	34	AV5	0.29
13	42	42	28	AV3	-0.03
13	42	42	27	AV2	-0.13
13	42	42	15	AV1	-0.19
13	42	42	14	AV6	0.27
13	42	42	35	AV4	-0.02
13	42	44	31	AV6	-0.03
13	42	44	18	AV5	0
13	42	44	26	AV2	-0.03
13	42	44	16	AV1	0
13	42	44	39	AV3	0.08
13	42	44	38	AV4	0.4
13	42	104	16	AV2	-0.1
13	42	104	15	AV1	0.26
13	43	41	31	AV6	0.1
13	43	41	25	AV5	0.16
13	43	41	26	AV5	-0.21
13	43	41	20	AV3	-0.14
13	43	41	20	AV1	-0.14
13	43	41	36	AV2	0.05

SG	ROW	COLUMN	% TW	LOCATION	
13	43	41	21	AV4	-0.18
13	43	41	28	AV4	0.18
13	43	41	28	AV4	0.18
13	43	41	21	AV4	-0.18
13	43	62	17	AV5	-0.02
13	43	64	12	AV5	-0.02
13	43	64	28	AV4	0
13	43	66	27	AV2	-0.11
13	43	66	14	AV3	0
13	43	66	23	AV5	0
13	43	66	13	AV6	0
13	43	66	34	AV4	0
13	43	68	35	AV3	0
13	43	68	31	AV5	-0.21
13	43	68	32	AV4	0
13	43	68	35	AV2	-0.13
13	43	69	14	AV6	0
13	43	69	15	AV5	0
13	43	69	12	AV4	0
13	43	69	14	AV3	0
13	43	71	16	AV5	0.02
13	43	72	27	AV6	0
13	43	73	19	AV3	-0.3
13	43	73	13	AV6	0
13	43	75	18	AV5	0
13	43	75	12	AV3	-0.34
13	43	75	13	AV6	0.02
13	43	77	11	AV4	-0.05
13	43	77	13	AV5	-0.27
13	43	80	19	AV4	-0.13
13	43	80	17	AV3	-0.11
13	43	80	24	AV5	0.01
13	43	80	12	AV2	0.01
13	43	80	15	AV1	0.01
13	43	81	21	AV2	0.08
13	43	81	11	AV3	0.1

SG	ROW	COLUMN	% TW	LOCATION	
13	43	81	18	AV5	-0.11
13	43	85	20	AV2	0
13	43	86	34	AV3	-0.02
13	43	86	34	AV4	-0.05
13	43	86	29	AV6	0.08
13	43	86	33	AV2	-0.11
13	43	93	19	AV2	-0.14
13	43	97	25	AV6	0
13	43	97	19	AV5	-0.02
13	43	97	23	AV2	-0.06
13	43	97	13	AV1	0.03
13	43	97	33	AV4	0
13	43	97	35	AV3	0
13	43	99	23	AV5	0
13	43	99	22	AV3	0
13	43	99	34	AV4	0
13	44	25	19	AV2	-0.05
13	44	25	18	AV3	-0.07
13	44	26	20	AV3	-0.1
13	44	26	19	AV2	-0.05
13	44	60	14	AV3	-0.03
13	44	61	40	AV6	0
13	44	61	15	AV1	0.06
13	44	61	9	AV2	-0.02
13	44	61	31	AV4	-0.16
13	44	61	1	AV5	0.13
13	44	61	40	AV6	0
13	44	61	39	AV3	-0.06
13	44	65	14	AV1	-0.11
13	44	65	34	AV2	-0.06
13	44	65	23	AV4	0
13	44	65	14	AV5	-0.21
13	44	65	33	AV6	0.18
13	44	65	36	AV3	0.34
13	44	68	22	AV5	0.13
13	44	68	18	AV4	0

SG	ROW	COLUMN	% TW	LOCATION	
13	44	68	21	AV3	0.03
13	44	68	23	AV2	-0.11
13	44	68	26	AV1	0.06
13	44	77	14	AV4	0
13	44	77	18	AV3	-0.05
13	44	77	12	AV2	0.02
13	44	102	34	AV5	0
13	44	102	17	AV4	0
13	44	102	14	AV1	0.18
13	44	102	37	AV6	0
13	45	23	17	AV6	-0.28
13	45	65	25	AV5	0.11
13	45	65	26	AV3	0.04
13	45	65	20	AV2	0.07
13	45	65	36	AV4	0
13	45	66	14	AV2	0
13	45	96	31	AV6	0.01
13	45	96	20	AV4	0.01
13	45	96	14	AV3	0.01
13	45	97	19	AV4	0
13	45	101	41	AV5	0
13	45	101	19	AV4	0
13	45	101	29	AV6	0
13	45	101	42	AV5	0
13	46	24	28	AV5	-0.1
13	46	24	13	AV6	0
13	46	46	17	AV5	0
13	46	46	9	AV5	0
13	46	46	28	AV2	-0.14
13	46	46	31	AV3	0.13
13	46	46	26	AV5	0
13	46	46	42	AV4	0.4
13	46	46	42	AV4	0.26
13	46	46	26	AV5	0
13	46	62	22	AV2	0
13	46	62	29	AV3	-0.1

SG	ROW	COLUMN	% TW	LOCATION	
13	46	62	20	AV4	0
13	46	65	15	AV1	-0.16
13	46	65	14	AV2	0.05
13	46	65	25	AV3	-0.14
13	46	65	18	AV4	-0.1
13	46	73	24	AV2	-0.05
13	46	75	19	AV6	0
13	46	75	16	AV5	0
13	46	75	15	AV4	0.37
13	46	75	35	AV3	0.34
13	46	75	16	AV1	-0.03
13	46	75	37	AV2	0.05
13	46	98	16	AV6	-0.03
13	46	98	25	AV5	-0.03
13	46	98	35	AV3	-0.02
13	46	98	17	AV1	-0.21
13	47	24	35	AV5	-0.05
13	47	24	25	AV6	0
13	47	25	19	AV6	-0.1
13	47	25	26	AV5	0.09
13	47	25	12	AV4	-0.07
13	47	26	17	AV6	0.05
13	47	26	14	AV5	0.09
13	47	83	51	AV3	0.1
13	47	83	40	AV4	0.08
13	47	83	24	AV2	0
13	47	83	32	AV5	0
13	47	83	19	AV6	0.1
13	47	83	40	AV4	0.08
13	47	83	51	AV3	0.1
13	47	96	23	AV2	-0.06
13	47	96	30	AV4	0
13	47	98	45	AV4	0
13	47	98	45	AV4	0
13	47	98	22	AV6	0
13	47	98	21	AV2	-0.05

SG	ROW	COLUMN	% TW	LOCATION	
13	47	98	37	AV5	0
13	47	99	21	AV5	0
13	47	99	19	AV1	0.14
13	47	99	35	AV6	-0.05
13	48	91	19	AV4	0
13	48	95	16	AV3	0
13	48	97	16	AV2	0
13	48	97	21	AV4	0
13	48	97	30	AV5	0
13	48	98	13	AV6	-0.02
13	49	27	16	AV1	0.34
13	49	31	29	AV6	0.01
13	49	31	25	AV5	0.01
13	49	31	21	AV3	0.01
13	49	31	20	AV4	-0.01
13	49	94	20	AV6	0
13	49	94	16	AV5	-0.02
13	49	95	21	AV4	0
13	49	96	30	AV3	0
13	49	96	31	AV4	0
13	49	96	35	AV5	0
13	49	96	15	AV2	0.03
13	50	28	20	AV4	-0.26
13	50	28	17	AV5	-0.52
13	50	79	21	AV4	0
13	50	79	35	AV2	0.06
13	50	79	11	AV1	-0.21
13	50	79	35	AV3	0.11
13	50	84	24	AV2	-0.19
13	50	84	14	AV4	0.16
13	50	84	33	AV3	0.06
13	50	88	25	AV5	-0.05
13	50	92	18	AV3	-0.05
13	50	92	31	AV4	0
13	50	92	33	AV5	0
13	50	92	31	AV6	0

SG	ROW	COLUMN	% TW	LOCATION	
13	50	93	17	AV5	0
13	50	94	21	AV1	0
13	50	94	23	AV2	0
13	51	50	20	AV6	-0.02
13	51	50	12	AV4	-0.16
13	51	55	19	AV5	-0.02
13	51	57	13	AV5	0.03
13	52	33	35	AV6	0.01
13	52	33	32	AV5	0.02
13	52	33	35	AV4	-0.02
13	52	33	33	AV3	0.01
13	52	34	26	AV6	-0.11
13	52	34	11	AV5	-0.03
13	52	89	19	AV2	0
13	53	33	38	AV5	-0.05
13	53	33	14	AV6	-0.34
13	53	33	17	AV4	-0.05
13	53	33	31	AV6	0.03
13	53	57	13	AV4	-0.02
13	53	57	16	AV3	0
13	53	57	17	AV2	-0.08
13	53	72	22	AV4	0.03
13	53	88	18	AV4	0
13	53	88	19	AV5	0
13	54	37	21	AV4	0
13	54	55	12	AV2	-0.05
13	54	55	19	AV3	-0.05
13	54	55	32	AV6	0.06
13	54	55	35	AV5	-0.02
13	54	55	36	AV4	-0.11
13	54	65	22	AV4	-0.03
13	54	65	28	AV5	0.13
13	54	65	26	AV6	0.1
13	54	71	17	AV5	-0.03
13	54	72	17	AV5	-0.05
13	54	73	19	AV6	-0.05

