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Callaway Plant

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October 25, 2007

U.S. Nuclear Regulatory Commission
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DOCKET NUMBER 50-483
CALLAWAY PLANT UNIT 1
UNION ELECTRIC COMPANY
FACILITY OPERATING LICENSE NPF-30
RESULTS OF FIRST REPLACEMENT STEAM GENERATOR TUBE IN-SERVICE INSPECTION

In accordance with Callaway Plant Technical Specification 5.6.10, the attached report provides the results of Callaway Plant's first replacement steam generator tube in-service inspections. The attachment, "Special Report: Results of First Replacement Steam Generator Tube In-Service Inspection", includes the following:

a. The scope of inspections performed on each steam generator;
b. Active degradation mechanisms found;
c. Nondestructive examination techniques utilized for each degradation mechanism;
d. Location, orientation (if linear), and measured sizes (if available) of service induced indications;
e. Number of tubes plugged during the inspection outage for each active degradation mechanism;
f. Total number and percentage of tubes plugged to date; and
g. The results of condition monitoring, including the results of tube pulls and in-situ testing.

No commitments are contained in this correspondence. If you have any questions concerning this matter, please contact me at (573) 676-6411 or Mr. Ryan Reed at (573) 676-4747.

Very truly yours,

Fadi M. Diya
Plant Director

DJW/nls
Attachment: Special Report: Results of First Replacement Steam Generator Tube In-Service Inspection (8 pages)

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SPECIAL REPORT
RESULTS OF FIRST REPLACEMENT STEAM GENERATOR TUBE IN-SERVICE INSPECTION

REPORTING REQUIREMENTS:

Technical Specification AC 5.6.10 requires that a report shall be submitted within 180 days after initial entry into MODE 4 following completion of an inspection in accordance with Specification 5.5.9, Steam Generator (SG) Program. This report shall include:

a. The scope of inspections performed on each steam generator;
b. Active degradation mechanisms found;
c. Nondestructive examination techniques utilized for each degradation mechanism found;
d. Location, orientation (if linear), and measured size (if available) of service induced degradation;
e. Number of tubes plugged during the inspection outage for each active degradation mechanism;
f. Total number and percentage of tubes plugged to date, and
g. The results of condition monitoring, including the results of tube pulls and in-situ testing.

SUMMARY:

The first replacement steam generator tube in-service inspections were completed by Areva during the Refuel 15 outage. An in-service inspection was performed on all four steam generators. The scope of inspections performed are described in the following Inspection Report. Callaway found no active degradation mechanisms. However, anti-vibration (AVB) wear was found in all four steam generators in a small quantity of tubes. For AVB wear, the non-destructive examination technique used was EPRI Examination Technique 96004.1. Table 1 provides the eddy current testing task summary for tubes inspected. Table 2 provides the summary of wear indications found for all four steam generators. Callaway did not perform repairs to any tubes because no tubes exceeded the repair criteria. In addition, the Condition Monitoring Report concluded that the Callaway steam generator tubes satisfied the structural integrity performance criterion, accident induced leakage criterion, and operational leakage criterion.

INSPECTION REPORT:

The Callaway Plant 15th refueling outage occurred in the spring of 2007. The plant started up and reached MODE 4 on April 25, 2007. During this period an in-service inspection was performed on all four steam generators. The inspection scope was as follows:

- 100% full length (bobbin coil) examination of all four steam generators
- Periphery tube top of tubesheet (TTS) RPC (+Point) examination of all four steam generators
- Special interest RPC (+Point) of bobbin coil indications as required

Table 1

Eddy Current Testing Task Summary (Tubes Inspected)

ECT Task	Extent	S/G A	S/G B	S/G C	S/G D	Total
100% Bobbin F/L	Tube end hot to tube end cold	5535	5536	5536	5536	22143
MRPC periphery tubes	Top of Tubesheet +3"/-3"	935	935	935	935	3740
MRPC S.I.	Specified location	40	48	52	35	175

(Note: 1 tube plugged in S/G A during manufacturing)

Callaway found no active degradation mechanisms. However, anit-vibration bar (AVB) wear was found in all 4 steam generators in a small quantity of tubes. For AVB wear, the nondestructive examination technique used was EPRI Examination Technique 96004.1. Callaway found a total of 36 tubes with AVB wear.

