



20004-015 (09/30/2008)

AREVA NP Inc.,
an AREVA and Siemens company

Engineering Information Record

Document No: 51 - 9111710 - 000

Calvert Cliffs Unit 2, Spring 2009 – 180 Day Steam Generator Report



AREVA

AREVA NP Inc.,
an AREVA and Siemens company

Document No.: 51-9111710-000

Calvert Cliffs Unit 2, Spring 2009 – 180 Day Steam Generator Report

Table of Contents

	Page
SIGNATURE BLOCK.....	2
RECORD OF REVISION	3
LIST OF TABLES	5
LIST OF FIGURES	6
CALVERT CLIFFS NUCLEAR POWER PLANT UNIT 2 – SPRING 2009	8



AREVA

AREVA NP Inc.,
an AREVA and Siemens company

Document No.: 51-9111710-000

Calvert Cliffs Unit 2, Spring 2009 – 180 Day Steam Generator Report

List of Tables

	Page
TABLE 1 NDE TECHNIQUES UTILIZED FOR IDENTIFIED DEGRADATION	14
TABLE 2 FOREIGN OBJECT WEAR	18
TABLE 3 LIST OF TUBES PLUGGED	19
TABLE 4 TUBE PLUGGING SUMMARY	21



List of Figures

	Page
FIGURE 1 SG 21 SUSCEPTIBLE FAN BAR WEAR ZONE AND BOBBIN INSPECTION SCOPE	10
FIGURE 2 SG 22 SUSCEPTIBLE FAN BAR WEAR ZONE AND BOBBIN INSPECTION SCOPE	11
FIGURE 3 SG 21 ROTATING PROBE INSPECTION SCOPE	12
FIGURE 4 SG 22 ROTATING PROBE INSPECTION SCOPE	13
FIGURE 5 FAN BAR THROUGHWALL DEPTH DISTRIBUTION	16
FIGURE 6 SG21 FAN BAR WEAR CONDITION MONITORING	22
FIGURE 7 SG 22 FAN BAR WEAR CONDITION MONITORING	23
FIGURE 8 SG 21 FOREIGN OBJECT CONDITION MONITORING WITH PART NOT PRESENT	24
FIGURE 9 SG 21 FOREIGN OBJECT CONDITION MONITORING WITH PART PRESENT	25
FIGURE 10 SG 22 FOREIGN OBJECT CONDITION MONITORING WITH PART NOT PRESENT	26



AREVA

AREVA NP Inc.,
an AREVA and Siemens company

Document No.: 51-9111710-000

Calvert Cliffs Unit 2, Spring 2009 – 180 Day Steam Generator Report

CALVERT CLIFFS NUCLEAR POWER PLANT UNIT 2
180-DAY REPORT ON THE SPRING 2009
STEAM GENERATOR TUBE INSPECTION

Calvert Cliffs Unit 2, Spring 2009 – 180 Day Steam Generator Report

CALVERT CLIFFS NUCLEAR POWER PLANT UNIT 2 – SPRING 2009

During the Calvert Cliffs Nuclear Power Plant (CCNPP) Unit 2, Spring 2009 refueling outage, both of the steam generators (i.e., SG21 and SG22) were inspected in accordance with CCNPP Technical Specification (TS) 5.5.9. The Spring 2009 outage (designated as 2R18) was the second in-service inspection of the steam generators and occurred after 5.67 effective full power years (EFPY). The first in-service inspection was performed during the Spring of 2005 after the first cycle of operation at 1.82 EFPY.

The discussion below summarizes the results of the inspection consistent with the 180-day reporting requirements of Technical Specification (TS) 5.6.9. **Bold** wording restates the TS requirement, followed immediately by the required CCNPP information.

A report shall be submitted within 180 days after the initial entry into Mode 4 following completion of an inspection performed in accordance with the Specification 5.5.9, Steam Generator (SG) Program.

Initial entry into Mode 4 occurred on March 13, 2009; therefore, this report is required to be submitted by September 9, 2009.

The report shall include:

a. The scope of inspections performed on each SG

The following primary side inspections were performed in SG21 during the Spring 2009 refueling outage:

- Full length eddy current bobbin probe examination of 5262 tubes (~62%) including:
 - o All tubes within the pre-defined fan bar wear susceptible region (1948 tubes; see Figure 1)
 - o All bundle periphery and no-tube lane locations approximately 5 to 10 tubes deep including:
 - Initial scope of 1138 tubes, and
 - Expanded scope of an additional 1026 tubes
 - o Bounding of previously plugged tubes (5 tubes)
 - o Random sample of 1145 tubes (~21.3%) of the remaining uninspected population

- Rotating eddy current probe examinations of 1825 locations including (see Figure 3):
 - o All fan bar wear indications sized 15%TW or greater (19 locations in 18 tubes)
 - o All bobbin I-Codes (22 locations in 22 tubes)
 - Bobbin I-Codes reported included NQI's (Non-Quantifiable Indications) and DTI's (Distorted Tubesheet Indications). These are bobbin signals indicative of possible degradation that are not attributable to fan bar wear.
 - o One bobbin PLP (Potential Loose Part) location
 - o 288 locations to bound locations of foreign objects and/or foreign object wear, including foreign objects discovered during the visual secondary side exam
 - o 732 peripheral tubes at the top of the hot leg tubesheet
 - o 763 peripheral tubes at the top of the cold leg tubesheet.

- Visual inspection of all previously installed plugs

Calvert Cliffs Unit 2, Spring 2009 – 180 Day Steam Generator Report

The following primary side inspections were performed in SG22 during the Spring 2009 refueling outage:

- Full length eddy current bobbin probe examination of 4236 tubes (50%) including:
 - o All tubes within the pre-defined fan bar wear susceptible region (1987 tubes; see Figure 2)
 - o All bundle periphery and no-tube lane locations 2 to 4 tubes deep (1115 tubes)
 - o Bounding of previously plugged tubes (12 tubes)
 - o Random sample of 1122 tubes (20.9%) of the remaining uninspected population

- Rotating eddy current probe examinations of 385 locations including (see Figure 4):
 - o All fan bar wear indications sized 15%TW or greater (36 locations in 33 tubes)
 - o All bobbin I-Codes (3 locations in 3 tubes)
 - Bobbin I-Codes reported included NQI's (Non-Quantifiable Indications) and DTI's (Distorted Tubesheet Indications). These are bobbin signals indicative of possible degradation that are not attributable to fan bar wear.
 - o One bobbin PLP (Potential Loose Part) location
 - o 37 tubes at the top of the cold leg tubesheet to bound tubes that were previously plugged due to a foreign object
 - o 308 locations to bound locations of foreign objects and/or foreign object wear, including foreign objects discovered during the visual secondary side exam

- Visual inspection of all previously installed plugs

The following secondary side inspections were performed in SG21:

- Secondary side visual inspection of the tubesheet regions including:
 - o Annulus and no-tube lane regions
 - o Multiple inner bundle passes
 - o Significant search and retrieval efforts for foreign objects
 - o All objects that could be reasonably inspected visually
- Secondary side visual inspection of the 1st (lowermost) lattice support

The following secondary side inspections were performed in SG22

- Secondary side visual inspection of the tubesheet regions including:
 - o Annulus and no-tube lane regions
 - o Multiple inner bundle passes
 - o Significant search and retrieval efforts for foreign objects
 - o All objects that could be reasonably inspected visually
- Secondary side visual inspection of the 1st (lowermost) lattice support
- Visual inspection of steam drum internal components
- Visual inspection of the u-bend region of the tube bundle

