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1CAN101306

October 23, 2013

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

Subject: Steam Generator Tube Inspection Report – 1R24
Arkansas Nuclear One - Unit 1
Docket No. 50-313
License No. DPR-51

Dear Sir or Madam:

Entergy Operations, Inc. (Entergy) inspected the Arkansas Nuclear One, Unit 1 (ANO-1) steam generator (SG) tubes during the Spring 2013 refueling outage (1R24) in accordance with ANO-1 Technical Specification (TS) 5.5.9, "Steam Generator (SG) Program." ANO-1 TS 5.6.7 requires that the results of inspections performed during the report period be submitted to the NRC within 180 days after the initial entry into Mode 4. The initial entry into Mode 4 post-1R24 was made on August 2, 2013. Enclosed is the subject inspection report.

The 1R24 inspection performed on both SGs involved an initial full-length bobbin coil examination of specific locations near tie rods. The X-probe used consists of an array of coils for diagnostic testing.

This submittal completes the reporting requirements of the ANO-1 TSs for this inspection.

This submittal contains no regulatory commitments. Should you have any questions, please contact me.

Sincerely,

Original signed by Stephenie L. Pyle

SLP/rwc

Enclosure: Results of ANO-1 Steam Generator (SG) Tube Inspections During 1R24

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ENCLOSURE TO

1CAN101306

Results of ANO-1 Steam Generator (SG) Tube Inspections During 1R24

RESULTS OF ANO-1 STEAM GENERATOR (SG) TUBE INSPECTIONS DURING 1R24

1 INTRODUCTION

Arkansas Nuclear One, Unit 1 (ANO-1) Technical Specification (TS) 5.6.7, “Steam Generator Tube Inspection Reports,” requires Entergy Operations, Inc. (Entergy) to submit a 180-day report to the NRC that outlines the details of the SG tubing inspections that were performed during the reporting period. The report shall include:

1. The scope of inspections performed on each SG.
2. Active degradation mechanisms found.
3. Nondestructive examination (NDE) techniques utilized for each degradation mechanism.
4. Location, orientation (if linear), and measured sizes (if available) of service-induced indications.
5. Number of tubes plugged during the inspection outage for each active degradation mechanism.
6. Total number and percentage of tubes plugged to date.
7. The results of condition monitoring, including the results of tube pulls and in-situ testing.

The operating period for this report includes one refueling inspection outage (1R24), in March-May 2013. This inspection was not an American Society of Mechanical Engineers (ASME) Code In-Service Inspection (ISI). This report details the result of that inspection. The inspection was to determine the extent of bowing of the tie rods and not an ASME Code type inspection. Tube Support Plate (TSP) wear was justified for two cycles. The extent of bowing was consistent with predictions made in the previous operational assessment (OA). Also the tubes that contained wear were consistent with the growth rates and estimates predicted in the previous OA. The degradation identified met all performance criteria.

1R24 examinations were established to validate the growth rate for the tube-to-tube wear (TTW). The TTW growth rates were consistent with the previous Condition Monitoring and Operational Assessment (CMOA) (1R23).

2 DESIGN

The replacement SGs for ANO-1 are Enhanced Once-Through Steam Generators (EOTSGs) manufactured by AREVA. The EOTSG is a straight shell-and-tube type heat exchanger installed in a vertical position with bottom supports and emergency supports as required to accommodate normal and accident loads. The tubing consists of Inconel 690 thermally-treated tubing that is 5/8" in diameter with a 0.037" wall thickness. The tubes are expanded full depth hydraulically in the tubesheet. There are 15 TSPs that are constructed of stainless steel (SA 240 Type 410) and are a broached trefoil-hole design.

3 Report Requirements

3.1 The scope of inspections performed on each SG.

Table 3.1.1
1R24 Inspection Scope

Examination Type	Inspections Conducted	% Scope	Extent Tested
SG A			
X-Probe (bobbin)	454		UTE to 09S
X-Probe/Plus Point	502		UTE to LTE
SG B			
X-Probe (bobbin)	446		UTE to 09S
X-Probe/Plus Point	467		UTE to LTE
Plus Point	23		Varies

Note: UTE Upper Tube End
LTE Lower Tube End

X-Probe full length scope includes:

- Tie Rod bounding
- Previous TTW
- Previous proximity tubes
- Pre-frequency test [SG B only]
- Proximity bounding
- Post frequency test [SG B only]

3.2 Active degradation mechanisms found.

1R24 was the fifth inspection following replacement of the SGs. There are three degradation mechanisms identified (mechanical wear at the TSP, TTW and tie rod/tube bowing). These are listed in Table 3.2.1. (Note: This was not an ASME Code inspection so only a portion of the TSP wear is reported.)