SG	ROW	COLUMN	% TW	LOCATION	
13	54	73	23	AV5	0
13	54	73	19	AV4	-0.21
13	54	73	21	AV3	0.14
13	54	76	15	AV1	-0.02
13	55	39	19	AV4	0
13	56	66	14	AV3	0
13	56	82	44	AV5	0
13	56	82	29	AV4	0.05
13	56	82	44	AV5	0
13	56	82	35	AV6	0.05
13	57	77	41	AV3	-0.03
13	57	77	26	AV4	-0.05
13	57	77	20	AV5	0
13	57	77	41	AV3	-0.05
13	57	78	16	AV6	-0.02
13	57	78	16	AV2	0.02
13	57	79	16	AV2	-0.06
13	58	47	31	AV5	-0.03
13	58	47	31	AV4	0.06
13	58	55	16	AV1	-0.09
13	58	75	11	AV2	0
13	58	75	18	AV3	0
13	58	76	14	AV3	0.02
13	58	76	14	AV6	0.03
13	58	76	15	AV5	0
13	59	61	12	AV6	0.52
13	59	61	16	AV1	-0.06
14	20	5	12	AV1	-0.08
14	23	6	21	AV1	0.58
14	24	6	21	AV1	-0.39
14	24	7	17	AV6	-0.22
14	24	116	24	AV1	-0.42
14	24	116	16	AV6	0.27
14	25	7	19	AV6	-0.25
14	25	7	12	AV1	-0.16
14	25	8	30	AV1	-0.23

SG	ROW	COLUMN	% TW	LOCATION	
14	25	35	11	AV6	-0.26
14	25	36	18	AV6	-0.13
14	25	44	16	AV5	0.21
14	25	109	13	AV6	0.03
14	25	115	25	AV6	0
14	26	7	22	AV1	-0.22
14	26	7	15	AV6	-0.24
14	26	8	24	AV1	-0.26
14	26	8	14	AV6	-0.22
14	26	114	13	AV2	-0.14
14	26	115	31	AV1	0
14	26	115	18	AV6	0
14	26	116	15	AV1	0
14	27	8	26	AV1	-0.27
14	27	8	22	AV1	0.19
14	27	8	21	AV6	-0.22
14	27	8	13	AV6	0.13
14	27	79	14	AV2	0.01
14	27	79	23	AV5	0.01
14	27	114	20	AV2	-0.09
14	28	8	45	AV1	-0.06
14	28	8	22	AV6	0.16
14	28	8	21	AV6	-0.28
14	28	8	7	07C	-0.59
14	28	8	46	AV1	-0.06
14	28	8	1	07C	-0.66
14	28	8	3	07C	-0.63
14	28	8	5	07C	-0.61
14	28	8	6	07C	-0.59
14	28	8	7	07C	-0.57
14	28	8	7	07C	-0.55
14	28	8	9	07C	-0.52
14	28	8	10	07C	-0.5
14	28	8	11	07C	-0.48
14	28	8	11	07C	-0.46
14	28	8	10	07C	-0.44

SG	ROW	COLUMN	% TW	LOCATION	
14	28	8	10	07C	-0.41
14	28	8	9	07C	-0.39
14	28	8	10	07C	-0.37
14	28	8	9	07C	-0.35
14	28	8	9	07C	-0.32
14	28	8	9	07C	-0.3
14	28	8	8	07C	-0.28
14	28	8	8	07C	-0.26
14	28	8	8	07C	-0.24
14	28	8	7	07C	-0.21
14	28	8	7	07C	-0.19
14	28	8	7	07C	-0.17
14	28	8	7	07C	-0.15
14	28	8	7	07C	-0.13
14	28	8	7	07C	-0.1
14	28	8	7	07C	-0.08
14	28	8	7	07C	-0.06
14	28	8	6	07C	-0.04
14	28	8	6	07C	-0.02
14	28	8	6	07C	0.01
14	28	8	6	07C	0.03
14	28	8	6	07C	0.05
14	28	8	5	07C	0.07
14	28	8	5	07C	0.1
14	28	8	5	07C	0.12
14	28	8	5	07C	0.14
14	28	8	5	07C	0.16
14	28	8	5	07C	0.18
14	28	8	5	07C	0.21
14	28	8	4	07C	0.23
14	28	8	4	07C	0.25
14	28	8	4	07C	0.27
14	28	8	3	07C	0.29
14	28	8	3	07C	0.32
14	28	8	3	07C	0.34
14	28	8	3	07C	0.36

SG	ROW	COLUMN	% TW	LOCATION	
14	28	8	2	07C	0.38
14	28	8	2	07C	0.41
14	28	8	2	07C	0.43
14	28	8	1	07C	0.44
14	28	9	25	AV2	0.27
14	28	9	12	AV6	-0.18
14	28	12	17	AV6	0.05
14	28	14	14	AV6	0
14	28	38	17	AV2	0
14	28	38	16	AV5	0
14	28	81	16	AV5	0.01
14	28	109	11	AV1	0
14	28	111	14	AV2	0.05
14	28	113	14	AV2	-0.17
14	28	113	10	AV6	0.01
14	28	113	17	AV5	0.01
14	29	109	19	AV6	-0.12
14	29	109	15	AV2	-0.05
14	29	110	22	AV5	-0.14
14	29	110	14	AV2	0.07
14	29	110	10	AV1	-0.12
14	29	111	20	AV5	-0.09
14	30	9	19	AV6	0.04
14	30	9	33	AV2	-0.06
14	30	9	18	AV5	-0.01
14	30	10	14	AV1	-0.03
14	30	10	36	AV2	-0.93
14	30	10	11	AV5	0.91
14	30	63	20	AV2	0.02
14	30	63	20	AV5	0.56
14	30	63	14	AV1	0
14	30	72	20	AV2	0.29
14	30	76	13	AV5	-0.12
14	30	107	17	AV5	0.01
14	30	111	16	AV2	0
14	30	114	13	AV2	-0.59

SG	ROW	COLUMN	% TW	LOCATION	
14	31	10	26	AV2	0.87
14	31	10	18	AV1	0
14	31	10	20	AV5	0.65
14	31	10	28	AV5	-0.76
14	31	10	11	AV5	-0.2
14	31	11	18	AV6	-0.09
14	32	12	17	AV4	-0.08
14	32	12	24	AV5	0.01
14	32	84	19	AV5	0
14	32	84	27	AV2	0.02
14	32	109	14	AV2	0.01
14	32	111	17	AV2	0.03
14	32	111	14	AV1	0.05
14	32	111	12	AV6	0.01
14	32	111	31	AV5	0.01
14	32	112	10	AV5	0.37
14	33	12	16	AV5	0.02
14	33	12	19	AV6	0.03
14	33	12	22	AV2	0.01
14	34	108	16	AV2	0
14	34	108	13	AV3	0
14	34	108	10	AV4	-0.1
14	34	109	26	AV4	0.01
14	34	109	23	AV3	0.01
14	34	111	13	AV6	0.25
14	34	111	15	AV2	-0.7
14	37	83	10	AV4	0
14	37	83	34	AV5	0.01
14	37	83	10	AV1	0.01
14	37	103	17	AV5	-0.09
14	38	16	24	AV6	0.01
14	38	16	28	AV5	0.01
14	38	16	35	AV4	0.01
14	38	16	18	AV3	0.01
14	38	32	14	AV3	0.01
14	38	40	30	AV2	0.06

SG	ROW	COLUMN	% TW	LOCATION	
14	38	40	24	AV3	0.19
14	38	40	31	AV4	0.03
14	38	92	11	AV3	0
14	38	99	17	AV5	-0.14
14	38	101	17	AV5	0.02
14	38	101	31	AV3	0.07
14	38	101	26	AV4	0.1
14	38	101	17	AV2	0.01
14	38	104	17	AV4	-0.05
14	38	108	10	AV3	-0.24
14	38	108	14	AV2	-0.46
14	39	37	24	AV2	-0.09
14	39	37	18	AV6	-0.22
14	39	37	36	AV5	0.01
14	39	37	28	AV4	0.01
14	39	37	24	AV3	0.01
14	39	56	20	AV5	-0.13
14	39	56	25	AV4	0.17
14	39	56	27	AV3	0.27
14	39	68	16	AV6	-0.22
14	39	77	25	AV4	-0.07
14	39	77	23	AV3	-0.02
14	39	77	12	AV2	0
14	39	79	16	AV3	-0.31
14	39	96	13	AV1	-0.26
14	39	96	19	AV2	0.09
14	39	96	18	AV3	0.1
14	39	96	16	AV4	0
14	39	97	23	AV3	0.03
14	39	98	17	AV3	0.14
14	39	100	24	AV3	0.01
14	39	100	16	AV2	0.01
14	40	48	22	AV6	-0.22
14	40	48	31	AV5	-0.05
14	40	48	11	AV4	-0.25
14	40	48	21	AV1	-0.14

