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DUKE POWER

September 23, 1992

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

Subject: Catawba Nuclear Station, Unit 1
Docket No. 50-413
Supplement to TS Amendment
Steam Generator Repair Criteria

On August 24, 1992, Catawba Nuclear Station submitted a proposed Technical Specification amendment. This proposed amendment was supplemented on September 2, 4, and 17, 1992. The proposed revisions change the Steam Generator repair criteria for Catawba Unit 1 Cycle 7 operation.

Per conversation with your staff, additional information is attached including:

- The SLB leak rate based on EOC voltage distributions and the numerical average of the leak rate correlation for leakage thresholds as low as 1.0 volt, and

- The results for voltage measurements between two inspections of the same indication using the same probe.

Catawba has not had any unforseen findings relative to the characteristics of the flaws at the TSPs. Dents at the TSPs have been inspected using RPC and no flaws were found to have been masked by the dents.

The following corrections to the September 17, 1992 submittal are being provided:

- The cover letter to the submittal should state that "Duke Power will evaluate the usefulness of pursuing an analysis for tube support plate displacement during a LOCA + SSE."

A001

- In the last paragraph on page 4 of the Duke summary of the WCAPs "non-repairable" should be changed to "acceptable", and the last sentence of this paragraph should be deleted.

- On page 11 of the Duke summary of the WCAPs SLB leakage at EOC7 was stated to be 0.54 gpm. This leakage should be 0.0 gpm for the Monte Carlo or 0.01 gpm using the deterministic assessment (WCAP-13494, Table 10-5).

Catawba also wishes to clarify that a mid-cycle inspection of the SGs will be performed beginning on May 1, 1993, unless specific relief has been granted by the NRC.

Very truly yours,

M. S. Tuckman

M. S. Tuckman

SG4/mhh

Attachment

M. S. Tuckman, being duly sworn, states that he is Vice President of Duke Power Company, Catawba Nuclear Site; that he is authorized on the part of said Company to sign and file with the Nuclear Regulatory Commission this revision to the Catawba Nuclear Station License No. NPF-35, and that all the statements and matters set forth therein are true and correct to the best of his knowledge.

M. S. Tuckman

M. S. Tuckman, Vice President
Catawba Nuclear Site

Subscribed and sworn to before me the 23rd day of Sept, 1992.

Yvonne H. Jackson
Notary Public

My Commission expires:

Nov 21, 2000

xc: Mr. S. D. Ebneter
Regional Administrator, Region II

Mr. Heywood Shealy, Chief
Bureau of Radiological Health
South Carolina Department of Health

Mr. Robert E. Martin, Project Manager

Mr. J. Stang, Project Manager

Mr. W. T. Orders
NRC Senior Resident Inspector

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1100 Circle 75 Parkway
Atlanta, Georgia 30339

Attachment

Supplemental SLB Leakage and EC Voltage Variability Between Inspections

SLB Leak Rate Based on Numerical Average for Leak Rate Correlation

Section 10 of WCAP-13494 provides estimated SLB leak rates at EOC-7 based on Monte Carlo methods and a deterministic method. The SLB leak rate at EOC-7 can also be conservatively estimated using the EOC-7 voltage distribution together with the numerical average of the SLB leak rate vs bobbin voltage correlation. This note provides leak rates for this method as a function of the threshold voltage between 1.0 and 2.0 volts applied for SLB leakage.

This analysis uses the reference analysis conditions of Section 10 based on RPC confirmed plus not RPC inspected indications ≤1.0 volt left in service. The projected EOC-7 voltages for this case are given in Figure 10-1 of the WCAP. The reference SLB leakage correlation of Figure 7-16 is applied for this analysis. This Figure shows the numerical average leak rate for the correlation as a function of bobbin voltage. The EOC-7 data leading to Figure 10-1 were grouped by number of indications per 0.05 volt interval for voltages above 1.0 volt. Above 1.8 volts, the intervals are ~0.2 volt intervals as only one indication is projected in each of these ~0.2 volt intervals (Figure 10-1). For the leakage calculations, the SLB leak rate per voltage interval is evaluated as the number of indications in the interval times the numerical average leak rate of Figure 7-16 evaluated at the mid-point of the voltage interval. The total SLB leak rate is then obtained as the sum of leak rates per interval for all intervals above the voltage threshold for leakage.