Table 3.2.1
Indication List for 1R24

SG	TSP Wear	TTW	Proximity (tie rod bowing)
A	161	55	14
B	356	93	8

3.3 NDE techniques utilized for each degradation mechanism.

Mechanism Location	Probe	Detection ETSS	Sizing ETSS	NDE Technique Uncertainty (%TW)
TTW	Bobbin	Note	N/A	1.69
TSP Wear	Bobbin	96043.1 Rev.1	96043.1 Rev. 1	1.85
TSP Wear	Bobbin	96004.1 Rev.13	96004.1 Rev.13	4.51
TTW	+Point™	Note	Note	1.51
TSP Wear	+Point™	96910.1 Rev. 10	96910.1 Rev. 10	6.68
TTW	X-Probe	Note	Note	1.38
TSP Wear	X-Probe	11956.3 Rev. 0	11956.3	2.42
TSP Wear	X-Probe	11956.4 Rev. 0	11956.4	4.60

TW Throughwall
ETSS Examination Technical Specification Sheet

Notes: Bobbin, +Point™ and X-Probe are being extended for detection and sizing of TTW in the 1R24 ETSS validation document.

Bobbin: Detection only, sizing for information
+Point™: Detection and sizing
X-Probe: Detection and sizing

3.4 Location, orientation (if linear), and measured sizes (if available) of service induced indications.

The only service-induced mechanisms were mechanical wear at the TSPs and TTW. There were no wear indications associated with proximity tubes (tubes in close contact or contacting adjacent tubes due to tie rod bowing). Due to the large number of indications, these are listed in Section 3.7 below.

Based on the limited examination scope of 1R24, the TSP wear tables were not included. The TTW scope was a 100% examination of previous TTW based on the results from 1R23.

3.5 Number of tubes plugged during the inspection outage for each active degradation mechanism.

There were 16 tubes plugged in 1R24 with all of these tubes being stabilized. Listed below in Tables 3.5.1 and 3.5.2 is a summary of the plugged tubes for SG A and SG B, respectively:

Table 3.5.1
SG A Repaired Tubes in 1R24

Row	Tube	Repair Type	Reason
25	11	Plug and Stabilize	Tie Rod Bowing 1st Span
25	12	Plug and Stabilize	Tie Rod Bowing 1st Span
47	22	Plug and Stabilize	Tie Rod Bowing 1st Span
48	23	Plug and Stabilize	Tie Rod Bowing 1st Span
86	21	Plug and Stabilize	Tie Rod Bowing 1st Span
109	8	Plug and Stabilize	Tie Rod Bowing 1st Span
110	8	Plug and Stabilize	Tie Rod Bowing 1st Span

Table 3.5.2
SG B Repaired Tubes in 1R24

Row	Tube	Repair Type	Reason
63	123	Plug and Stabilize	Tie Rod Bowing 1st Span
64	122	Plug and Stabilize	Tie Rod Bowing 1st Span
87	123	Plug and Stabilize	Tie Rod Bowing 1st Span
88	122	Plug and Stabilize	Tie Rod Bowing 1st Span
109	110	Plug and Stabilize	Tie Rod Bowing 1st Span
110	107	Plug and Stabilize	Tie Rod Bowing 1st Span
128	82	Plug and Stabilize	Tie Rod Bowing 1st Span
129	85	Plug and Stabilize	Tie Rod Bowing 1st Span
31	1	Plug and Stabilize	Preventive, Tube Wear Depth 11S-85

3.6 Total number and percentage of tubes plugged to date.

There were no sleeves installed in either SG. The aggregate plugging information is listed in Table 3.6.1 below.