SG	ROW	COLUMN	% TW	LOCATION	
14	40	51	13	AV6	0.16
14	40	51	27	AV4	0.35
14	40	51	12	AV2	-0.21
14	40	51	13	AV1	-0.03
14	40	51	34	AV3	0.14
14	40	52	22	AV6	0.02
14	40	52	35	AV5	0.02
14	40	52	27	AV4	0.27
14	40	52	16	AV2	0
14	40	52	20	AV1	0.09
14	40	52	24	AV3	0
14	40	56	15	AV5	0.17
14	40	56	14	AV4	0.22
14	40	56	17	AV3	-0.24
14	40	58	10	AV2	-0.27
14	40	60	18	AV6	0.02
14	40	60	21	AV3	-0.19
14	40	76	17	AV5	0.01
14	40	76	30	AV4	0.01
14	40	76	27	AV3	0.01
14	40	76	22	AV2	0.01
14	40	80	19	AV6	0.21
14	40	80	21	AV5	0.03
14	40	80	23	AV4	-0.27
14	40	80	22	AV3	-0.12
14	40	81	12	AV6	-0.09
14	40	81	24	AV5	0.37
14	40	81	31	AV4	0.34
14	40	81	26	AV3	0.32
14	40	81	31	AV2	0.29
14	40	81	28	AV1	0.03
14	40	81	14	AV4	-0.31
14	40	85	22	AV5	0
14	40	85	31	AV4	0.02
14	40	85	23	AV3	0.34
14	40	85	18	AV3	-0.29

SG	ROW	COLUMN	% TW	LOCATION	
14	40	85	13	AV2	0.15
14	40	85	29	AV2	-0.19
14	40	85	12	AV6	-0.12
14	40	87	14	AV3	-0.02
14	40	87	27	AV5	0.01
14	40	87	21	AV4	0.01
14	40	87	10	AV2	0.01
14	40	106	15	AV6	0.08
14	40	106	12	AV5	0.22
14	40	106	11	AV1	0.05
14	40	106	12	AV3	0.15
14	41	100	14	AV3	-0.07
14	41	100	13	AV5	0
14	41	105	14	AV1	0
14	41	105	16	AV5	0
14	42	21	12	AV3	-0.05
14	42	30	16	AV2	0
14	42	30	19	AV4	0.05
14	42	30	18	AV3	0.05
14	42	30	12	AV5	0.08
14	43	53	14	AV2	0.16
14	43	53	22	AV3	0.16
14	43	53	13	AV4	0.19
14	43	53	21	AV5	-0.25
14	43	53	7	AV2	-0.19
14	43	53	14	AV2	0.16
14	43	54	17	AV6	0.02
14	43	54	16	AV5	0.21
14	43	54	17	AV4	0.32
14	43	54	18	AV4	-0.38
14	43	54	20	AV3	0.28
14	43	54	28	AV2	0.05
14	43	55	25	AV1	0.01
14	43	55	34	AV3	0.3
14	43	55	32	AV5	-0.09
14	43	55	23	AV4	-0.24

SG	ROW	COLUMN	% TW	LOCATION	
14	43	55	35	AV2	0.05
14	43	55	28	AV6	0.01
14	44	102	13	AV2	-0.14
14	44	102	13	AV3	-0.03
14	45	22	14	AV4	-0.05
14	45	101	14	AV1	-0.1
14	45	101	16	AV3	-0.07
14	46	24	14	AV6	0.09
14	47	43	19	AV3	0.01
14	47	48	14	AV6	-0.28
14	47	48	33	AV4	-0.49
14	47	48	29	AV2	0.05
14	47	48	18	AV1	0.16
14	47	48	38	AV3	0.16
14	47	48	35	AV5	-0.08
14	47	57	17	AV3	-0.02
14	47	57	15	AV2	0.02
14	47	81	40	AV3	0.31
14	47	81	21	AV4	-0.24
14	47	81	17	AV3	-0.2
14	47	81	37	AV4	0.29
14	47	81	40	AV3	0.24
14	47	81	35	AV6	0.01
14	47	81	29	AV5	0.01
14	47	81	36	AV2	0.01
14	47	81	20	AV1	0.01
14	47	83	11	AV2	0.01
14	47	83	5	AV2	0.02
14	47	83	17	AV2	0.01
14	47	83	32	AV4	-0.07
14	47	83	27	AV1	-0.02
14	47	83	37	AV3	-0.03
14	47	83	19	AV6	0.01
14	47	83	38	AV5	0.01
14	47	83	17	AV2	0.01
14	47	88	10	AV4	0

SG	ROW	COLUMN	% TW	LOCATION	
14	48	26	18	AV2	-0.3
14	49	95	13	AV3	0.02
14	50	28	19	AV5	0.03
14	50	28	29	AV6	0.12
14	50	94	18	AV3	-0.05
14	50	95	11	AV2	-0.03
14	51	31	13	AV4	-0.05
14	51	31	14	AV6	-0.25
14	51	31	9	AV5	-0.19
14	52	35	27	AV3	0
14	53	38	17	AV4	-0.13
14	53	38	20	AV6	-0.35
14	54	86	17	AV2	-0.15
14	54	87	13	AV6	0.01
14	54	87	17	AV5	0.01
14	55	83	27	AV6	0.02
14	55	83	12	AV4	0
14	55	83	10	AV2	0
14	56	41	27	AV6	0.05
14	56	41	33	AV5	0.03
14	56	41	20	AV4	0.05
14	56	81	12	AV2	0.21
14	56	82	14	AV2	0.09
14	58	50	17	AV1	0
14	58	65	13	AV6	-0.02
14	58	70	13	AV1	0
14	58	72	10	AV1	-0.1
14	58	74	13	AV1	-0.1
14	58	76	17	AV2	0.09
14	59	55	23	AV6	0.22
14	59	63	11	AV2	0
14	59	63	11	AV6	0
14	59	68	15	AV1	-0.51

NDE Techniques Utilized for 1R15

Salem Technique		Industry Qualification	Damage Mechanism	Demonstrated Applicability	Extended Applicability	Depth Sizing Technique Applied	Site-Specific Review Deemed Acceptable	
							Detection	Sizing
1	Bobbin	96001.1 Revision 8	Thinning	TSP	Above Tubesheet	Differential Mix Phase Analysis	Yes	For Service
2	Bobbin	96004.1 Revision 7	Wear	TSP and AVB	FDB & PLP Wear	Differential Mix Amplitude Analysis	Yes	For Service
3	Bobbin	96004.3 Revision 7	Wear	TSP and AVB	FDB & PLP Wear	Absolute Mix Amplitude Analysis	Yes	For Service
4	Bobbin	96005.2 Revision 6	Pitting	Presence of Copper	None	Differential Mix Phase Analysis	Yes	CM/OA Purposes
5	Bobbin	96007.1 Revision 8	IGA/ODSCC	TSP	None	Differential Mix Phase Analysis	Yes	CM/OA Purposes
6	Bobbin	96008.1 Revision 10	IGA/ODSCC	TSP	Freespan, Sludge Pile	Differential Mix Phase Analysis	Yes	CM/OA Purposes
7	+Point	96910.1 Revision 5	Wear	TSP	Loose Part Wear	Differential Mix Amplitude Analysis	Yes	CM/OA Purposes
8	+Point	21998.1 Revision 0	Volumetrics	TSP, AVB, Pitting above the TTS and in the freespan	PLP Wear & Pitting	Single Frequency Amplitude Analysis	Yes	N/A
9	+Point	96701.1 Revision 7	Circ PWSCC	Expansion Transition	Dent, Tubesheet	Single Frequency Amplitude Analysis	Yes	CM/OA Purposes
10	+Point	20510.1 Revision 2	Circ PWSCC	Expansion Transition	Dings	Single Frequency Phase	Yes	CM/OA Purposes

Salem Technique		Industry Qualification	Damage Mechanism	Demonstrated Applicability	Extended Applicability	Depth Sizing Technique Applied	Site-Specific Review Deemed Acceptable	
							Detection	Sizing
						Analysis		
11	+Point	96703.1 Revision 10	Axial PWSCC	Dent	Tubesheet	Single Frequency Phase Analysis	Yes	CM/OA Purposes
12	+Point	20511.1 Revision 3	Axial PWSCC	Expansion Transition	Tubesheet	Single Frequency Phase Analysis	Yes	CM/OA Purposes
13	+Point	21410.1 Revision 0	Circ ODSCC	Expansion Transition	TSP, Freespan, Sludge Pile, Tubesheet, U-bend	Single Frequency Phase Analysis	Yes	CM/OA Purposes
14	+Point	22842.3 Revision 1	Circ ODSCC	Dented TSP	Dings	Length Sizing Only	Yes	CM/OA Purposes
15	+Point	21409.1 Revision 0	Axial ODSCC	TSP, Freespan, Sludge Pile, Tubesheet Crevice	Tubesheet Expansion Transition, U-bend	Single Frequency Phase Analysis	Yes	CM/OA Purposes
16	+Point	22841.3 Revision 3	Axial ODSCC	Dented TSP	Dings	Length Sizing Only	Yes	CM/OA Purposes
17	+Point	96511.1 Revision 10	PWSCC	U-bend	None	Single Frequency Phase Analysis	Yes	CM/OA Purposes
18	+Point	96511.2 Revision 10	PWSCC	U-bend	None	Single Frequency Phase Analysis	Yes	CM/OA Purposes
19	+Point	99997.1 Revision 4	PWSCC	U-bend	None	Single Frequency Phase Analysis	Yes	CM/OA Purposes

Attachment 2

Salem Unit 2 Refueling Outage Number 12 Summary

OVERVIEW

The detailed ECT scope was delineated in the 2R12 Steam Generator Tubing Degradation Assessment, Engineering Eval. No. S-2-RC-MEE-1625. This document identified the active and potential degradation mechanisms affecting the tubing in the Salem Unit 2 Steam Generators, identified the inspection scope and techniques to be used, and provided structural limits for each damage mechanism for assessing tube integrity requirements. The base eddy current examination scope met Salem Unit 2 Technical Specification requirements. A summary of the base scope is shown below:

- With the exception of those low row u-bends inspected under the next bullet, a full-length bobbin coil inspection was performed on 100% of the in-service tubes in each steam generator.
- 100% Rotating Coil (+ Point) exam of the row 2 short radius U-bends and 20% of the row 3 short radius U-bends (07C-07H) in each steam generator.
- 100% Rotating Coil (+ Point) exam of the Hot Leg (HL) WEXTEX Top of Tubesheet (TTS) transition regions in each steam generator.
- 100% Rotating Coil (+ Point) exam of the ≥1-volt dented HL Tube Support Plate (TSP) intersections at 01H and 02H AND 20% of the ≥1-volt dented HL Tube Support Plate (TSP) intersections at 03H in each steam generator.
- 20% Rotating Coil (+ Point) exam of the ≥5-volt dented HL TSP population at 05H, 06H and 07H in each steam generator.
- 20%Rotating Coil (+ Point) exam of the ≥2 volt HL free span dings (TSH +0.5" to 07H +2.0").
- Rotating Coil (+ Point) examination of previous and new suspect Ligament Indications identified from the 2R11 bobbin coil data.