Table 2

Summary of Wear Indications

Steam Generator	*Row*	*Column*	*Location*	*Size (%TW)*
A	77	51	AV3 +0.06	5
			AV4 +0.24	5
			AV3 -0.02	5
			AV3 -0.08	4
			AV4 +0.13	7
A	78	76	AV2 +0.06	6
			AV3 +0.06	9
			AV2 -0.12	9
			AV3 +0.02	6
			AV3-0.09	8
A	85	63	AV2 +0.13	10
			AV4 +0.00	13
			AV5 +0.00	9
			AV3 +0.04	9
			AV2 -0.04	5
			AV2 +0.02	8
			AV3 -0.05	3
			AV3 +0.06	8

Steam Generator	*Row*	*Column*	*Location*	*Size (%TW)*
A	85	63	AV4 -0.07	3
			AV4 +0.09	11
			AV5 -0.01	6
			AV5 +0.03	6
A	92	82	AV4 +0.09	6
			AV4 +0.05	6
			AV4 -0.05	5
A	96	66	AV3 +0.11	6
			AV4 +0.06	3
			AV3 +0.05	6
			AV3 +0.11	4
			AV4 +0.03	2
			AV4 -0.08	5
A	98	66	AV1 +0.02	4
			AV2 +0.04	6
			AV3 +0.06	9
			AV4 +0.06	5
			AV1 +0.19	4
			AV1 -0.21	6
			AV2 -0.02	8
			AV3 +0.04	5
			AV3 +0.08	8
			AV4 +0.01	8
A	99	67	AV1 +0.22	3
			AV2 +0.15	5
			AV3 +0.06	6
			AV4 +0.09	3
			AV5 +0.24	5
			AV1 +0.01	3
			AV1 +0.17	3
			AV2 -0.04	5
			AV2 -0.10	2
			AV3 -0.03	5
			AV3 +0.03	4
			AV4 -0.09	2
			AV5 +0.09	7
A	104	64	AV6 +0.17	2
			AV6 -0.10	3

Steam Generator	*Row*	*Column*	*Location*	*Size (%TW)*
A	107	65	AV1 -0.11	6
			AV2 +0.13	8
			AV3 +0.09	10
			AV4 +0.09	5
			AV5 +0.15	3
			AV1 -0.09	9
			AV2 +0.04	10
			AV3 -0.07	12
			AV4 +0.01	7
			AV5 +0.01	5
A	109	61	AV6 -0.13	5
			AV6 -0.15	7
A	110	68	AV2 +0.02	5
			AV3 +0.04	5
			AV2 -0.04	6
			AV3 -0.01	6
A	111	63	AV2 -0.11	3
			AV2 -0.11	4
B	88	70	AV1 +0.22	3
			AV2 +0.02	4
			AV3 +0.07	7
			AV4 +0.07	3
			AV5 +0.11	4
			AV6 +0.04	2
			AV1 +0.16	4
			AV1 +0.02	3
			AV2 +0.01	4
			AV2 +0.03	3
			AV3 +0.06	8
			AV4 +0.13	5
			AV5 +0.07	6
			AV6 +0.12	3
B	88	78	AV3 +0.09	4
			AV4 +0.07	5
			AV3 +0.08	6
			AV4 +0.05	7
B	91	65	AV3 +0.07	9
			AV4 +0.11	4

Steam Generator	*Row*	*Column*	*Location*	*Size (%TW)*
C	91	65	AV2 -0.02	3
			AV2 -0.08	4
			AV3 +0.16	8
			AV3 +0.15	5
			AV4 +0.09	4
C	77	71	AV3 -0.04	6
			AV3 -0.02	6
C	81	51	AV4 +0.04	5
			AV3 +0.00	5
			AV5 +0.00	4
			AV5 +0.00	7
			AV3 +0.01	6
			AV4 +0.02	7
C	81	77	AV5 +0.00	4
			AV3 +0.00	4
			AV2 +0.00	6
			AV2 +0.02	7
			AV3 -0.02	4
			AV5 -0.08	5
C	81	79	AV3 +0.00	7
			AV3 +0.09	8
C	84	76	AV3 +0.00	7
			AV2 +0.02	5
			AV2 -0.03	4
			AV2 +0.01	3
			AV3 -0.08	5
			AV3 +0.04	5
C	89	61	AV5 +0.02	8
			AV4 +0.00	10
			AV3 +0.00	10
			AV2 +0.02	10
			AV6 -0.02	5
			AV6 -0.03	7
			AV2 +0.03	8
			AV2 -0.03	5
			AV3 +0.01	9
			AV4 -0.02	6
			AV4 +0.04	6