Calvert Cliffs Unit 2, Spring 2009 – 180 Day Steam Generator Report

<h2 style="margin: 0;">Calvert Cliffs Unit 2 2R18 Fan Bar Wear</h2>		GROUP TUBES-HIDDEN W Fan Bar Wear 85 - 0 Z Pre-Defined Wear Zone 1949 - 45 O Tested Outside Zone 5262 - 1948
S/G 21 HOT PRIMARY FACE	TOTAL TUBES: 8471 SELECTED TUBES: 5262 OUT OF SERVICE (#): 37	SCALE: 0.067388 X Tue Apr 21 19:52:15 2009 <small>This drawing is the property of AREVA NP Inc. or AREVA and Siemens companies and is loaned under condition that it is not to be reproduced or copied, in whole or in part, or used for furnishing information to others, or for any other purpose detrimental to the interests of AREVA NP Inc. and will be returned upon request.</small>

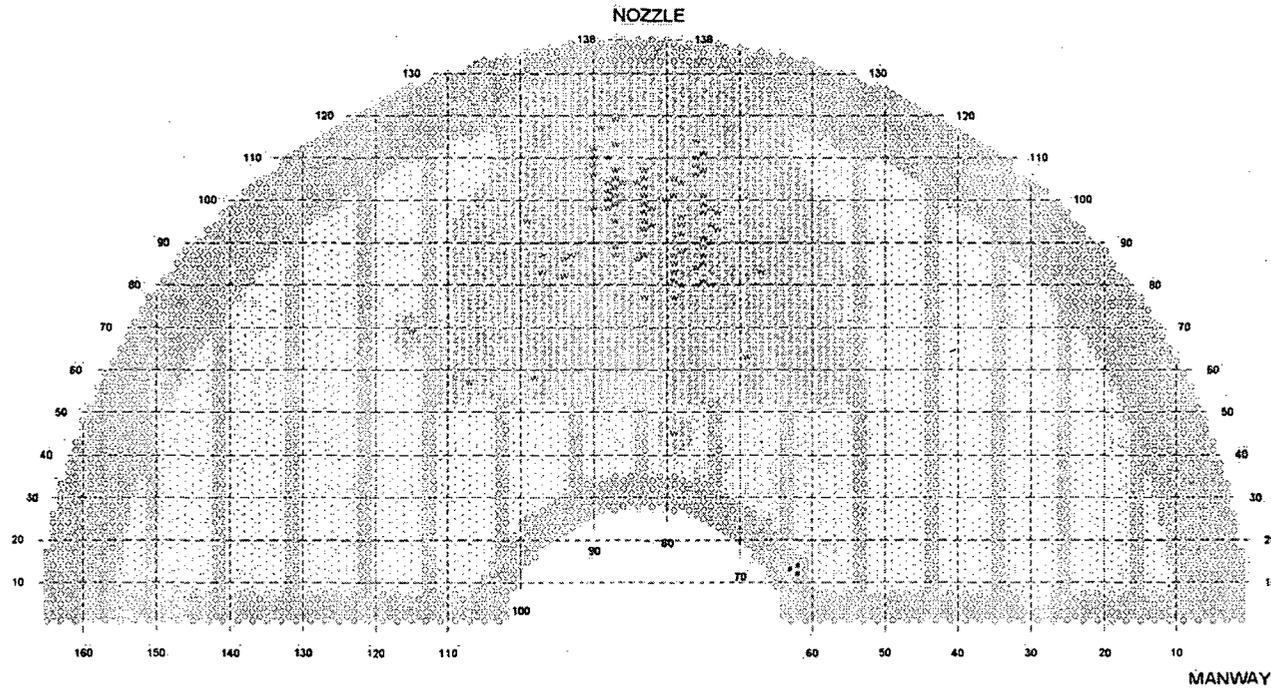


Figure 1 SG 21 Susceptible Fan Bar Wear Zone and Bobbin Inspection Scope

Calvert Cliffs Unit 2, Spring 2009 – 180 Day Steam Generator Report

<h3>Calvert Cliffs Unit 2 2R18 Fan Bar Wear</h3>		GROUP TUBES-HIDDEN W Fan Bar Wear 173 - 0 Z Pre-Defined Wear Zone 1957 - 172 O Tested Outside Zone 4236 - 1988
<small>AREVA - ECU 3.mao module Version 4.0</small>		SCALE: 0.067388 X Tue Apr 21 20:27:46 2009
S/G 22 HOT PRIMARY FACE	TOTAL TUBES: 8471 SELECTED TUBES: 4236 OUT OF SERVICE (#): 29	<small>This drawing is the property of AREVA NP Inc. an AREVA and Siemens company and is loaned upon condition that it is not to be reproduced or copied, in whole or in part, or used for furnishing information to others, for any other purpose, detrimental to the interests of AREVA NP Inc. and will be returned upon request.</small>