EPRI Rev. 5 Technical Deviations

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 2R12. Justification for each deviation is documented in the confirmation for each order listed. All deviations were reviewed and approved in accordance with station procedures. A summary of the deviations is provided below:

- 80041193, deviates from the normalization requirements specified in Rev. 5 to provide for more consistent sizing technique for Anti-Vibration Bar (AVB) wear indications.
- 80041192, deviates from the minimum required EDM notches in the rotating coil calibration standard.
- 80041189, deviates 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.

- 80041191, deviates from requiring all data analysts to pass the Site Specific Performance Demonstration (SSPD).
- 80041190, deviates from requiring production data analysts to review overcalls.
- 80041474, deviates from the process control requirements (e.g. 3 letter codes) delineated in Rev. 5.
- 80041194 deviated from the volumetric inspection requirements for installed FANP Inconnel-690 rolled plugs.

Assessment of Examination Results and Technical Specification Classification

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 Management Program for 2R12. A complete assessment of the examination results is documented in S-2-RC-MEE-1673, 2R12 Steam Generator Condition Monitoring & Operational Assessment Evaluation. 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)	11	4	4*	2	21
PWSCC @ HL TTS (Circ)	0	1	0	0	1
PWSCC @ HL TTS (Volumetric)	0	0	1	0	1
ODSCC @ HL TTS (Volumetric)	0	0	2*	0	2
Anti-Vibration Bar Wear	1	0	1	0	2
Cold Leg Thinning	0	0	2	4	6
PWSCC @ HL TSP (Axial)	0	1	0	1	2
PWSCC @ HL TSP (Circ)	0	1	0	0	1
ODSCC @ HL TSP (Axial)	2	0	1	0	3
PWSCC LOW ROW U-BENDS	0	0	0	0	0
Loose Part Wear / Preventative	0	0	0	2	0
Unacceptable Data Quality (PVN)	0	1	0	0	1
TOTAL TUBES PLUGGED	14	8	10	9	41
TOTAL TUBES PLUGGED CUMULATIVE	211	224	171	306	912
CUMULATIVE TUBE PLUGGING %	6.22	6.61	5.05	9.03	6.73

* This tube had two indications reported in the HL tubesheet region

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

WEXTEX Tubesheet Inspections

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 2R12, 100% rotating coil (+ Point) inspections of the HL TTS WEXTEX transition region were performed in each steam generator at an extent of +2" above TTS to - 8" below the TTS. The table below lists all tubesheet indications repaired during 2R12. All indications were sized for tube integrity assessment.

SG	Tube ID	Indication	Location	Damage Mechanism
21	R2C34	SAI	TSH -1.61"	PWSCC
21	R5C29	SAI	TSH - 1.59"	PWSCC
21	R5C57	SAI	TSH - 7.76"	PWSCC
21	R5C64	SAI	TSH - 2.50"	PWSCC
21	R5C73	SAI	TSH - 9.29"	PWSCC
21	R9C63	SAI	TSH - 7.45"	PWSCC
21	R12C38	SAI	TSH - 1.70"	PWSCC
21	R19C49	SAI	TSH - 2.37"	PWSCC
21	R22C31	SAI	TSH - 1.46"	PWSCC
21	R23C32	SAI	TSH - 0.95"	PWSCC
21	R25C23	SAI	TSH -6.55"	PWSCC
22	R5C45	SAI	TSH - 1.42"	PWSCC
		SAI	TSH -1.00	
22	R8C67	SAI	TSH -6.71"	PWSCC
22	R13C28	SCI	TSH -2.16"	PWSCC

22	R29C63	SAI	TSH -2.88"	PWSCC
		SAI	TSH -1.40"	
		SAI	TSH -1.07"	
		SAI	TSH - 0.91"	
22	R32C45	SAI	TSH -0.91"	PWSCC
23	R17C91	SAI	TSH -2.43"	PWSCC
23	R19C26	SVI	TSH -0.45"	ODSCC
23	R22C31	SVI	TSH -4.18"	PWSCC
23	R31C24	SVI	TSH -0.74"	ODSCC
		SAI	TSH -11.18"	PWSCC
23	R38C61	SAI	TSH -2.20"	PWSCC
23	R42C38	SAI	TSH -0.48"	PWSCC
24	R9C51	SAI	TSH -0.31"	PWSCC
24	R20C49	SAI	TSH -7.13"	PWSCC

Dented HL TSP Intersection Inspections

About 3160 ≥ 1 volt dented TSP's intersections were inspected as part of the base scope and 186 new dents[2] were examined with a rotating coil technique. Six tubes were repaired for dented TSP ODSCC or PWSCC indications (see table below). All indications were sized for tube integrity assessment.

SG	Tube ID	Indication	TSP Location	2R12 Bobbin Dent Voltage	Damage Mechanism
21	R6C9	SAI	01H	1.68	ODSCC
21	R24C10	SAI	01H	1.67	ODSCC
22	R2C61	SAI	01H	1.56	PWSCC
22	R27C23	SCI	01H	4.08	PWSCC
23	R10C92	SAI	01H	5.15	ODSCC
24	R6C71	SAI	01H	1.31	PWSCC

Anti-vibration Bar (AVB) Wear

During previous ISI's AVB wear was detected and sized utilizing an absolute mix per EPRI ETSS 96004.3. In an effort to obtain greater consistency in the sizing of AVB indications, for 2R12 the differential mix technique per EPRI ETSS 96004.1 was site

[2] New dents are ≥ 1 volt indications that were reported during the 2R12 bobbin coil inspection at 01H, 02H and 03H that were NOT inspected during 2R11.

validated and used. This required historical indications to be re-sized per technique 96004.1. This work was completed prior to 2R12 by Framatome ANP personnel and is documented in VTD 325511, AVB Resizing Bobbin Differential Depth Sizing of AVB Wear at Salem Unit 2. Changing techniques for identifying and reporting AVB wear did not result in an inspection transient.

AVB wear indications are plugged if bobbin indicates a depth ≥ 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. A total of two tubes were plugged for this damage mechanism. The table below lists the tubes plugged for AVB wear during 2R12:

SG	Tube ID	Indication	TSP Location
21	R27C52	40%	AV3
23	R30C63	43%	AV2

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 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 repaired for this damage mechanism as shown in the table below.

SG	Tube ID	Indication	TSP Location
23	R28C10	44%	01C
23	R33C17	41%	01C
24	R31C77	40%	01C
24	R34C78	45%	01C
24	R35C78	45%	01C
24	R43C60	37%	02C

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

100% of the Row 2 and 20% of the Row 3 U-bends in each steam generator were inspected with a dual coil + Point probe. The probe contained both mid frequency and high frequency coils spaced 18" apart. No indications were reported during this inspection.

Loose Parts

All bobbin and rotating coil data was analyzed for the presence of loose parts. The following tubes were identified as having possible foreign material on the secondary side of the steam generator.

SG	Tube ID	Indication	Location
21	R19C61	PLP	TSH
21	R30C66	PLP	TSH
22	R12C69	PLP	TSH
22	R22C32	PLP	TSH
22	R23C28	PLP	TSH
22	R30C23	PLP	TSH
22	R31C22	PLP	TSH
24	R28C55	PLP	TSH
24	R34C61	PLP	TSH
24	R34C62	PLP	TSH

No tube wear was reported; therefore, IAW with the following Framatome ANP Condition Reports these locations did not require repair.

SG	Framatome ANP Condition Report	PSEG Notification
21	6014762-00	20097108
22	6014714-00	20097109
24	6014764-00	20097345

Two tubes in 24SG,R3C93 and R9C93, exhibited indications of loose part wear above the HL TTS during 2R7. Secondary side inspections were performed during that outage that confirmed the presence of the loose part that was subsequently removed. These tubes have remained in service since 2R7. Since 2R9 these indications have been sized with + Point technique. 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 conservatively removed from service (preventative) during 2R12.

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. One tube in 22 SG, Row 22 Column 8 was repaired due to Permeability Variation @ 05H+5.12.

Freespan Indications

Manufacturer's Burnish Marks (MBM's) and Freespan Differential Signals (FSD)

MBM's are identified during the bobbin coil examination. All freespan 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 freespan flow chart were left in the eddy current database with a "MBH", "MBS" or MBM code. Signal changes meeting the parameters of the freespan flow chart were identified with an "MBI" code that require supplemental +Point examination for characterization. No supplemental +Point inspections were required.