Table 1 and Figure 1 show the total SLB leak rate as a function of the leakage threshold voltage between 1.0 and 2.0 volts. For the recommended leakage threshold of 2.0 volts, the Table 1 leak rate of 0.009 gpm is essentially the same as the deterministic analysis of Table 10-5 of WCAP-13494. Even with a voltage threshold assumed to be as low as 1.0 volt, the projected SLB leak is only 0.049 gpm.

These results support the WCAP-13494 results showing SLB leak rates well below the 1.0 gpm allowable limit.

Comparison of Bobbin Voltages Between Repeat Inspections

For about 123 intersections, bobbin voltage data were collected to compare single analyst voltage calls to the voltage calls resulting from the analyst resolution process. This analysis comparison was performed for voltage calls made from the same data tape (single inspection). This evaluation is documented in Section 5.8.2 of WCAP-13494. These data were collected for indications which also had a second inspection. The second inspection was generally performed to verify the location of the indication and often was done with a smaller probe (0.590") compared to the original inspection (0.610"). For 26 of the intersections, however, the probe diameters were the same for both inspections. These 26 indications can be used to compare the voltage differences between the resolution process and a single analyst for the same data tape (same probing or inspection) to the differences between the resolution process on one tape and a single analyst from another tape (second probing or inspection).

Table 2 provides the data for the 26 TSP intersections having two inspections with the same probe diameter. Columns 3 and 4 in the Table are the single analyst and resolution process voltages as obtained from one tape. Column 5 is the single analyst voltage call from the second tape or inspection. The resolution process was not usually applied to the repeat inspection tape. The last 2 columns provide the difference of the single analyst calls from the resolved voltage calls for both data from the same tape (Column 4- Column 3) and from the two different tapes (Column 4 - Column 5). In general, the voltage differences for the same tape show about the same differences as obtained between tapes. For example, 18 voltage differences are <0.1 volt for the analysis from the same tape compared to 16 for analysis differences between the two tapes.

Overall, the data of Table 2 show that voltage differences obtained between separate inspections of the same indication are of the same magnitude as voltage differences between separate analyses of the same data. As shown in Figure 5-10 of WCAP-13494, the voltage differences between analysts are <20% for voltage indciations above about 0.8 volts.

Table 1

CATAWBA UNIT 1

EOC-7 SLB LEAK RATE - REFERENCE CASE
SENSITIVITY TO SLB LEAKAGE THRESHOLD

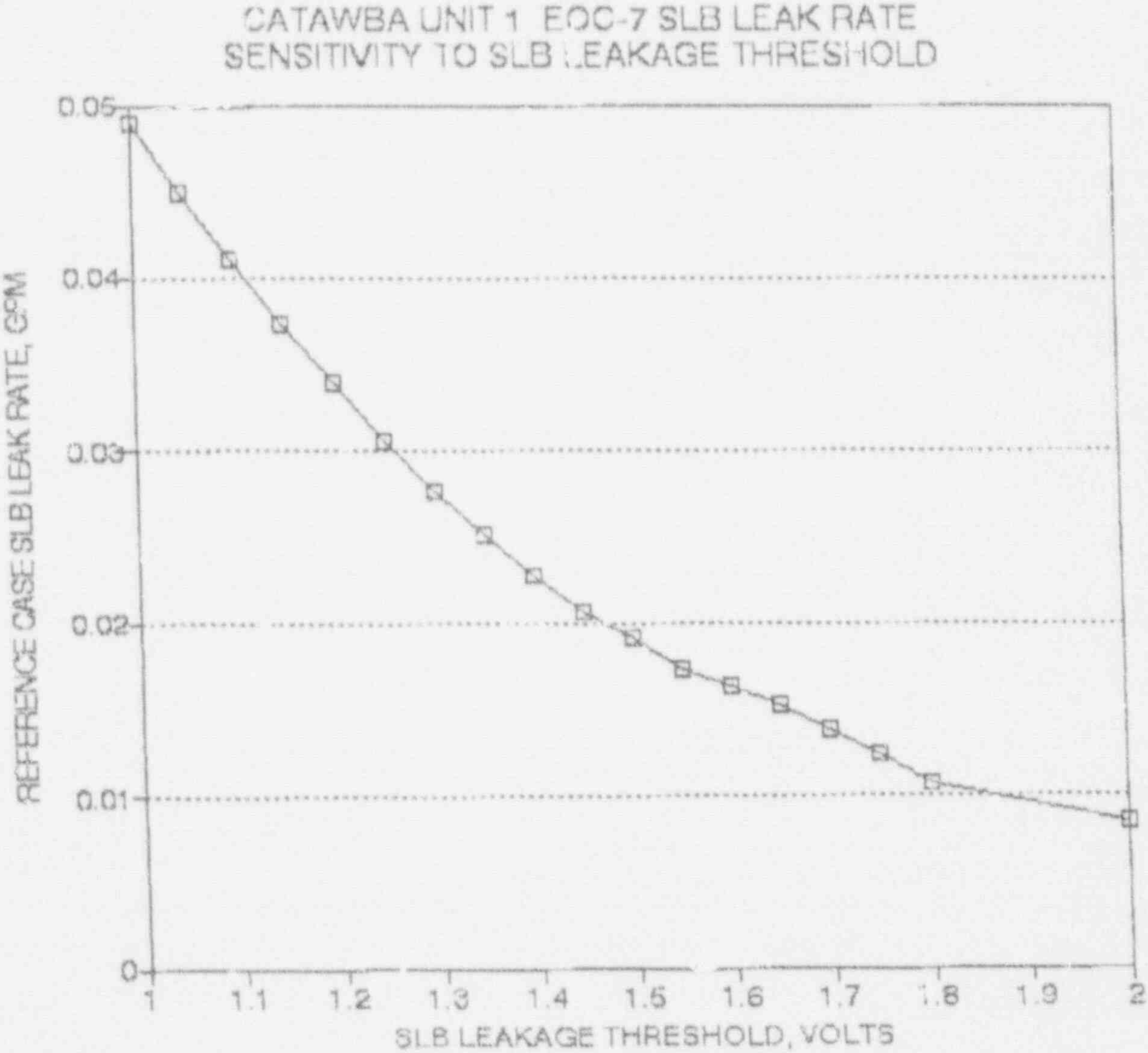
THRESHOLD VOLTAGE	LEAK RATE (GPM)
1.00	0.049
1.05	0.045
1.10	0.041
1.15	0.037
1.20	0.034
1.25	0.031
1.30	0.028
1.35	0.025
1.40	0.023
1.45	0.021
1.50	0.019
1.55	0.017
1.60	0.016
1.65	0.015
1.70	0.014
1.75	0.012
1.80	0.011
2.00	0.009