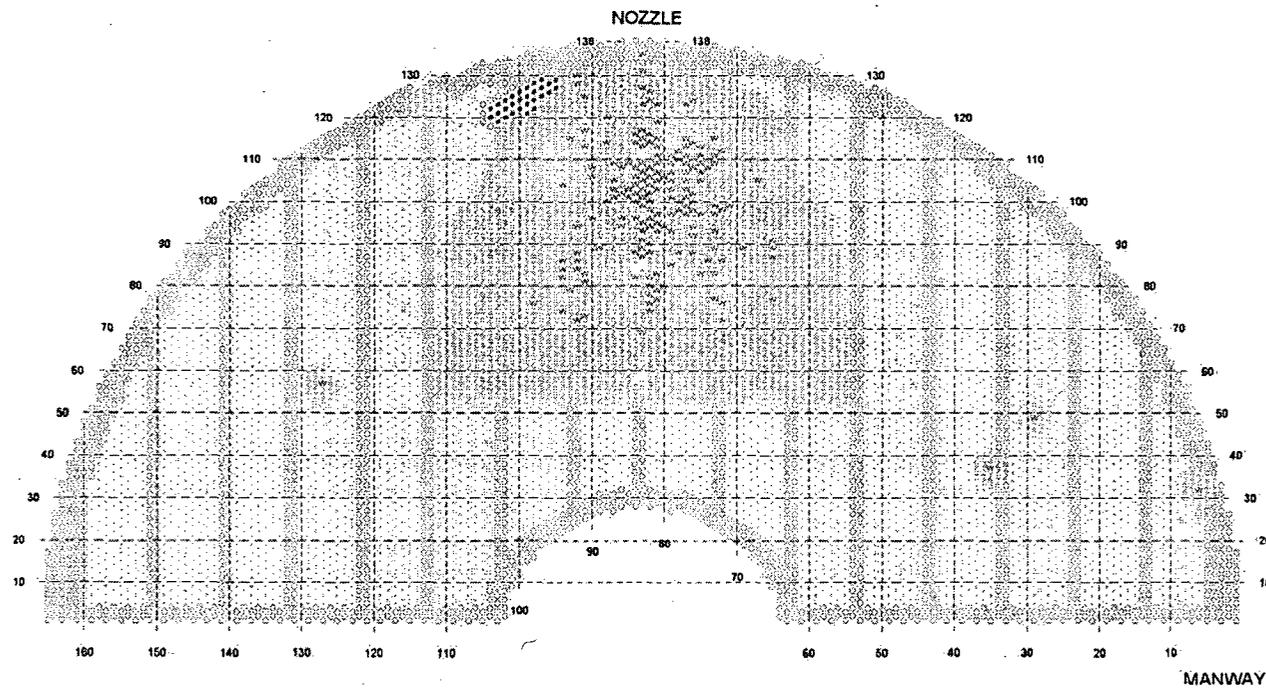


Figure 2 SG 22 Susceptible Fan Bar Wear Zone and Bobbin Inspection Scope

Calvert Cliffs Unit 2, Spring 2009 – 180 Day Steam Generator Report

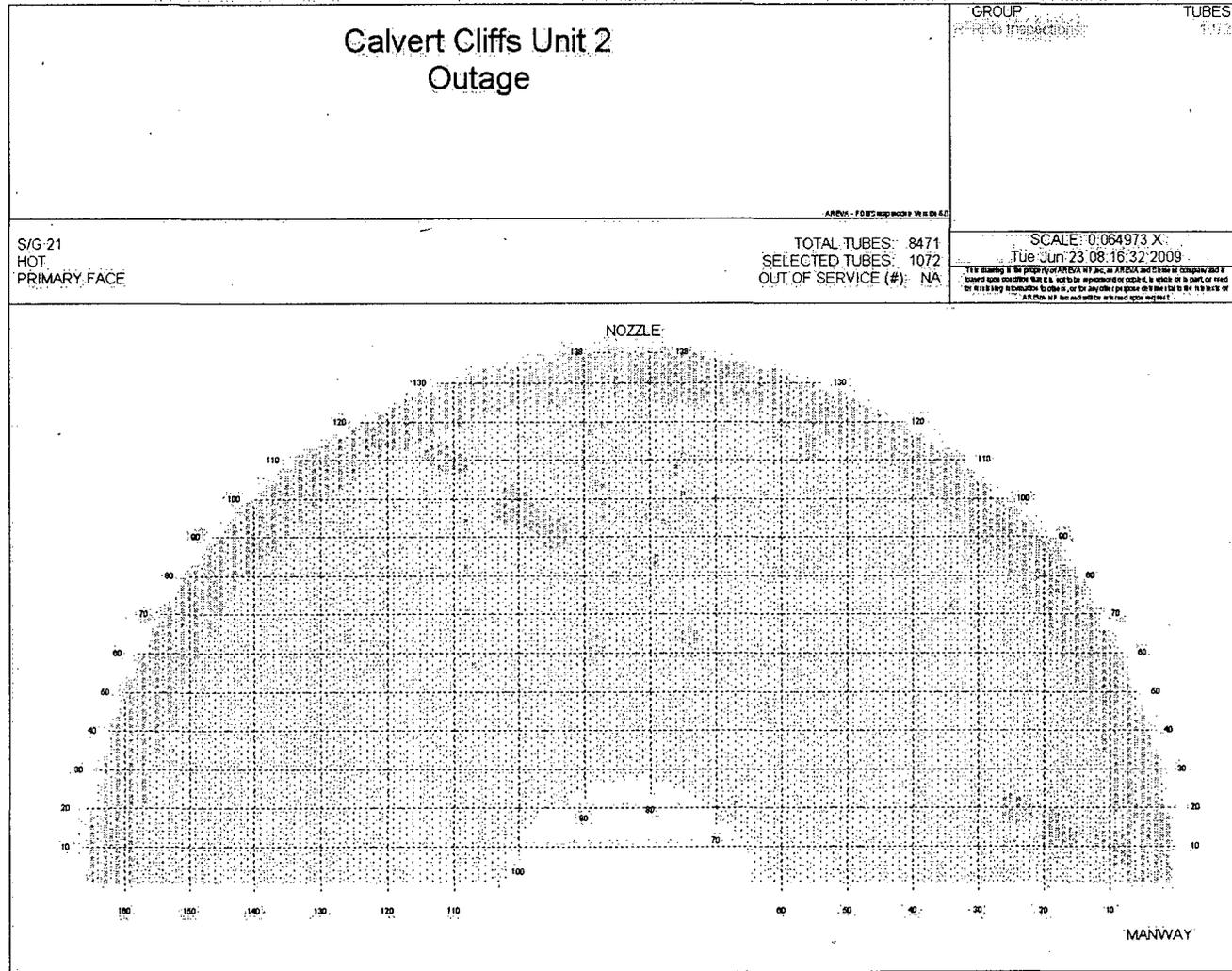


Figure 3 SG 21 Rotating Probe Inspection Scope

Calvert Cliffs Unit 2, Spring 2009 – 180 Day Steam Generator Report

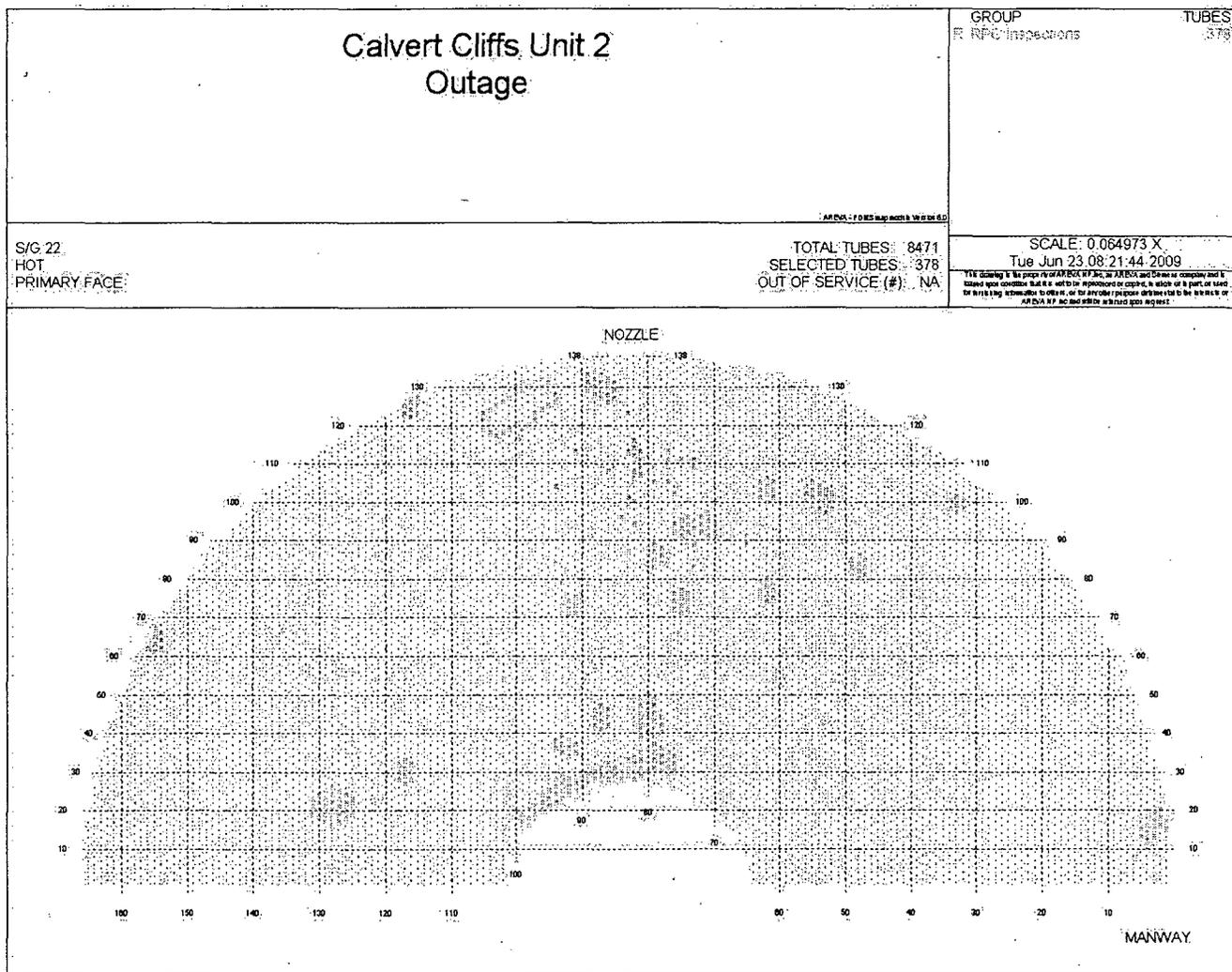


Figure 4 SG 22 Rotating Probe Inspection Scope

Calvert Cliffs Unit 2, Spring 2009 – 180 Day Steam Generator Report

b. Active degradation mechanisms found

Two degradation mechanisms were identified during this examination and are evaluated herein: 1) fan bar wear, and 2) foreign object wear.

No evidence of corrosion degradation processes or lattice support wear was identified. There were also no tubes identified that were in close proximity to one another.

c. Nondestructive examination techniques utilized for each degradation mechanism

The following table identifies NDE examination techniques utilized for each identified degradation mechanism.

For foreign object wear indications, ETSS 27901.1 was used for depth sizing if the object was not present. This technique is qualified for leaving indications in service. If the part was still present, ETSS 96910.1 was used for depth sizing. Since this is an extended technique for foreign object wear, this information was used for condition monitoring purposes only (i.e., all tubes with foreign object wear with the part still present were removed from service).

Table 1 NDE Techniques Utilized for Identified Degradation

Degradation Mechanism	Inspection Type	EPRI ETSS
Fan bar wear	Bobbin	96004.1 (Rev. 11)
	+Point™	96910.1 (Rev. 10)
Foreign Object Wear	Bobbin	27091.2 (Rev. 0)*
	+Point™	27901.1 (Rev. 0) ** (circ groove)
	+Point™	96910.1 (Rev. 10)

* The bobbin probe was the primary means of detecting foreign objects and foreign object wear during the inspection. This ETSS is qualified to detect foreign object wear (i.e. volumetric degradation) in the freespan in general; however detection of wear and foreign objects confined to a region very close to the top of the tubesheet is difficult. Bobbin detectability in this region was enhanced through the use of a three frequency “turbo mix” which has been shown in the field to provide improved detection in this region.

** There are other EPRI techniques qualified for sizing of foreign object wear depending on the shape of the flaw. ETSS 27901 was selected based on the circumferential groove appearance of the foreign object wear indications detected during the 2R18 inspection.

Calvert Cliffs Unit 2, Spring 2009 – 180 Day Steam Generator Report