As compared to the MBM signal, freespan differential signals exhibit sharper signal characteristics, which could be indicative of damage mechanisms such as IGA/SCC or pitting. These signals are also identified during the bobbin coil examinations. FSD signals are compared to the historical data to detect change in phase and voltage. If no change was noted, the indication was left in the database as with an "FSH" or "FSS" code. Signal changes meeting the parameters of the freespan flow chart were identified with an "FSI" code that required supplemental +Point examination for characterization. Seven tubes (8 locations) were identified with "FSI" codes and none of these indications confirmed to be crack-like when examined with the +Point probe. These locations are shown below:

SG	Tube ID	Bobbin Coil Analysis Code	Location	+ Point Analysis Code
21	R9C88	FSI	TSC +35.86"	MBM
		FSI	TSC +22.88"	MBM
21	R40C53	FSI	07H +23.77"	MBM
22	R25C43	FSI	TSC +24.29"	NDF
24	R5C13	FSI	TSH +41.38"	NDF
24	R7C17	FSI	TSH +48.99"	NDF
24	R9C20	FSI	01C +14.58"	NDF
24	R43C43	FSI	02H +1.13"	NDF

Tube Support Plate Integrity Inspections

All bobbin coil and TSP rotating coil data was analyzed for Suspect Ligament Cracking (SLC) in accordance with the station's eddy current data analysis guidelines and ETSS. The acceptance criteria for SLC indications are that missing ligaments measured less than the 145-degrees are not required to be repaired.

Eleven new bobbin SLC's were detected during the outage, 10 at HL TSP's and 1 at a CL TSP. Of the 11 new indications detected, only 1 could be traced back to 2R1 by doing a bobbin coil comparison. Based on historical looks, all HL TSP SLC's were judged to be present in the 2R9 (1996) rotating coil data. Historical data for the CL TSP indication was not available. The maximum extent of missing ligament for the "new indications" was 31 degrees. The remaining 10 locations were single indications (no measurable gap).

The table below provides a cumulative listing of all SLC indications:

SG	ROW	COL	CHN	IND	LOCATION		SIZING INFORMATION
21	20	53	7	SLC	05H	+0.18	SINGLE
21	31	79	7	SLC	06H	+0.21	SINGLE
21	35	54	7	SLC	03H	+0.18	SINGLE
21	36	40	7	SLC	06H	-0.06	SINGLE
21	37	40	7	SLC	06H	+0.13	SINGLE
21	37	40	7	SLC	05H	+0.22	SINGLE
21	42	34	7	SLC	06H	-0.30	SINGLE
21	42	36	7	SLC	06H	-0.25	SINGLE
21	43	40	7	SLC	06H	+0.03	SINGLE
21	45	41	7	SLC	06H	+0.00	DOUBLE
22	37	54	7	SLC	03H	+0.01	SINGLE
22	37	54	7	SLC	03H	+0.03	SINGLE
22	41	54	7	SLC	03H	-0.22	SINGLE
23	3	56	7	SLC	06C	+0.00	46 DEG
23	6	27	9	SLC	04H	-0.12	46DEG
23	9	40	7	SLC	06C	-0.22	47 DEG
23	9	55	9	SLC	02H	-0.02	51DEG
23	9	55	9	SLC	03H	-0.10	82DEG
23	14	37	9	SLC	04H	+0.26	37DEG
23	14	38	9	SLC	04H	+0.04	54DEG
23	14	57	7	SLC	05C	+0.00	61 DEG
23	17	27	9	SLC	04H	-0.01	64DEG
23	22	75	7	SLC	01H	-0.00	51DEG
23	22	75	7	SLC	07H	-0.10	111DEG
23	25	87	7	SLC	07C	-0.04	SINGLE
23	29	81	7	SLC	01C	+0.01	40 DEG
23	29	81	7	SLC	07C	-0.00	71 DEG

23	39	56	7	SLC	07H	-0.22	SINGLE
23	42	59	7	SLC	04H	+0.13	SINGLE
23	45	54	7	SLC	07H	+0.18	SINGLE
23	46	54	7	SLC	07H	+0.21	SINGLE
24	20	29	7	SLC	07C	+0.32	SINGLE
24	26	9	7	SLC	05C	+0.01	31 DEG
24	34	46	7	SLC	02C	+0.01	SINGLE
24	41	39	7	SLC	02C	+0.09	SINGLE
24	45	41	7	SLC	07H	-0.00	SINGLE
24	45	57	7	SLC	01H	+0.19	32DEG
24	46	41	7	SLC	01H	+0.03	29DEG
24	46	41	7	SLC	07H	-0.03	SINGLE
24	46	54	7	SLC	07H	+0.24	DOUBLE

Free Span Ding Inspections

+ Point inspections were performed on a 20% sample of the HL >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"). About 63 dings were inspected as part of the base scope and 63 new dings[3] were examined. No anomalies were noted.

Sludge Mapping

The station performed sludge mapping utilizing a Computerized Data Screening (CDS) sort of the low frequency bobbin coil data. Sludge analysis provides the information necessary for assessing the positive inspection height for HL TTS rotating coil inspections. For 2R12, the results of the HL sludge screening show the average sludge height per SG to be < 2 inches. Seven tubes in 23 SG had sludge reported in excess of the +2 inch planned extent for the HL rotating coil inspections. The 2R12 rotating coil data for these tubes was reviewed and found to bound the maximum height of the sludge reported. The table below summarizes the sludge analysis results.

SG	21	22	23	24
Count	181	179	160	127
Max	1.56"	1.44"	2.53"	1.46"
Min	0.37"	0.15"	0.50"	0.42"
Average	0.73"	0.72"	1.09"	0.86
95th	1.27"	1.12"	1.83"	1.25"

[3] New dings are ≥ 2 volts indications that were reported during the 2R12 bobbin coil inspection from TSH +0.5" to 07H +2.0" that were NOT inspected during 2R11.

Percentile				

Tube Plug Inspections

During 2R12 station SG engineering 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 procedure SC.SG-TI.RCE-0002 (Q), STEAM GENERATOR TUBE PLUG VISUAL EXAMINATION. The following anomalies were noted during the inspection:

SG	Anomaly	Framatome ANP Condition Report Number	PSEG Nuclear Notification Number	Disposition
21 HL	R1C77 - Wet PIP with no significant boron deposits R1C24 - Wet PIP with small amount of boron deposits	6014732	20097051	No action required
22 HL	R1C31 - Wet PIP with small amount of boron deposits	6014733	20097039	No action required
23 HL	R1C65 - Wet PIP (recessed) with no significant amount of boron deposits	6014734	20097037	No action required
24 HL	R1C13 - PIP with small amount of boron deposits R1C65 - Wet PIP with small amount of boron deposits	6014735	20097033	No action required

Technical Deviation 80041194 provided the justification for not performing a 20% volumetric (eddy current) inspection of installed FTI 690 rolled plugs.

Repair Techniques and Equipment

All repairs were performed utilizing the Framatome ANP mechanical rolled plugs (material master 5006402). The plugs were installed in accordance with the stations work control process utilizing the ROGER fixtures and associated remote plugging equipment.

Two cable stabilizers (material master 5006264) were installed in locations with circumferential indications (see table below):

SG	LOCATION	INDICATION	LOCATION
22	R13C28	SCI	TSH -2.16"
22	R27C23	SCI	01H +0.12"

FINAL ECT SCOPE

The table below summarizes the final (base scope + special interest and/or expansions) scope performed during 2R12.

	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	12264	N/A
2	Short Radius U-Bends (07H to 07C)	+Point™	100% of all in-service Row 2 and 20% of Row 3 tubes in each steam generator	420	Detection of degradation may require verification, redefinition, and expansion of C-A and Buffer zones per EPRI PWR Examination Rev 5 guidelines.
3	WEXTEX TTS	+Point™	100% of all in-service tubes in the HL in each steam generator Extent is +2" above TTS and -8" below TTS	12684	Detection of degradation may require verification, redefinition, and expansion of C-A and Buffer zones per EPRI PWR Examination Rev 5 guidelines.
4	Tubesheet Anomalies	+Point™	Inspect all 2R11 history expansion anomalies in of interest	72	All new expansion anomalies will be inspected with +Point in the area of interest.
5	Defined scope from Degradation Assessment of PWSCC for Dented TSP Intersections (≥ 1 V)	+Point™	100% of the ≥ 1 volt dented TSP locations at 01H and 02H, 20% sample of 03H in each SG.	3344	Detection of degradation may require verification, redefinition, and expansion of C-A and Buffer zones per EPRI PWR Examination Rev 5 guidelines.
6	Defined scope from Degradation Assessment of ODSCC for Dented TSP Intersections (≥ 5 V)	+Point™	20% of the ≥ 5 volt dented TSP locations at 05H to 07H.	930	Critical area (C-A) will need to be defined after detection of ODSCC at TSP dented location. Expansion will be based on the C-A.
7	Suspected TSP Ligament Cracking (PSI or SLC)	Bobbin and +Point™	100% of all previously identified bobbin PSIs / +Point SLC	39	Any new PSI will be +Point inspected
8	Free Span Bobbin Indications (Dings)	+Point™	20% inspection of the ≥2 volt HL dings in each SG	126	If PWSCC or ODSCC is detected in 20% sample, evaluate the need to expand IAW EPRI PWR Examination Rev 5 guidelines.
9	Plugs	Visual	Visual inspection of 100% of the installed tube plugs in each steam generator.	1742	N/A