Table 3.6.1
Cumulative Plugs in Service

SG A

Year	Outage	Installed	Cumulative	% Plugged
2004	Fabrication	2 (welded)	2	0.013
2005	Baseline (1R19)	0	2	0.013
2007	First ISI 1R20	0	2	0.013
2008	1R21	8	10	0.064
2010	1R22	0	10	0.064
2011	1R23	7	17	0.109
2013	1R24	7	24	0.154

SG B

Year	Outage	Installed	Cumulative	% Plugged
2005	Fabrication	0	0	0
2005	Baseline (1R19)	0	0	0
2007	First ISI 1R20	1	1	0.006
2008	1R21	5	6	0.038
2010	1R22	0	6	0.038
2011	1R23	9	15	0.096
2013	1R24	9	24	0.154

Note – 15597 total tubes, so 0.1% = ~15 tubes

3.7 The results of condition monitoring, including the results of tube pulls and in-situ testing.

All condition monitoring requirements for the tubing performance criteria were met. There were no indications that exceeded performance criteria or in-situ screening limits. There was no tube pulls required.

The CMOA for 1R23 (previous outage) evaluated an OA of three operating cycles totaling 4.13 Effective Full Power Years (EFPY) to 1R26 (End of Cycle 26) which supported skip inspections for both 1R24 and 1R25 refueling outages. Only 1.32 EFPY has passed as of the 1R24 inspection; therefore the prior CMOA is still applicable. The following is a summary of the three damage mechanism results identified in 1R24:

Tie Rod Bowing

Based on 1R24 inspection results, the following observations are made concerning tie rod bowing in SG A:

- All tie rod bowing in SG A is less than the historical projection curve used in the structural integrity justification of SGs.
- Tie rod bowing increased between the 1R23 and 1R24 inspections and the SGs experienced only one cool-down loading between inspections.
- The magnitude of bow in the first span tie rods has increased slightly from 1R23. The general trend is the net change between inspections appears to be less.
- Tie rod bowing in both the outer and second ring of first-span tie rods are in the plastic range which means there will be some amount of residual bow during normal power operation.
- The magnitude of bowing in spans above the first-span remains in the elastic range (e.g., no plastic set, except possibly a single tie rod that may have a small plastic set), and the tie rods should straighten out at normal operating temperatures.
- Bowing in first span now includes a second third-ring tie rod.
- Based on the tie rod bow projections for the requested four allowable future heatup and cool-down cycles, it is predicted that four peripheral tie rods in the first span will contact the adjacent tube(s) during normal operation. Therefore, the affected tubes were removed from service (plugged and stabilized).

Based on 1R24 inspection results, the following observations are made concerning tie rod bowing in SG B:

- All tie rod bowing in SG B is less than the historical projection curve used in the structural integrity justification of SGs.
- Tie rod bowing increased between the 1R23 and 1R24 inspections and the SGs experienced only one cool-down loading between inspections.
- The magnitude of bow in the first-span tie rods has increased and is now in the plastic range which means there will be some amount of residual bow during normal power operation.
- The magnitude of bowing in spans above the first-span remains in the elastic range (e.g., no plastic set), and the tie rods should straighten out at normal operating temperatures.
- Bowing in first span now includes two additional second-ring tie rods and a total of nine additional tubes with proximity signals.

- The increase in bowing over three cool-down cycles (5, 6 and 7) of the first-span periphery tie rods is consistent with the "historical projections' developed from the observed bowing in SG A.

- Bowing in the 15th span is essentially unchanged between 1R23 and 1R24 (cool-down cycles 6 and 7).

- There is now bowing in one tie rod in the 13th span.

- The direction of tie rod bowing in the first span is not consistent with that observed in SG A. Bowing in SG A is all radially inward while some of the observed SG B bowing is circumferential. This was addressed in the site corrective action program CR-ANO-1-2011-1925.

- A review of limited inspection results from Framatome Data Management System shows an apparent increase in low-level dents for 1R24. This is based on a review using 0.2 volts and higher.

- Based on the tie rod bow projections for the requested four allowable future heatup and cool-down cycles, it is predicted that the peripheral tie rods in the first-span will contact the adjacent tube(s) during normal operation. Therefore, the affected tubes were removed from service (plugged and stabilized). The preventative plugging of the peripheral first-span tie rods is consistent with that performed in SG A.

Listed below in Figures 3.7.1 and 3.7.2 is the lateral bowing extents by location for the last five outages in the first span (bounding).