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

Fan bar wear (FBW) is a mechanical degradation process which produces volumetric tube wear at the interface between the unbend anti-vibration supports (fan bars) and the tubes. In total, 330 fan bar wear (FBW) indications in 258 tubes were identified in the CCNPP Unit 2 steam generators during the 2R18 inspection. 131 of the indications were newly reported during 2R18. This represents an increase of about 66% since the first inservice inspection in 2005 (2R16). None of the reported indications exceeded the Technical Specification plugging limit of 40%TW, and none were plugged. The maximum depth reported was a 28%TW indication in SG22. The largest newly-reported indication was a 19%TW indication in SG21. Figure 5 shows the distribution of the fan bar wear depths for both steam generators as reported with the bobbin coil. As shown in the figure, SG22 contained more indications and also contained the majority of the indications greater than 20%TW.

As expected, the growth rates for the fan bar wear indications decreased significantly from the growth rates observed during the first cycle of operation. The median growth rate of FBW reported during both the 2009 and 2005 inspections was 0.31 %TW/EFPY in both SGs compared to median growth rates during the first cycle of 7.48 %TW/EFPY in SG21 and 6.71 %TW/EFPY in SG22. The upper 95th percentile growth rates were also determined using Benard's equation as discussed in the EPRI SG Integrity Guidelines. The upper 95th percentile growth rate for indications reported during both the 2009 and 2005 inspections was 2.34 %TW/EFPY in SG21 and 2.08 %TW/EFPY in SG22. The upper 95th percentile growth rates during the first cycle of operation were 12.39 %TW/EFPY in SG21 and 13.42 %TW/EFPY in SG22.

Based on the Unit 1, 2008 inspection results, an increased number of fan bar wear indications was expected. The decrease in the number of new indications and the slower growth rate compared with the Unit 2, 2005 results show that the degradation mechanism is not becoming more severe with time.

Fan bar wear is caused by the relative motion between the tubes and adjacent fan bars due to flow related forces. As wear depths increase, the contact area between the tubes and fan bars increases, which slows the rate of throughwall growth. As a result, the growth rate of previously detected indications is expected to decrease with more time in service. The Unit 2, 2R18 inspection found fewer new indications and a lower growth rate than what was found after the first in-service inspection. This is consistent with the current understanding of fan bar wear.