2R12 Location and Percent Through Wall Indications

SG	ROW	COLUMN	%TW	LOCATION
21	17	25	11	AV3 +0.22
21	17	35	10	AV1 +0.11
21	17	37	13	AV4 -0.56
21	17	39	19	AV1 -0.17
21	17	52	11	AV4 -0.38
21	17	52	12	AV3 +1.01
21	17	52	11	AV1 +0.15
21	17	52	7	AV2 -0.84
21	17	52	8	AV2 +0.99
21	17	52	8	AV3 -0.80
21	17	56	13	AV2 +0.11
21	17	63	11	AV2 +0.09
21	17	63	11	AV3 +0.09
21	18	67	11	AV4 +0.88
21	18	67	12	AV1 -1.01
21	19	30	15	AV1 +0.09
21	19	30	14	AV2 -0.26
21	19	30	16	AV2 +0.35
21	19	30	24	AV3 -0.18
21	19	58	26	AV2 +0.63
21	19	58	15	AV4 +0.49
21	19	66	17	AV2 +0.25

SG	ROW	COLUMN	%TW	LOCATION
21	19	66	13	AV1 -0.44
21	19	66	6	AV4 -0.02
21	19	66	18	AV3 +0.04
21	21	29	7	AV3 +0.33
21	21	29	15	AV4 -0.53
21	21	60	12	AV3 -0.44
21	21	60	10	AV2 -0.27
21	22	60	11	AV2 -0.33
21	23	64	14	AV3 +0.19
21	23	67	21	AV3 -0.17
21	23	67	26	AV2 -0.25
21	23	67	21	AV1 -1.01
21	23	68	15	AV4 -0.23
21	23	68	22	AV3 +0.00
21	23	68	33	AV2 -0.44
21	23	70	12	AV4 +1.26
21	24	41	11	AV1 -1.64
21	24	52	21	AV2 +1.25
21	24	52	9	AV3 +1.20
21	24	52	12	AV4 +0.52
21	24	67	19	AV2 -0.27
21	24	68	27	AV2 +0.81
21	24	68	26	AV3 +0.13
21	24	70	9	AV1 +0.40
21	26	46	12	AV2 +0.30

SG	ROW	COLUMN	%TW	LOCATION
21	26	56	30	AV4 -0.68
21	26	56	23	AV3 +0.11
21	26	56	15	AV2 +0.02
21	26	56	26	AV1 +0.26
21	26	58	11	AV2 -0.48
21	26	58	19	AV3 -0.72
21	26	59	11	AV4 -0.44
21	26	59	13	AV3 +0.36
21	26	59	11	AV2 +0.15
21	26	63	12	AV4 -0.59
21	26	64	21	AV1 -0.11
21	26	64	11	AV2 +0.11
21	26	64	12	AV3 +0.20
21	26	67	23	AV1 -0.75
21	27	44	31	AV2 +0.00
21	27	44	31	AV3 +0.00
21	27	44	24	AV4 +0.78
21	27	44	16	AV1 -0.57
21	27	45	22	AV4 +0.11
21	27	46	33	AV3 +0.69
21	27	46	25	AV4 -0.37
21	27	46	16	AV2 -0.22
21	27	46	32	AV2 +0.33
21	27	47	21	AV2 -0.41

SG	ROW	COLUMN	%TW	LOCATION
21	27	47	38	AV3 -0.81
21	27	47	33	AV4 -1.40
21	27	52	23	AV4 +0.54
21	27	52	20	AV3 +1.41
21	27	52	40	AV3 -0.95
21	27	52	20	AV2 +1.35
21	27	52	28	AV2 -0.99
21	27	52	21	AV1 -1.74
21	27	56	29	AV3 +0.06
21	27	56	24	AV2 +0.06
21	27	56	23	AV1 +0.27
21	27	56	26	AV4 +0.00
21	27	59	15	AV4 -0.33
21	27	64	21	AV1 +0.00
21	27	64	26	AV2 +0.08
21	27	64	33	AV3 +0.17
21	29	46	15	AV1 -0.44
21	29	46	23	AV2 +0.37
21	29	46	36	AV3 +0.37
21	29	46	11	AV4 -0.15
21	29	57	19	AV4 -0.04
21	29	57	20	AV3 +0.00
21	29	57	17	AV2 +0.08
21	29	65	27	AV4 -0.40

SG	ROW	COLUMN	%TW	LOCATION
21	29	65	10	AV3 +0.50
21	31	64	20	AV2 +0.00
21	31	67	14	AV2 +0.48
21	32	39	12	AV4 +0.02
21	32	48	27	AV3 +0.27
21	32	48	18	AV2 +0.09
21	32	49	12	AV4 -0.20
21	32	49	11	AV3 +1.36
21	32	51	16	AV4 +1.71
21	32	51	22	AV3 +1.35
21	32	51	23	AV3 -1.20
21	32	51	12	AV2 +1.35
21	32	54	10	AV3 +0.00
21	33	41	11	AV2 +0.00
21	33	41	10	AV3 -0.17
21	33	41	16	AV4 +0.80
21	33	55	13	AV3 +0.08
21	33	60	25	AV3 +0.44
21	33	60	22	AV1 +0.52
21	34	36	15	AV3 -0.21
21	34	36	28	AV2 -0.47
21	34	36	12	AV1

SG	ROW	COLUMN	%TW	LOCATION
				+0.34
21	34	36	11	AV1 -0.26
21	34	37	10	AV4 +0.17
21	34	37	21	AV3 +0.28
21	34	37	24	AV2 +0.15
21	34	37	11	AV1 +0.28
21	34	44	13	AV1 +0.45
21	34	44	28	AV2 -0.02
21	34	44	35	AV3 +0.11
21	34	45	13	AV1 +0.17
21	34	45	16	AV2 -0.04
21	34	45	22	AV4 -0.17
21	34	45	29	AV3 -0.50
21	34	49	10	AV3 +1.28
21	34	49	10	AV2 +0.00
21	34	51	14	AV3 +1.24
21	34	51	14	AV2 +1.28
21	34	51	25	AV1 +0.00
21	34	52	15	AV2 +1.03
21	34	65	23	AV4 -0.29
21	34	65	27	AV3 -0.29
21	35	68	14	AV2 -0.25
21	35	68	13	AV1 -0.48
21	35	76	17	02C -0.10

SG	ROW	COLUMN	%TW	LOCATION
21	36	41	21	AV3 +0.00
21	36	43	13	AV3 +0.77
21	36	52	30	AV2 -0.71
21	36	56	24	AV2 +0.00
21	36	58	19	AV3 -0.42
21	36	58	11	AV2 +0.52
21	36	58	18	AV2 -0.46
21	36	58	14	AV1 +0.31
21	39	37	28	AV2 +0.00
21	39	37	15	AV1 +0.33
21	39	54	10	AV1 -0.17
21	39	61	22	AV1 -0.59
21	39	61	31	AV2 -0.48
21	40	58	10	AV2 -0.31
21	42	31	11	AV3 -0.02
21	46	48	1	01C +0.38
22	16	68	19	AV2 +0.28
22	16	68	15	AV3 +0.56
22	16	68	14	AV4 +0.18
22	18	65	23	AV1 -0.95
22	18	65	17	AV2 -0.60
22	18	65	24	AV2 +0.82
22	18	65	29	AV3 +0.09
22	18	65	21	AV4 -0.80
22	18	65	11	AV4

SG	ROW	COLUMN	%TW	LOCATION
				+0.89
22	18	65	14	AV1 +1.68
22	22	62	12	AV2 -0.06
22	22	62	22	AV3 +0.00
22	22	87	10	01C +0.11
22	23	71	15	AV1 +0.00
22	23	71	16	AV3 +0.34
22	23	71	13	AV4 +0.29
22	23	74	13	AV2 +0.58
22	23	74	12	AV4 +0.00
22	25	9	11	AV2 +0.39
22	25	9	17	AV3 +0.00
22	25	30	21	AV2 -0.02
22	25	30	25	AV3 +0.26
22	25	30	16	AV1 +1.70
22	25	63	12	AV3 -0.34
22	25	69	17	AV2 +0.00
22	25	69	31	AV3 +0.15
22	25	71	16	AV3 +0.37
22	26	23	16	AV3 +0.00
22	26	62	28	AV1 +0.54
22	26	62	22	AV2

SG	ROW	COLUMN	%TW	LOCATION
				+0.13
22	26	62	23	AV3 -0.17
22	26	62	10	AV4 +0.49
22	27	28	15	AV2 -0.11
22	27	28	13	AV3 +0.28
22	31	27	20	AV2 +0.00
22	31	28	14	AV1 +0.74
22	31	28	23	AV2 +0.29
22	32	52	14	AV3 -0.19
22	32	79	13	02C -0.04
22	32	79	13	03C -0.15
22	33	16	29	03C +0.00
22	33	67	18	AV2 +0.00
22	33	76	14	01C -0.24
22	33	77	27	01C -0.09
22	34	32	27	AV3 +0.00
22	34	32	26	AV2 +0.00
22	34	32	27	AV1 +0.00
22	34	39	13	AV3 +0.00
22	34	41	11	AV3 +0.00
22	34	47	12	AV3 +0.00
22	34	49	34	AV4 -0.71
22	34	50	12	AV1 +0.00
22	34	50	27	AV3 +0.28

SG	ROW	COLUMN	%TW	LOCATION
22	34	50	20	AV4 +0.91
22	34	50	14	AV2 +0.00
22	34	58	9	AV2 +0.02
22	35	26	10	AV1 +0.11
22	35	26	9	AV2 +0.07
22	35	53	15	AV2 +0.07
22	35	53	11	AV3 -0.11
22	36	34	26	AV3 +0.00
22	37	19	3	01C -0.04
22	40	36	27	AV4 +0.00
22	40	37	22	AV2 +0.00
22	40	37	15	AV1 +0.00
22	40	44	30	AV2 +0.00
22	40	44	21	AV1 +0.00
22	40	52	13	AV1 -0.09
22	40	52	17	AV2 -0.06
22	40	67	23	02C +0.17
22	41	32	12	AV3 +0.00
22	41	62	20	02C +0.13
22	42	41	19	02C +0.00
22	42	61	4	02C -0.09
22	42	62	11	02C -0.04
22	42	65	18	01C +0.35
22	43	37	25	02C -0.09