Figure 3.7.1
SG A Bowing History (in lateral inches)

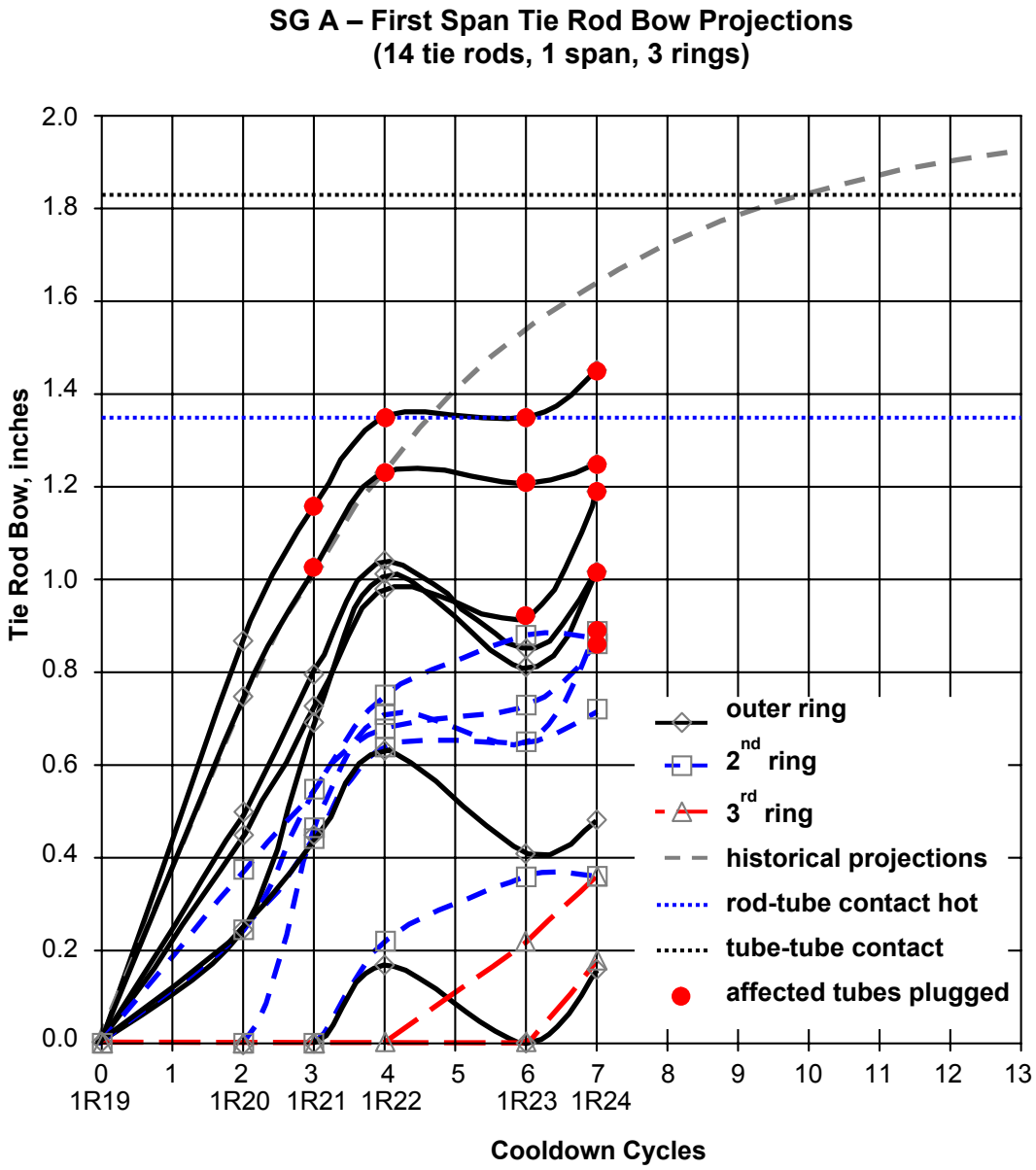
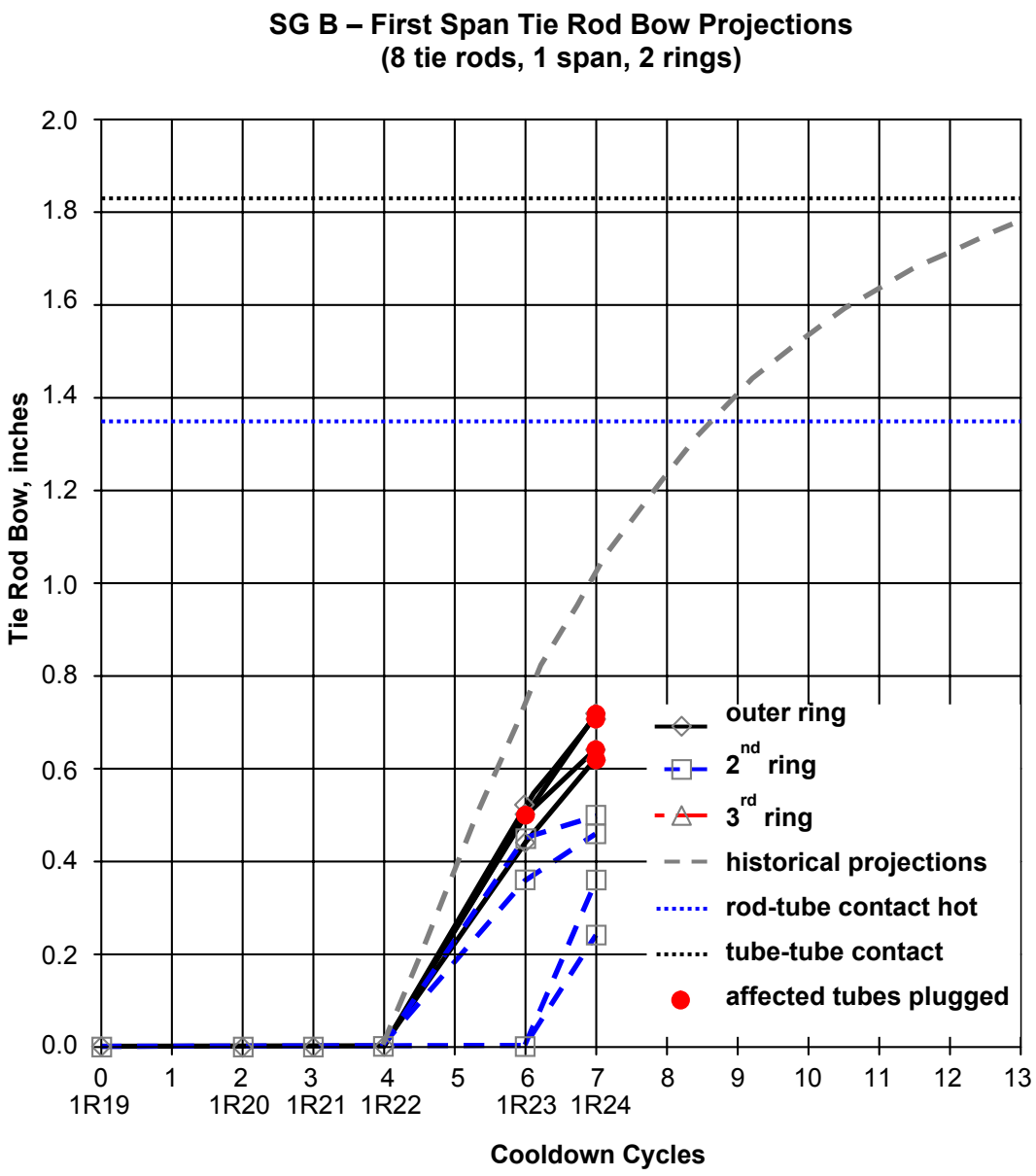