Calvert Cliffs Unit 2, Spring 2009 – 180 Day Steam Generator Report

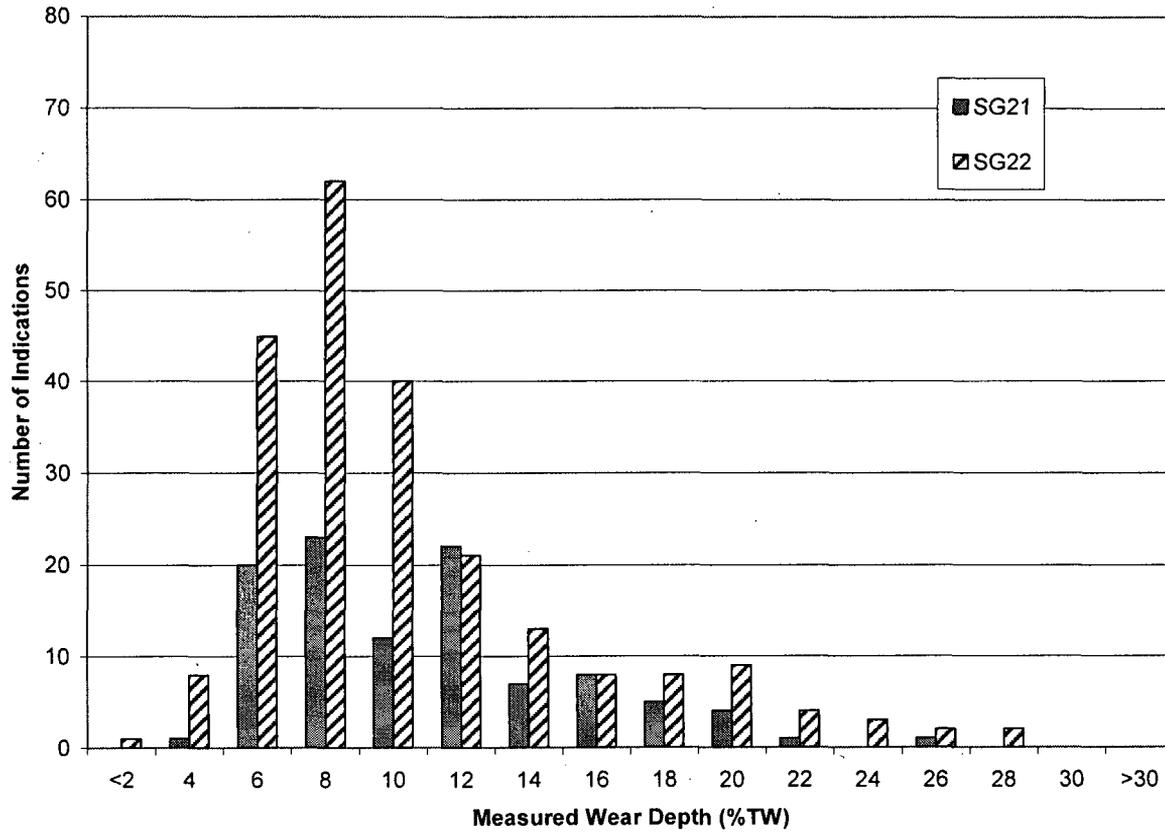


Figure 5 Fan Bar Throughwall Depth Distribution

Calvert Cliffs Unit 2, Spring 2009 – 180 Day Steam Generator Report

During the 2R18 inspection, 32 indications of foreign object wear were detected in 28 tubes with the +Point™ coil. These indications were reported as LPW (Loose Part Wear) indications in the eddy current database. Most of these indications were located within the first three inches above the top of the tubesheet. However, six indications were reported to be clearly in the freespan region between the tubesheet and the first lattice grid support. In addition, one indication was reported at about four inches below the fifth lattice grid support.

Table 2 is a summary of all of the foreign object wear identified during the 2009 inspection. As shown in the table, some locations had foreign objects detected by eddy current while other locations had no signs of foreign objects. In some cases where foreign objects were detected, the objects were successfully removed from the steam generator. In these cases, the lengths and depths shown are those reported after removal of the part using ETSS 27901.1.

Six of the 32 LPW indications were related to locations of previously known wear. All six of these locations were in SG22. The remaining 26 LPW indications were newly identified during the 2009 inspection.

In SG22, there were seven indications of loose part wear detected. Six of these seven indications were related to previously detected loose part wear. The one exception was an indication in SG22 R112 C82 located at an elevation of 05H -4.02". This indication had a measured depth of 23%TW. In all seven cases, the foreign object was not detected by eddy current. This is consistent with the results from the 2005 inspection in SG22.

In addition to loose part wear indications, there were a large number of Possible Loose Part (PLP) indications, which were inspected with the rotating probe coil. Secondary side visual inspections were also performed of all reasonably accessible PLP locations. In total, 75 foreign objects were detected by the eddy current and visual inspections: 47 in SG 21 and 28 in SG 22. All loose parts that were left in service, whether or not they had caused wear, were addressed in an engineering evaluation to ensure that tube integrity will be maintained until the next inspection.



AREVA

AREVA NP Inc.,
an AREVA and Siemens company

Document No.: 51-9111710-000

Calvert Cliffs Unit 2, Spring 2009 – 180 Day Steam Generator Report

Table 2 Foreign Object Wear

SG	Row	Col	Ind	%TW	Supp	Elevation	Eddy Current Technique	Measured or Bounding Length	Loose Part Detected
SG21	10	2	LPW	45	TSC	0.06	27901.1	0.23	No
SG21	11	1	LPW	34	TSC	1.35	27901.1	0.46	Yes (Removed)
SG21	11	161	LPW	54	TSH	0.16	27901.1	0.39	Yes (Removed)
SG21	12	2	LPW	48	TSC	0.31	27901.1	0.46	Yes (Removed)
SG21	12	2	LPW	37	TSC	1.27	27901.1	0.23	Yes (Removed)
SG21	12	2	LPW	21	TSC	1.77	27901.1	0.32	Yes (Removed)
SG21	12	162	LPW	24	TSH	0.13	27901.1	0.21	Yes (Removed)
SG21	13	161	LPW	47	TSH	0.16	27901.1	0.47	Yes (Removed)
SG21	18	4	LPW	5	TSC	0.12	96910.1	1.5	Yes (Removed)
SG21	37	5	LPW	21	TSH	0.47	27901.1	0.23	No
SG21	38	6	LPW	30	TSH	0.54	96910.1	0.31	Yes
SG21	39	5	LPW	6	TSH	0.36	96910.1	0.18	Yes
SG21	72	146	LPW	32	TSH	0.24	27901.1	0.22	Yes (Removed)
SG21	75	147	LPW	19	TSH	18.07	27901.1	1.5	No
SG21	77	147	LPW	21	TSH	18.01	27901.1	1.5	No
SG21	77	149	LPW	21	TSH	21.44	27901.1	0.21	No
SG21	90	26	LPW	11	TSH	0.25	96910.1	1.5	Yes
SG21	91	27	LPW	16	TSH	0.45	96910.1	1.5	Yes
SG21	93	27	LPW	13	TSH	0.14	96910.1	1.5	Yes
SG21	131	95	LPW	5	TSC	0.13	96910.1	0.19	Yes
SG21	131	97	LPW	5	TSC	0.18	96910.1	0.21	Yes
SG21	134	74	LPW	5	TSH	0.38	96910.1	0.16	Yes
SG21	135	75	LPW	4	TSH	0.12	96910.1	0.11	Yes
SG21	135	75	LPW	2	TSH	0.44	96910.1	0.13	Yes
SG21	136	74	LPW	4	TSH	0.9	96910.1	0.22	Yes
SG22	14	4	LPW	24	TSC	0.49	27901.1	0.18	No
SG22	17	1	LPW	25	TSC	0	27901.1	0.15	No
SG22	18	2	LPW	24	TSC	-0.13	27901.1	0.21	No
SG22	112	82	LPW	23	05H	-4.02	27901.1	0.41	No
SG22	124	116	LPW	17	01C	-11.55	27901.1	0.24	No
SG22	126	116	LPW	37	TSC	13.02	27901.1	0.36	No
SG22	126	116	LPW	23	TSC	12.73	27901.1	0.24	No

Calvert Cliffs Unit 2, Spring 2009 – 180 Day Steam Generator Report

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

Thirty-four tubes in SG21 were plugged during 2R18 (see Table 3). All of the tubes were plugged due to foreign objects or foreign object wear. All tubes that had wear and a foreign object present were plugged. Several tubes with a part present but no wear were also conservatively plugged. The tubes labeled as PTP (Preventative Tube Plug) were plugged to bound locations of foreign objects remaining in the steam generator. There were no tubes in SG22 that were plugged during the 2009 refueling outage.