TABLE 2

Catawba-1 Comparison of Bobbin Voltages Between Analyses of Same Data and Between Repeat Inspections (Common Probe Diameter)

Tube	TSP	Volts: Same Tape Single Analyst	Volts: Same Tape Resolved	Volts 2nd Tape Single Analyst	Differences Same Tape	Differences Second Tape
R2C83	6	0.26	0.19	0.13	-0.07	0.06
R36C93	2	2.00	2.00	1.92	0.0	0.08
	3	0.34	0.38	0.36	0.04	0.02
R9C91	2	3.51	3.51	3.69	0.0	-0.18
	3	1.13	1.12	1.08	-0.01	0.04
	4	0.41	0.42	0.39	0.01	0.03
R15C20	3	0.42	0.37	0.38	-0.05	-0.01
	5	0.53	0.77	0.76	0.24	0.01
	6	0.26	0.22	0.18	-0.04	0.04
R5C58	2	0.44	0.42	0.50	-0.02	-0.08
R4C17	2	0.33	0.24	0.50	-0.09	-0.26
R6C9	2	0.45	0.45	0.43	0.0	0.02
	3	1.07	1.07	1.10	0.0	-0.03
R12C76	2	0.10	0.29	0.13	0.19	0.16
R44C40	4	0.18	0.20	0.16	0.02	0.04
R12C86	2	0.38	0.39	0.27	0.01	0.12
	3	0.25	0.54	0.36	0.29	0.18
	5	0.23	0.62	0.18	0.39	0.44
R23C77	2	0.15	0.18	0.04	0.03	0.14
	3	0.35	0.77	0.24	0.42	0.53
R31C89	2	1.38	1.57	1.35	0.19	0.22
	4	0.24	0.44	0.38	0.20	0.06
R4C104	2	0.44	0.49	0.29	0.05	0.20
	3	0.51	0.54	0.52	0.03	0.02
	4	0.80	0.92	0.83	0.12	0.09
R8C68	2	0.29	0.23	0.18	-0.06	0.05

FIGURE 1


CATAWBA UNIT 1 EOC-7 SLB LEAK RATE
SENSITIVITY TO SLB LEAKAGE THRESHOLD
REFERENCE CASE SLB LEAK RATE, GPM
0.05
0.04
0.03
0.02
0.01
0
1
1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
1.9
2
SLB LEAKAGE THRESHOLD, VOLTS