Figure 3.7.2
SG B Bowing History (in lateral inches)



TSP Wear

As stated earlier, the scope of the 1R24 SG inspection was to monitor and assess tie rod bowing with additional inspection scope for low-level denting on the top TSP and TTW. All TSP wear identified in these inspections is summarized in Tables 3.7.1 and 3.7.2.

There were 14 new indications in SG A and 14 new indications in SB B in 1R24; however, review of 1R23 inspection data confirmed wear for 13 of these locations in SG A as well as 13 locations in SG B. The larger of the two new TSP wear indications (SG B R149-T1, 12S-0.64") has a depth of 24% TW. The probabilistic full-bundle model in the 1R23 OA used a distribution of new TSP wear up to 35% TW; therefore, the new indication is bounded by the 1R23 OA. The new indication in SG A is 14% TW, which is bounded by the flaw in SG B.

The probabilistic full-bundle model in the 1R23 OA assumed the maximum 1R23 growth rate of 9.37% TW/EFPY. Of the 160 (SG A) and 355 (SG B) repeat indications in 1R24, only one wear indication exceeded this growth rate (SG B R31-T1 11S -0.78) with 12.88% TW/EFPY growing from 13% TW in 1R23 to 30% TW in 1R24. This is a peripheral tube which is experiencing the highest growth rates at ANO-1. The growth is only a 3.5% TW/EFPY increase over the 1R23 maximum. Additionally, under the constant volume assumption over a three-cycle run, approximately half of the growth should occur in the first cycle and would be expected to decrease over the next two cycles and is therefore accounted for in the uncertainty of the 1R23 CMOA. However, a decision was made to conservatively plug R31-T1 in SG B based on the growth.

Table 3.7.1
Summary of 1R24 TSP Wear Depths

	SG A	SG B
Total TSP Wear Indications	161	356
New TSP Wear Indications (Note)	14 (1)	14 (1)
Maximum Depth, Repeat (%TW)	26	35
Maximum Depth, New (%TW)	14	24

Note: 1R23 inspection results for both SGs were reviewed for all new TSP wear indications. The numbers in parentheses are the indications that are confirmed as new in 1R24 (i.e., There is no data present in 1R23.).

Table 3.7.2
Summary of 1R24 TSP Wear Growth Rates

	SG A 1R24	SG A 1R23	SG B 1R24	SG B 1R23
Maximum (% TW/EFPY)	6.82	7.12	12.88	9.37
95th (% TW/EFPY)	2.05	1.87	2.27	2.62

TTW

After the ANO 1R23 inspection was completed, inspection in the first in-service inspection of the Three Mile Island, Unit 1 (TMI-1) EOTSGs detected numerous freespan (not coincident with a tube support or tubesheet) Bobbin coil Absolute Drift Indications. Scrutiny of these calls concluded that these were actually indications of TTW in the mid-span regions of the SG. This resulted in a post-1R23 re-analysis of ANO-1 inspection data, beginning with the first in-service inspection at 1R20 that confirmed a total of 126 indications of TTW (48 in SG A, and 78 in SG B). A % TW depth was assigned based on a bobbin voltage correlation to the TMI-1 data.

Prior to 1R24, qualification for detection and sizing of TTW was performed for Bobbin, X-probe (Array) and +Point™ coil which was implemented at the 1R24 inspection. As Bobbin coil is limited in that it cannot distinguish multiple wear indications at the same location, X-probe or +Point™ is used for the official depth measurements; however, as the historical data for TTW thru 1R23 has been sized only with Bobbin coil, the 1R24 inspection data is used to bridge the gap between techniques. This is done by listing the historical Bobbin coil depths, including 1R24 Bobbin, alongside the 1R24 X-probe depths. Tables 3.7.5 and 3.7.6 tabulate the TTW indications for both SGs. As a check, the 1R23 Bobbin coil results were resized using the Bobbin coil calibration curve and the average difference was < 1% TW; therefore, the 1R23 Bobbin coil results were left unchanged.

Table 3.7.3
Summary of 1R24 TTW Depths

	SG A	SB B
Total Indications / Tubes (Note 1)	55/49	93 / 80
New Indications / Tubes (Note 2)	3/2 (0 / 0)	7 / 6 (7 / 6)
Maximum Depth, New (%TW)	5	7
Maximum Depth, Repeat (%TW)	14	22

Notes:

1. Number of indications and reported depths are from the X-probe (Array) results.

2. 1R23 inspection results for both SGs were reviewed for all new TTW indications. The numbers in parentheses are the indications and tubes that are confirmed as new in 1R24 (i.e. There is no data present in 1R23.).

Table 3.7.4
Summary of 1R24 TTW Growth Rates

	SG A Bobbin (Note 1)	SG A Array-Bobbin (Note 2)	SG B Bobbin (Note 1)	SG B Array-Bobbin (Note 2)
Average (%TW/EFPY)	1.31	0.26	1.41	0.14
Maximum (%TW/EFPY)	6.44	3.79	9.34	9.01
95th (%TW/EFPY)	1.77	1.53	6.44	4.89

Notes:

1. Due to the difference in techniques, these growth rates are calculated using just the Bobbin depths.

2. Due to the difference in techniques, these growth rates are calculated using the 1R24 Array depths and 1R23 Bobbin depths.