Table 3 List of Tubes Plugged

SG	Row	Col	Hot Leg	Cold Leg	Reason for Tube Repair	Tube Qty.	Stab
SG21	11	1	ROLLED	ROLLED	LPW @ TSC+1.35	1	NO
SG21	10	2	ROLLED	ROLLED	LPW @ TSC+0.06	2	NO
SG21	12	2	ROLLED	ROLLED	LPW @ TSC+0.31	3	NO
SG21	15	3	ROLLED	ROLLSTAB	PTP	4	YES
SG21	17	3	ROLLED	ROLLSTAB	PLP @ TSC+0.47	5	YES
SG21	19	3	ROLLED	ROLLSTAB	PLP @ TSC+0.38	6	YES
SG21	14	4	ROLLED	ROLLSTAB	PLP @ TSC+0.47	7	YES
					PLP @ TSC+0.46		
SG21	16	4	ROLLED	ROLLSTAB	PLP @ TSC+0.53	8	YES
SG21	18	4	ROLLED	ROLLSTAB	LPW @ TSC+0.12	9	YES
SG21	20	4	ROLLED	ROLLSTAB	PLP @ TSC+0.47	10	YES
SG21	15	5	ROLLED	ROLLSTAB	PTP	11	YES
SG21	19	5	ROLLED	ROLLSTAB	PLP @ TSC+0.65	12	YES
SG21	37	5	ROLLSTAB	ROLLED	LPW @ TSH+0.47	13	YES
SG21	39	5	ROLLSTAB	ROLLED	LPW @ TSH+0.36	14	YES
SG21	38	6	ROLLSTAB	ROLLED	LPW @ TSH+0.54	15	YES
SG21	40	6	ROLLSTAB	ROLLED	PLP @ TSH+0.72	16	YES
SG21	90	26	ROLLSTAB	ROLLED	LPW @ TSH+0.25	17	YES
SG21	92	26	ROLLSTAB	ROLLED	PLP @ TSH+0.53	18	YES



Calvert Cliffs Unit 2, Spring 2009 – 180 Day Steam Generator Report

Table 3 List of Tubes Plugged

SG	Row	Col	Hot Leg	Cold Leg	Reason for Tube Repair	Tube Qty.	Stab
SG21	91	27	ROLLSTAB	ROLLED	LPW @ TSH+0.45	19	YES
SG21	93	27	ROLLSTAB	ROLLED	LPW @ TSH+0.14	20	YES
SG21	134	74	ROLLSTAB	ROLLED	LPW @ TSH+0.38	21	YES
SG21	136	74	ROLLSTAB	ROLLED	LPW @ TSH+0.90	22	YES
SG21	131	75	ROLLSTAB	ROLLED	PLP @ TSH+0.57	23	YES
SG21	133	75	ROLLSTAB	ROLLED	PLP @ TSH+0.42	24	YES
SG21	135	75	ROLLSTAB	ROLLED	LPW @ TSH+0.12	25	YES
					LPW @ TSH+0.44		
SG21	132	76	ROLLSTAB	ROLLED	PLP @ TSH+0.64	26	YES
SG21	135	89	ROLLED	ROLLSTAB	PLP @ TSC+0.15	27	YES
SG21	134	90	ROLLED	ROLLSTAB	PLP @ TSC+0.11	28	YES
SG21	131	95	ROLLED	ROLLSTAB	LPW @ TSC+0.13	29	YES
SG21	133	95	ROLLED	ROLLSTAB	PLP @ TSC+0.54	30	YES
SG21	132	96	ROLLED	ROLLSTAB	PLP @ TSC+0.44	31	YES
SG21	131	97	ROLLED	ROLLSTAB	LPW @ TSC+0.18	32	YES
SG21	11	161	ROLLED	ROLLED	LPW @ TSH+0.16	33	NO
SG21	13	161	ROLLED	ROLLED	LPW @ TSH+0.16	34	NO
Totals:						34	29

LPW = Loose Part Wear; PLP = Potential Loose Part; PTP = Preventative Tube Plug

Calvert Cliffs Unit 2, Spring 2009 – 180 Day Steam Generator Report

f. Total number and percentage of tubes plugged to date

There are 37 tubes plugged in SG21, 34 of which were plugged during the Spring 2009 outage. There are 29 tubes plugged to date in SG22, none of which were plugged during the Spring 2009 outage.

Table 4 Tube Plugging Summary

	Tubes Installed	Tubes Plugged To-Date
SG21	8,471	37 (0.437%)
SG22	8,471	29 (0.342%)
Total	16,942	66 (0.390%)

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

The condition monitoring assessment is summarized in Figures 4 through 8. The figures provide the condition monitoring limit curves corresponding to the NDE technique employed for each degradation type. All reported degradation falls below the applicable condition monitoring curve and therefore satisfies the Technical Specification structural performance criteria. For volumetric indications, meeting the structural performance criteria also provides reasonable assurance that the accident leakage performance criteria would be satisfied at the lower steam line break pressure differential. Since this conclusion could be reached analytically using NDE inspection results with a full accounting of significant uncertainties, no in-situ pressure testing was required to demonstrate structural and leakage integrity. During the past operating cycle, no measurable primary-to-secondary leakage was observed, thereby satisfying the operational leakage performance criteria.

The results of the 2009 inspection and the condition monitoring conclusions confirm that the 2005 operational assessment was appropriately bounding. No tubes were removed from the SG for destructive examination.

h. The effective plugging percentage for all plugging in each SG

There are no sleeves installed in the CCNPP Unit 2 steam generators, therefore the effective plugging percentage is the same as stated in (f) above.