Steam Generator	*Row*	*Column*	*Location*	*Size (%TW)*
C	89	61	AV5 +0.03	4
			AV5 -0.02	6
C	89	71	AV5 +0.00	6
			AV3 +0.00	7
			AV4 +0.00	4
			AV4 +0.00	4
			AV3 -0.02	9
			AV5 -0.04	8
C	90	72	AV5 +0.13	4
			AV5 +0.14	5
C	91	71	AV5 +0.00	5
			AV5 -0.02	5
			AV5 +0.08	2
C	93	65	AV3 +0.00	7
			AV2 -0.02	6
			AV1 +0.09	4
			AV1 +0.18	6
			AV2 +0.02	7
			AV3 +0.02	9
C	93	71	AV3 +0.00	5
			AV4 +0.00	3
			AV4 +0.01	5
			AV3 -0.01	7
C	95	73	AV5 -0.02	4
			AV6 +0.00	4
			AV3 +0.00	4
			AV4 +0.02	3
			AV6 +0.00	5
			AV3 +0.00	3
			AV4 +0.02	6
			AV5 -0.12	5
C	96	58	AV3 +0.00	11
			AV4 +0.00	5
			AV2 +0.02	5
			AV4 +0.18	6
			AV4 -0.07	3
			AV2 -0.02	6
			AV3 +0.02	9

Steam Generator	*Row*	*Column*	*Location*	*Size (%TW)*
C	96	58	AV3 -0.02	4
C	96	74	AV2 +0.00	5
			AV2 +0.03	4
			AV2 -0.04	1
C	97	71	AV3 +0.00	7
			AV4 +0.00	4
			AV4 +0.00	4
			AV3 -0.07	9
C	100	74	AV4 +0.00	5
			AV3 +0.00	6
			AV2 +0.00	7
			AV2 -0.02	8
			AV3 +0.08	6
			AV3 -0.03	2
			AV4 -0.02	5
C	103	67	AV4 +0.00	14
			AV3 +0.00	7
			AV2 +0.15	4
			AV5 -0.07	4
			AV5 -0.07	6
			AV2 +0.13	6
			AV3 +0.05	7
			AV3 -0.04	3
			AV4 +0.02	13
			AV4 +0.06	2
D	66	92	AV3 +0.00	5
			AV3 +0.01	6
			AV4 +0.00	5
			AV4 +0.03	6
D	78	68	AV3 +0.00	8
			AV3 -0.00	7
			AV4 -0.02	6
			AV4 +0.05	5
			AV5 +0.12	4
			AV5 +0.17	3
			AV6 -0.17	4
			AV6 -0.12	5
D	88	56	AV3 -0.02	5

Steam Generator	*Row*	*Column*	*Location*	*Size (%TW)*
D	88	56	AV3 +0.00	8
			AV3 +0.10	6
			AV4 -0.02	4
			AV4 +0.10	4
D	88	72	AV5 -0.17	3
			AV5 -0.10	4

Callaway did not perform repairs to any tubes in Refuel Outage 15. No tubes exceeded the repair criteria. The total number of tubes repaired to date is one. This is 4.5 x 10^{-7}% plugged. This tube was plugged during manufacturing of the steam generators.

Results of Condition Monitoring

The Condition Monitoring report concluded that the Callaway steam generator tubes satisfied the structural integrity performance criterion, accident induced leakage criterion and operational leakage performance criterion. These criteria are specified in Technical Specification AC 5.5.9 and SR 3.4.13. Callaway did not perform any tube pulls or in-situ testing.

Key

AV1,2,3,4,5,6 – Anti-Vibration Bars
TWD – Through Wall Degradation