Table 3.7.5
SG A TTW Historical Summary

				Bobbin (%TW)				X-Probe (%TW)	Notes
Row	**Tube**	**Loc**	**In**	**1R20**	**1R21**	**1R23**	**1R24**	**1R24**	
42	22	8	18.50	6	7	7	9	7	
43	22	8	18.94	8	9	9	10	N/A	2 wear scars by Array
46	89	8	18.27	0	0	7	9	6	
47	21	8	17.69	N/A	N/A	N/A	8	5	New in 1R24
50	23	8	17.18	N/A	N/A	N/A	9	N/A	New in 1R24 2 wear scars by Array
61	30	8	18.84	0	0	12	13	13	
62	29	8	18.80	0	0	13	14	14	
71	109	8	18.53	0	0	6	8	6	
71	110	8	18.43	0	0	11	12	9	
72	107	8	18.29	0	0	8	10	9	
72	108	8	18.26	0	0	9	10	9	
72	110	8	18.48	0	0	10	11	9	
74	22	8	18.16	6	7	7	9	5	
74	109	8	17.93	0	0	13	14	13	
74	110	8	18.06	0	0	16	16	13	
75	108	8	17.73	0	0	9	10	8	
75	109	8	17.89	0	0	10	11	N/A	2 wear scars by Array
77	22	8	17.34	5	6	6	8	7	
77	25	8	18.81	0	0	7	9	N/A	2 wear scars by Array
77	108	8	16.88	0	0	8	9	9	
77	109	8	17.12	0	0	11	12	N/A	2 wear scars by Array
78	21	8	17.19	5	7	7	8	7	
81	21	8	17.89	9	9	9	10	10	
81	110	8	17.99	0	0	10	11	9	
81	111	8	18.33	0	0	15	15	N/A	2 wear scars by Array
82	20	8	17.34	6	7	7	9	9	
82	31	8	18.23	0	0	6	8	8	
82	110	8	18.40	0	0	9	10	9	
82	111	7	20.95	6	7	7	8	9	

				Bobbin (%TW)				X-Probe (%TW)	Notes
Row	**Tube**	**Loc**	**In**	**1R20**	**1R21**	**1R23**	**1R24**	**1R24**	
83	31	8	17.81	0	0	7	9	9	
90	106	7	18.63	12	12	11	12	11	
91	108	7	18.79	11	12	12	12	12	
99	101	8	17.88	0	2	7	9	9	
100	100	8	17.80	0	0	7	9	8	
107	87	8	18.14	0	0	6	8	7	
107	88	8	18.36	0	3	7	8	7	
117	35	8	18.18	0	3	9	10	9	
118	35	8	18.37	0	3	9	10	9	
118	87	8	18.50	8	7	8	9	6	
118	90	7	20.02	7	6	6	8	6	
119	44	8	18.11	0	4	9	10	7	
119	70	8	18.28	0	0	9	10	9	
119	71	8	18.25	0	3	8	10	9	
119	84	7	19.49	6	7	6	8	N/A	No Degradation Found with Array
120	73	8	17.21	0	0	8	9	9	
121	73	8	17.65	0	0	9	11	10	
124	62	6	20.10	6	7	7	9	6	
124	63	6	20.02	7	7	7	9	6	
126	52	8	17.54	0	3	8	10	9	
127	51	8	17.07	0	3	8	10	10	

Table 3.7.6
SG B TTW Historical Summary

				Bobbin (%TW)				X-Probe (%TW)	Notes
Row	**Tube**	**Loc**	**In**	**1R20**	**1R21**	**1R23**	**1R24**	**1R24**	
20	51	8	18.34	10	9	10	11	10	
20	52	8	18.41	10	9	10	12	8	
21	47	8	18.50	7	8	9	11	6	
21	50	7	19.51	13	13	12	13	14	
21	50	8	18.70	7	8	8	10	7	
21	51	7	19.41	14	12	13	15	13	
22	49	8	18.34	8	9	10	11	6	
22	51	8	18.88	8	9	9	11	8	
22	62	8	18.86	8	9	9	11	9	
22	63	8	18.59	8	10	10	11	N/A	2 wear scars by Array
23	59	8	17.74	7	6	6	8	7	
25	71	8	17.75	11	10	11	12	N/A	2 wear scars by Array
25	72	8	17.68	13	13	14	14	N/A	2 wear scars by Array
26	39	8	18.14	0	11	10	11	8	
26	72	8	18.02	7	10	8	10	6	
26	73	8	16.94				9	7	Newly reported in 1R24
27	69	8	18.28	7	8	8	10	7	
28	67	7	20.13	9	10	8	11	10	
28	68	7	19.75	10	10	9	11	9	
28	68	8	18.58	8	7	8	9	9	
28	69	8	18.01	8	8	9	10	8	
28	76	8	17.13	14	13	13	14	13	
28	77	8	17.54	14	13	15	14	N/A	2 wear scars by Array
29	68	8	17.09				7	6	Newly reported in 1R24
29	77	8	18.67	9	9	10	11	8	
31	34	8	18.35	12	13	13	14	11	
31	35	8	18.24	9	10	10	12	10	
31	38	8	17.98	7	8	6	9	6	