Calvert Cliffs Unit 2, Spring 2009 – 180 Day Steam Generator Report

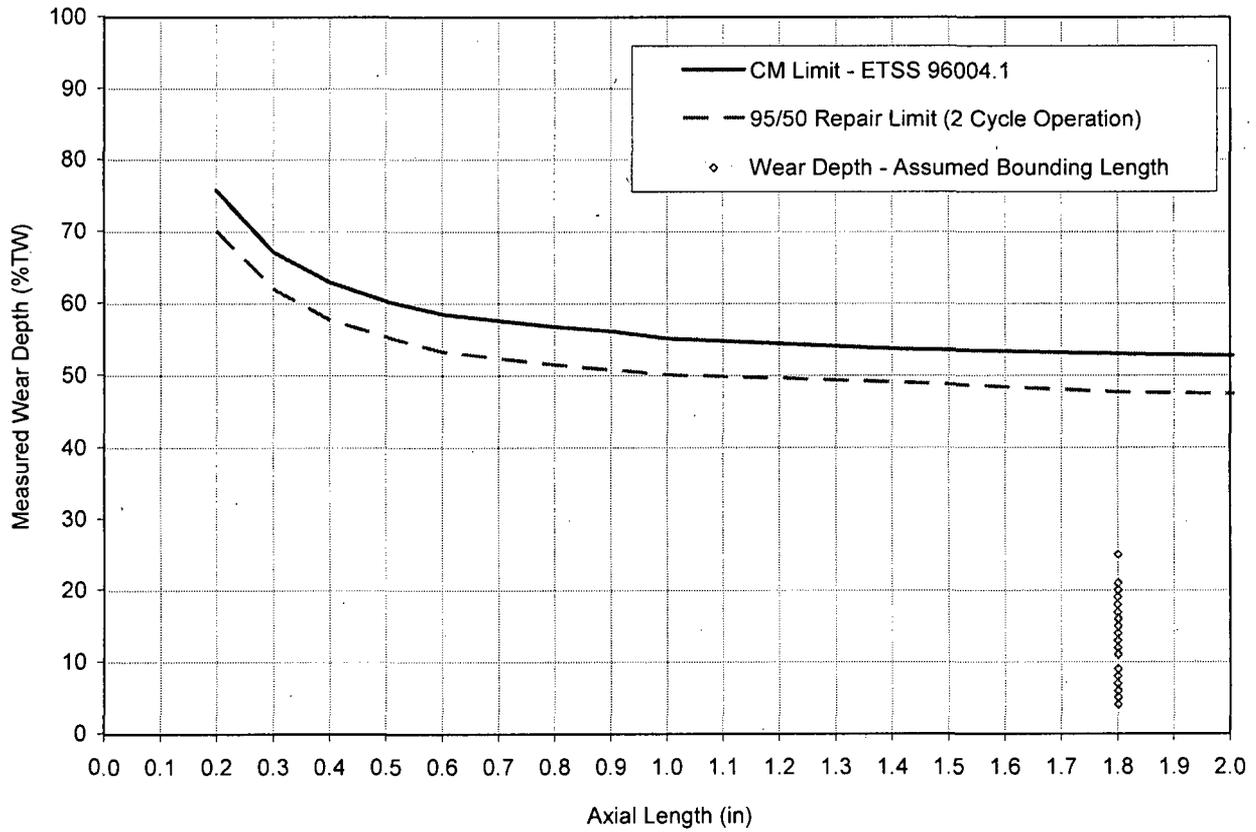


Figure 6 SG21 Fan Bar Wear Condition Monitoring

Calvert Cliffs Unit 2, Spring 2009 – 180 Day Steam Generator Report

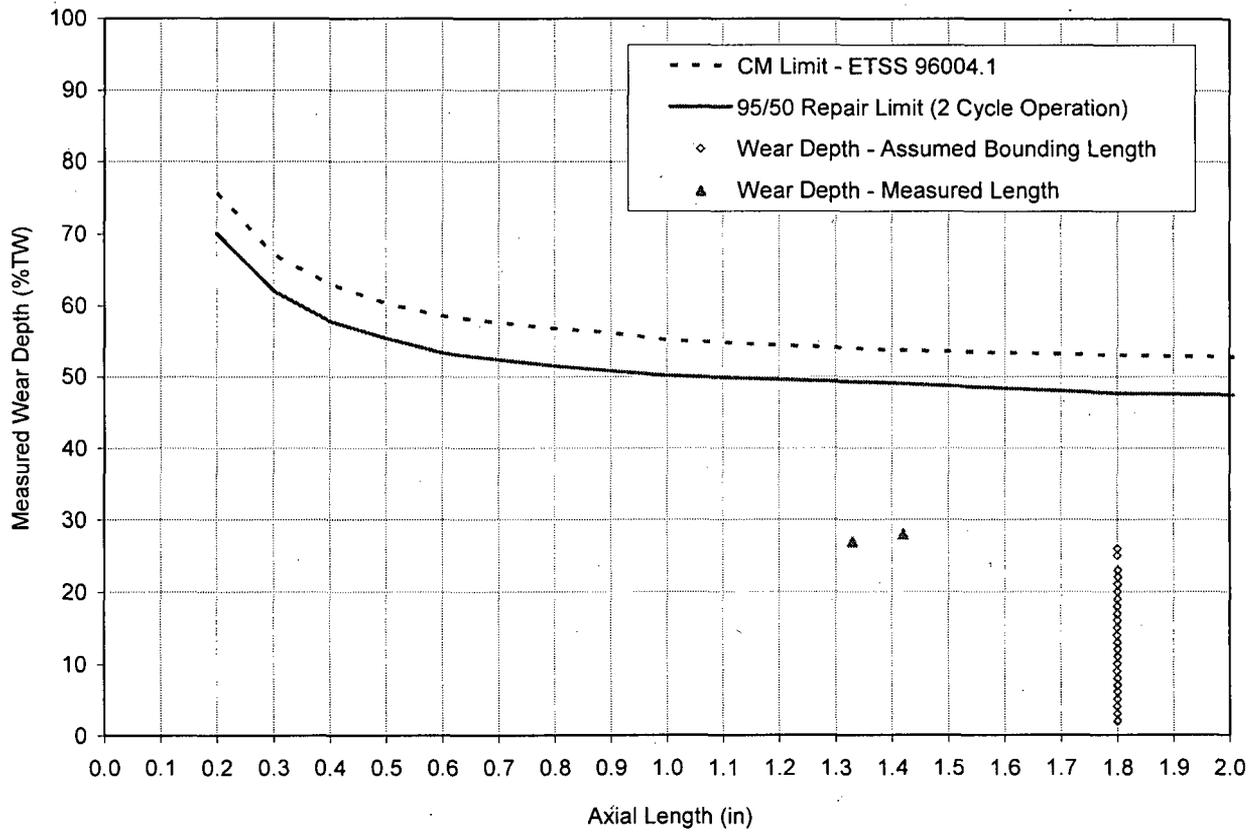


Figure 7 SG 22 Fan Bar Wear Condition Monitoring

Calvert Cliffs Unit 2, Spring 2009 – 180 Day Steam Generator Report

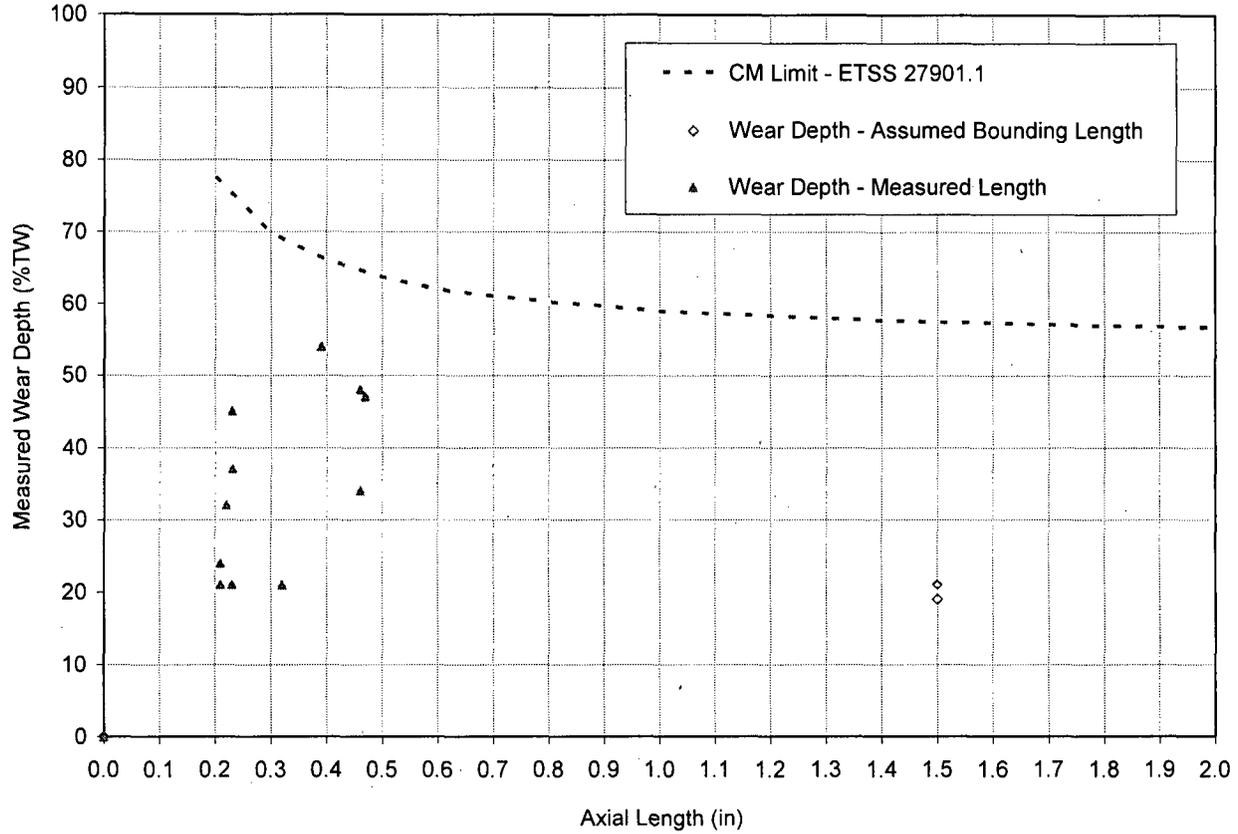