SG	ROW	COLUMN	%TW	LOCATION
22	43	58	15	02C +0.04
22	43	60	27	02C -0.07
22	43	61	7	02C -0.11
22	43	64	13	02C +0.07
22	43	65	25	02C +0.11
22	44	37	10	02C -0.13
22	44	38	17	01C +0.04
22	44	39	28	01C +0.17
22	44	46	20	02C +0.15
22	44	47	25	02C +0.21
22	44	56	32	02C +0.11
22	44	58	10	02C -0.17
22	44	59	7	02C -0.09
22	44	59	21	02C -0.11
22	44	60	19	02C +0.07
22	44	61	24	04C +0.17
22	44	62	7	03C -0.21
22	45	41	7	02C +0.18
22	45	52	18	02C +0.22
22	45	53	28	02C +0.15
22	45	55	25	02C +0.11
22	45	56	17	02C +0.15
22	45	58	20	01C +0.15
22	46	47	20	02C +0.04
22	46	51	18	02C +0.13
22	46	52	35	02C +0.17
22	46	53	28	02C -0.11
22	46	54	14	01C +0.15
23	6	3	14	01C +0.23
23	8	3	15	01C +0.06
23	9	2	11	01C +0.23
23	9	3	32	01C +0.15
23	11	2	18	01C +0.04
23	12	3	29	01C +0.07

SG	ROW	COLUMN	%TW	LOCATION
23	16	57	17	AV4 -0.81
23	16	57	21	AV3 -0.41
23	16	57	14	AV2 -0.24
23	16	57	23	AV1 +0.45
23	20	31	15	AV1 +0.89
23	20	56	10	AV4 -1.77
23	20	64	13	AV4 +0.00
23	20	67	13	AV1 -0.92
23	21	22	10	AV2 +0.00
23	21	32	11	AV1 -0.07
23	21	44	11	AV1 +0.59
23	21	44	12	AV2 -0.06
23	23	40	11	AV3 +0.00
23	23	44	10	AV2 +0.00
23	23	53	11	AV1 +0.57
23	23	53	16	AV2 +0.00
23	23	53	26	AV3 +0.00
23	23	53	7	AV4 +0.00
23	23	58	11	AV4 +0.00
23	23	58	31	AV3 +0.00
23	23	58	27	AV2 +0.00
23	23	58	13	AV1 -0.28
23	24	46	13	AV3 +0.30

SG	ROW	COLUMN	%TW	LOCATION
23	24	48	12	AV1 +0.00
23	24	48	15	AV2 +0.00
23	24	53	8	AV3 +0.06
23	24	55	17	AV1 +0.98
23	24	55	10	AV4 +0.02
23	24	56	18	AV4 -1.64
23	24	56	23	AV3 +0.77
23	24	56	12	AV2 +1.15
23	24	56	21	AV2 -1.30
23	24	56	21	AV1 -0.74
23	24	56	25	AV3 -0.81
23	25	8	30	01C +0.13
23	25	9	26	01C +0.30
23	25	44	10	AV2 +0.00
23	26	44	11	AV4 +0.00
23	26	44	21	AV3 +0.00
23	26	44	22	AV2 +0.00
23	26	45	22	AV1 +0.00
23	26	45	19	AV2 +0.00
23	26	45	14	AV4 +0.55
23	26	55	12	AV3 -0.06
23	26	55	23	AV2 +0.55
23	26	55	20	AV1 -0.87

SG	ROW	COLUMN	%TW	LOCATION
23	27	49	13	AV3 -0.17
23	27	51	35	AV2 +0.00
23	27	51	33	AV3 +0.00
23	27	51	28	AV4 -0.33
23	27	51	27	AV1 -0.99
23	27	59	27	AV1 +0.24
23	27	59	17	AV2 +0.22
23	27	59	12	AV3 +0.20
23	27	59	14	AV4 +0.35
23	27	63	35	AV2 +0.15
23	27	63	22	AV3 +0.31
23	27	63	18	AV4 -0.74
23	27	63	28	AV1 +0.00
23	27	64	14	AV1 -0.74
23	27	64	10	AV2 -0.02
23	27	65	17	AV4 +0.96
23	27	65	12	AV3 +0.28
23	27	65	13	AV3 -0.28
23	27	65	13	AV2 -0.07
23	28	10	44	01C +0.00
23	28	45	17	AV2 -0.15
23	29	12	35	01C +0.24
23	30	35	26	AV4 +0.00
23	30	35	20	AV3 +0.00

SG	ROW	COLUMN	%TW	LOCATION
23	30	35	37	AV2 +0.00
23	30	35	36	AV2 +0.00
23	30	35	12	AV3 +0.00
23	30	35	17	AV4 +0.75
23	30	57	15	AV2 -0.17
23	30	57	15	AV1 +0.00
23	30	63	22	AV1 +1.00
23	30	63	43	AV2 -0.02
23	30	63	12	AV3 +0.25
23	30	63	7	AV4 -0.76
23	30	63	13	AV4 +0.51
23	31	14	20	01C +0.09
23	31	15	34	01C +0.00
23	31	63	12	AV2 +0.00
23	32	41	31	AV3 +0.00
23	32	41	15	AV2 +0.00
23	32	45	28	AV1 +0.00
23	32	45	37	AV2 +0.00
23	32	45	37	AV3 +0.00
23	32	45	9	AV4 -0.55
23	32	45	24	AV4 +0.48
23	32	45	26	AV4 +0.48

SG	ROW	COLUMN	%TW	LOCATION
23	32	45	10	AV4 -0.55
23	32	45	37	AV3 +0.00
23	32	45	39	AV2 +0.00
23	32	45	31	AV1 +0.00
23	32	59	25	AV3 +0.13
23	32	59	17	AV4 +0.34
23	32	61	14	AV1 +0.32
23	33	17	41	01C -0.02
23	33	26	20	AV3 +0.00
23	33	26	21	AV2 +0.00
23	33	26	12	AV1 +0.00
23	33	52	15	AV1 +0.00
23	34	17	21	01C +0.00
23	34	38	11	AV4 -0.11
23	34	38	14	AV3 +0.00
23	34	52	18	AV4 +0.00
23	34	54	12	AV4 +0.00
23	35	53	17	AV3 +0.00
23	35	53	20	AV4 +0.00
23	35	54	15	AV4 +0.00
23	36	44	19	AV4 +0.00

SG	ROW	COLUMN	%TW	LOCATION
23	36	45	13	AV3 -0.02
23	36	45	15	AV4 -1.18
23	36	45	10	AV4 -0.30
23	36	58	12	AV4 -0.15
23	36	63	21	AV2 -0.06
23	36	71	10	AV2 +0.00
23	37	19	31	02C -0.04
23	37	42	15	AV3 +0.00
23	37	42	18	AV4 +0.00
23	37	45	23	AV4 +0.00
23	37	45	14	AV3 +0.00
23	37	52	31	AV4 +0.00
23	38	47	14	AV4 +0.00
23	38	47	19	AV3 +0.00
23	38	48	27	AV3 +0.00
23	39	50	17	AV1 +0.00
23	39	50	23	AV2 +0.00
23	39	51	13	AV1 +0.44
23	39	52	25	AV1 +0.00
23	39	52	21	AV2 +0.00
23	39	58	24	AV2 +0.21
23	39	58	25	AV1 +0.00

SG	ROW	COLUMN	%TW	LOCATION
23	39	60	12	AV3 +0.00
23	39	60	17	AV4 -0.39
23	40	42	33	AV2 +0.00
23	40	50	28	AV2 +0.17
23	40	51	15	AV3 +0.00
23	40	51	28	AV2 +0.00
23	40	51	21	AV1 +0.00
23	40	54	34	AV4 +0.00
23	40	54	23	AV3 +0.00
23	40	54	32	AV2 +0.00
23	40	54	36	AV1 +0.00
23	40	56	14	AV1 -0.35
23	40	62	11	AV1 +0.04
23	40	66	21	AV2 +0.00
23	41	52	22	AV3 +0.00
23	41	52	17	AV2 +0.00
23	41	55	27	AV2 +0.11
23	41	55	33	AV1 -0.65
23	41	55	19	AV1 +0.59
23	41	60	14	AV2 +0.00
23	41	61	12	AV1 +0.00

SG	ROW	COLUMN	%TW	LOCATION
23	41	65	13	AV2 +0.00
23	42	52	15	AV1 +0.00
23	42	60	11	AV3 -0.04
23	42	65	24	AV2 +0.00
23	42	66	7	AV2 -0.04
23	42	66	10	AV3 -0.04
23	42	67	30	AV1 +0.00
23	42	67	25	AV2 +0.02
23	42	67	34	AV3 -0.13
23	43	63	19	AV2 +0.00
23	44	33	36	01C -0.07
23	44	36	27	01C -0.13
23	44	40	14	AV4 -0.08
23	45	58	19	AV4 +0.00
23	45	58	9	AV3 +0.00
24	2	94	26	01C +0.14
24	15	33	10	AV3 -0.21
24	17	32	20	AV3 -0.40
24	17	32	14	AV2 +0.09
24	17	65	23	AV2 +0.00
24	17	78	12	AV2 +0.37
24	18	55	16	AV4 +0.59
24	18	55	17	AV3 +0.15
24	18	55	19	AV2 +0.18