				Bobbin (%TW)				X-Probe (%TW)	Notes
Row	**Tube**	**Loc**	**In**	**1R20**	**1R21**	**1R23**	**1R24**	**1R24**	
31	61	7	18.69				7	7	Newly reported in 1R24
31	62	7	19.37	5	5	6	7	8	
31	62	8	19.03	5	8	10	11	10	
31	63	8	19.28	0	0	10	11	10	
31	74	8	18.55	0	0	7	9	8	
32	74	8	18.60	0	0	7	9	7	
34	27	8	19.37	9	10	9	10	7	
34	55	8	18.81	0	0	7	19	19	
34	56	8	18.92	0	0	9	18	17	
34	89	8	18.41	6	6	6	8	6	
34	90	8	18.04	7	8	8	10	N/A	2 wear scars by Array
35	28	8	19.29	7	8	7	9	8	
38	86	8	19.89	0	0	9	11	10	
38	87	8	19.73	0	0	9	10	10	
39	37	8	17.95	7	7	7	9	8	
39	91	8	19.64	0	0	6	8	7	
39	92	8	19.77	0	0	8	9	8	
40	36	8	18.17	8	8	8	10	9	
44	25	8	18.86	0	6	7	8	5	
46	21	8	18.22	8	8	8	10	9	
46	100	8	18.40	4	4	15	14	14	
47	21	8	17.79	7	7	7	9	6	
47	99	8	18.54	3	3	13	14	12	
58	26	8	18.86	7	7	7	8	7	
60	21	8	18.32	6	7	6	8	7	
66	21	8	17.46	N/A	N/A	N/A	9	N/A	Newly reported in 1R24, 2 wear scars by Array
67	22	8	18.81	N/A	N/A	N/A	7	5	Newly reported in 1R24
67	108	8	18.51	5	9	8	10	8	

				Bobbin (%TW)				X-Probe (%TW)	Notes
Row	**Tube**	**Loc**	**In**	**1R20**	**1R21**	**1R23**	**1R24**	**1R24**	
68	110	8	18.33	3	9	10	10	8	
75	114	8	18.66	6	7	8	8	7	
78	20	8	18.28	7	7	7	9	N/A	2 wear scars by Array
89	25	8	17.67	9	9	9	11	9	
90	25	8	17.84	9	8	10	11	10	
102	102	8	17.20	0	5	6	7	7	
103	21	8	17.69	7	5	7	9	7	
103	22	8	17.40	7	7	7	9	7	
105	23	8	18.42	5	5	7	8	8	
106	24	8	18.75	5	6	7	9	7	
114	82	8	18.86	0	0	10	11	10	
114	83	8	18.83	0	0	11	12	10	
115	30	8	17.82	5	11	11	12	11	
115	31	8	18.14	6	11	13	13	10	
116	29	7	19.76	9	27	26	22	22	
117	29	7	19.82	10	27	26	23	21	
118	28	8	18.07	6	6	6	8	5	
118	88	8	18.34	5	7	7	9	5	
119	25	7	20.08	16	14	16	15	13	
119	28	7	19.83	8	7	7	8	6	
119	29	7	19.70	9	9	9	11	N/A	2 wear scars by Array
120	25	7	20.22	15	9	14	14	13	
123	32	8	18.18	5	7	7	9	5	
128	44	7	19.01				9	6	Newly reported in 1R24
128	45	7	20.17	8	8	7	10	7	
128	45	8	17.90	4	5	5	5	4	
128	60	8	18.64	5	5	6	7	6	
129	30	8	17.55	8	8	8	10	7	