Figure 8 SG 21 Foreign Object Condition Monitoring with Part not Present

Calvert Cliffs Unit 2, Spring 2009 – 180 Day Steam Generator Report

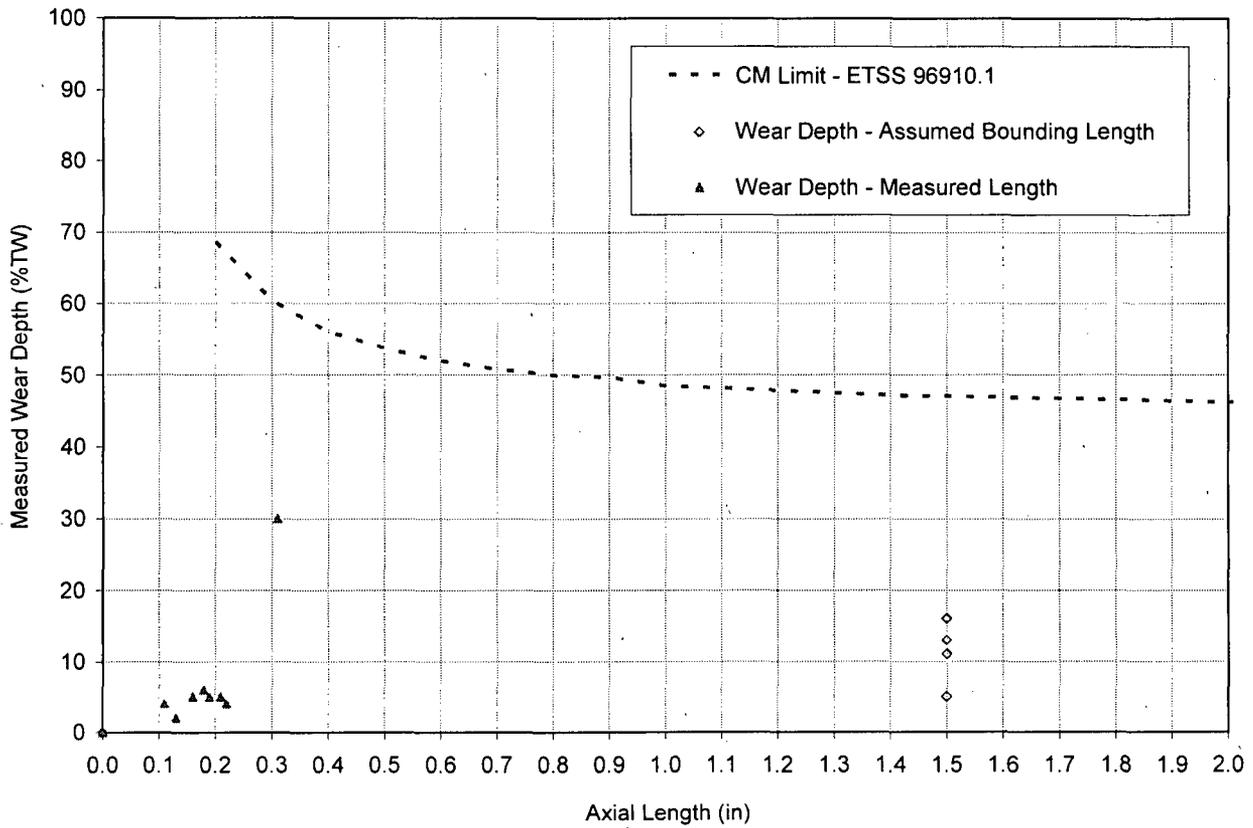


Figure 9 SG 21 Foreign Object Condition Monitoring with Part Present

Calvert Cliffs Unit 2, Spring 2009 – 180 Day Steam Generator Report

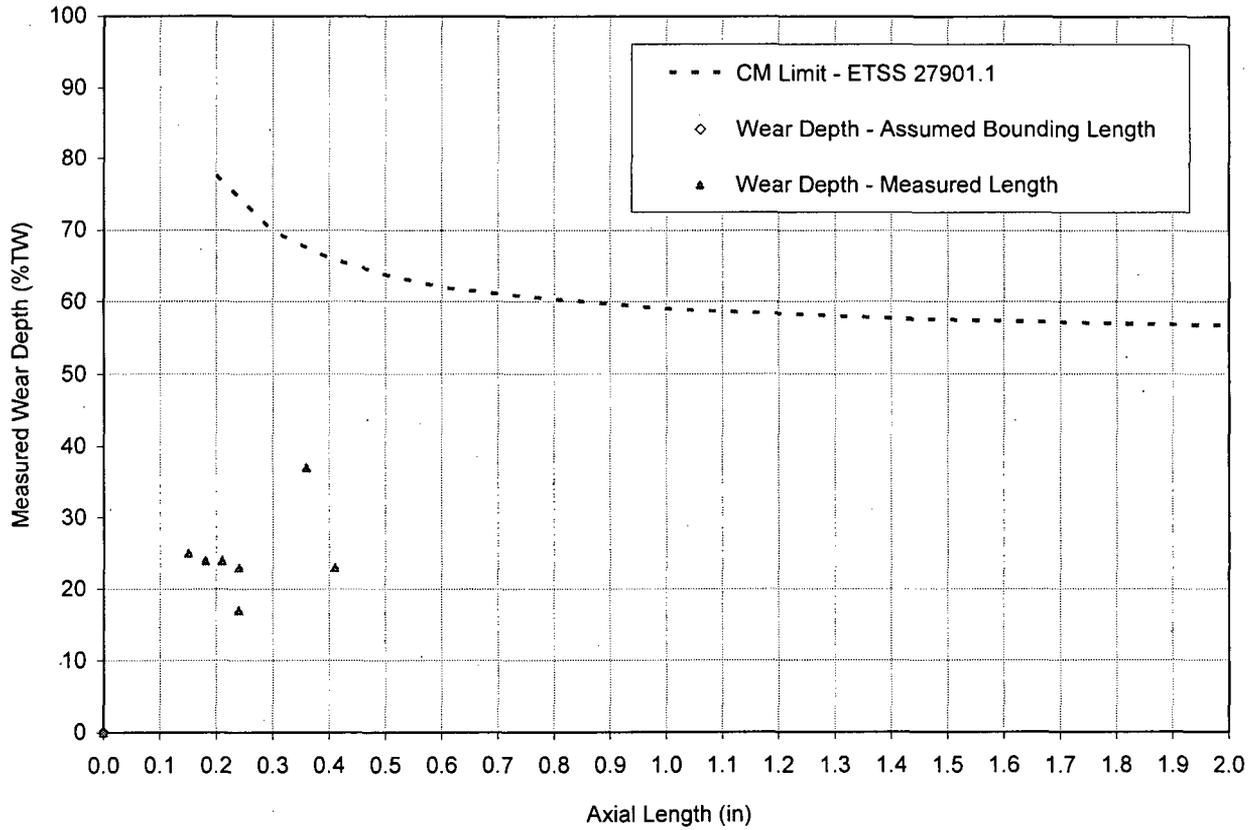


Figure 10 SG 22 Foreign Object Condition Monitoring with Part not Present