SG	ROW	COLUMN	%TW	LOCATION
24	18	55	13	AV1 -0.04
24	21	28	23	AV1 +0.07
24	21	28	24	AV2 +0.00
24	21	28	27	AV3 -0.30
24	21	28	19	AV4 +0.40
24	21	30	21	AV1 -0.14
24	21	30	27	AV2 +0.00
24	21	30	16	AV3 +0.63
24	21	30	18	AV3 -0.68
24	21	72	15	AV4 -0.74
24	22	72	27	AV2 +0.17
24	23	28	33	AV3 +0.16
24	23	33	18	AV1 -0.33
24	23	33	17	AV2 +0.21
24	23	33	26	AV3 +0.00
24	23	53	18	AV4 -0.15
24	23	56	17	AV4 +0.24
24	23	57	13	AV2 -0.43
24	23	57	30	AV3 -0.65
24	23	57	32	AV4 -0.17
24	23	57	11	AV1 +0.11
24	23	57	32	AV4 -0.20
24	23	57	30	AV3 -0.61
24	23	59	25	AV2 +0.28
24	23	59	17	AV3

SG	ROW	COLUMN	%TW	LOCATION
				+0.24
24	23	59	14	AV3 -0.35
24	23	59	21	AV1 +1.15
24	23	62	11	AV4 +0.00
24	23	62	27	AV3 +0.00
24	23	62	20	AV2 +0.00
24	23	62	8	AV1 +0.83
24	23	72	30	AV4 +0.00
24	23	72	12	AV2 +0.00
24	24	34	18	AV4 -0.76
24	24	34	21	AV3 -0.07
24	24	34	23	AV2 -0.09
24	25	87	14	01C +0.13
24	26	34	16	AV1 +0.39
24	26	34	16	AV2 -0.13
24	26	34	17	AV3 +0.00
24	26	34	19	AV4 +0.55
24	26	58	17	AV4 +1.28
24	26	58	26	AV3 +0.33
24	26	58	26	AV2 +0.50
24	26	58	18	AV1 -0.44
24	26	62	14	AV4 +0.85
24	26	67	11	AV2 -0.09
24	27	62	12	AV2 -0.63

SG	ROW	COLUMN	%TW	LOCATION
24	27	62	9	AV1 +0.00
24	27	68	18	AV4 -0.13
24	27	68	21	AV3 -0.52
24	27	83	13	01C -0.13
24	28	59	24	AV2 +0.28
24	28	59	13	AV1 +0.83
24	28	85	29	01C +0.24
24	29	82	28	01C -0.02
24	30	83	22	01C -0.09
24	31	31	36	AV3 -0.12
24	31	48	11	AV3 +0.02
24	31	77	40	01C -0.21
24	31	82	23	01C +0.11
24	32	64	14	AV2 -0.17
24	33	41	21	AV1 +0.07
24	33	47	35	AV4 +0.00
24	33	47	37	AV3 -0.64
24	33	47	21	AV2 +0.64
24	33	48	15	AV2 +0.00
24	33	48	13	AV1 +0.00
24	33	50	13	AV4 +0.00
24	33	50	8	AV3 +0.00
24	33	51	15	AV3 +0.00
24	33	51	33	AV2 +0.00

SG	ROW	COLUMN	%TW	LOCATION
24	33	51	6	AV1 -0.25
24	33	57	29	AV4 -0.22
24	33	57	21	AV3 +0.42
24	33	57	12	AV2 -0.24
24	33	57	16	AV1 -0.02
24	33	58	21	AV3 -0.43
24	33	65	9	AV3 -0.91
24	33	66	7	AV3 -0.04
24	33	66	24	AV2 -0.15
24	33	67	20	AV1 +0.04
24	33	78	13	02C +0.15
24	33	79	32	01C +0.06
24	34	63	18	AV3 -0.11
24	34	63	19	AV2 -0.13
24	34	63	10	AV4 +0.20
24	34	65	16	AV4 +0.30
24	34	65	21	AV3 -0.37
24	34	78	45	01C +0.09
24	35	78	45	01C +0.00
24	36	63	10	AV3 -0.07
24	36	76	7	01C -0.09
24	37	75	9	01C -0.06
24	38	39	20	AV3 -0.33
24	38	39	24	AV4 -0.28
24	38	52	29	AV4 +0.00
24	38	52	11	AV3 +0.00
24	38	67	23	AV3 -0.30
24	38	67	18	AV2 -0.07
24	38	68	24	AV4 +0.00

SG	ROW	COLUMN	%TW	LOCATION
24	38	68	25	AV3 +0.00
24	38	68	33	AV2 +0.00
24	39	42	20	AV4 +0.23
24	39	42	16	AV3 +0.19
24	39	49	31	AV4 +0.00
24	39	49	11	AV3 +0.00
24	39	65	13	AV2 -0.13
24	39	65	21	AV1 -0.24
24	39	71	7	01C -0.15
24	40	37	21	AV2 +0.00
24	40	37	29	AV1 +0.00
24	40	56	18	AV2 -0.18
24	40	56	24	AV1 +0.00
24	40	57	10	AV4 +0.00
24	41	35	24	AV1 -0.09
24	41	35	22	AV2 -0.05
24	41	53	24	AV4 +0.00
24	41	53	22	AV3 +0.20
24	41	53	21	AV3 -0.33
24	41	53	27	AV2 +0.00
24	41	53	17	AV1 +0.00
24	41	57	10	AV1 -0.02
24	41	59	22	01C -0.02
24	41	59	20	AV4

SG	ROW	COLUMN	%TW	LOCATION
				+0.22
24	42	33	32	02C -0.09
24	42	53	11	AV2 +0.09
24	42	55	17	AV2 +0.00
24	42	55	39	AV1 -0.02
24	42	55	38	AV1 -0.02
24	42	55	11	AV2 +0.00
24	42	59	24	02C +0.02
24	43	34	23	03C +0.00
24	43	34	27	02C +0.11
24	43	35	17	02C +0.16
24	43	35	14	04C +0.12
24	43	58	18	02C +0.28
24	43	59	19	02C +0.28
24	43	60	37	02C -0.06
24	43	62	4	01C +0.28
24	44	35	10	AV2 -0.02
24	44	35	23	AV1 -0.07
24	44	58	1	02C -0.19
24	44	59	33	02C +0.29
24	45	51	8	02C +0.15
24	45	54	18	AV1 +0.00
24	45	57	20	01C -0.11
24	45	59	8	02C -0.22

NDE Techniques Utilized for 2R12

Salem Technique		Industry Qualification	Damage Mechanism	Demonstrated Applicability	Extended Applicability	Depth Sizing Technique Applied	Site-Specific Review Deemed Acceptable	
							Detection	Sizing
1	Bobbin	96001.1 Revision 7	Thinning	TSP	Above Tubesheet	Differential Mix Phase Analysis	Yes	For Service
2	Bobbin	96004.1 Revision 7	Wear	TSP and AVB	PLP Wear (Sizing is performed with techniques 11 and 12)	Differential Mix Phase Analysis	Yes	For Service
3	Bobbin	96005.2 Revision 6	Pitting	Presence of Copper	None	Differential Mix Phase Analysis	Yes	CM/OA Purposes
4	Bobbin	96007.1 Revision 8	IGA/ODSCC	TSP	Freespan, Sludge Pile	Differential Mix Phase Analysis	Yes	CM/OA Purposes
5	+Point (MR Probe)	96511.1/. 2 Revision 10	PWSCC	U-bend	ODSCC (Techniques 9 and 10)	Single Frequency Phase Analysis	Yes	CM/OA Purposes
6	+Point (HF Probe)	99997.1 Revision 4	PWSCC	U-bend	ODSCC (Techniques 9 and 10)	Single Frequency Phase Analysis	Yes	CM/OA Purposes
7	+Point	20510.1 Revision 2	Circ PWSCC	Expansion Transition	Dent, Tubesheet	Single Frequency Phase Analysis	Yes	CM/OA Purposes
7	+Point	96701.1 Revision 7	Circ PWSCC	Expansion Transition	Dent, Tubesheet	Single Frequency Amplitude Analysis	Yes	CM/OA Purposes
8	+Point	20511.1 Revision 2	Axial PWSCC	Expansion Transition	Tubesheet	Single Frequency Phase Analysis	Yes	CM/OA Purposes
8	+Point	96703.1 Revision 10	Axial PWSCC	Dent	Tubesheet	Single Frequency Phase Analysis	Yes	CM/OA Purposes
9	+Point	21409.1 Revision 0	Axial ODSCC	TSP, Freespan,	Tubesheet, Expansion	Single Frequency	Yes	CM/OA Purposes

Salem Technique		Industry Qualification	Damage Mechanism	Demonstrated Applicability	Extended Applicability	Depth Sizing Technique Applied	Site-Specific Review Deemed Acceptable	
							Detection	Sizing
				Sludge Pile, Tubesheet Crevice	Transition, Dent, U-bend	Phase Analysis		
10	+Point	21410.1 Revision 0	Circ ODSCC	Expansion Transition	TSP, Freespan, Sludge Pile, Tubesheet, Dent, U-bend	Single Frequency Phase Analysis	Yes	CM/OA Purposes
11	+Point	96910.1 Revision 5	Wear	TSP, AVB	PLP Wear	Differential Mix Amplitude Analysis	N/A	For Service
12	Pancake	96911.1 Revision 5	Wear	TSP, AVB	PLP Wear	Absolute Mix Amplitude Analysis	N/A	For Service