

Duke Power Company
Nuclear Production Dept.
P.O. Box 1007
Charlotte, N.C. 28201-1007

M. S. TUCKMAN
Vice President
Nuclear Operations
(704)373-3851



DUKE POWER

December 6, 1990

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

Subject: Catawba Nuclear Station, Unit 1
Docket No. 50-413
NRC Bulletin No. 88-09
Incore Instrument Guide Thimble Wear Examination

In H. B. Tucker's response to NRC Bulletin 88-09 for Catawba Unit 1 dated March 16, 1989, it was stated that the next Incore Instrument Guide Thimble Wear Examination would take place at the End-of-Cycle (EOC) 5. At that time, Westinghouse had quoted a 10% uncertainty on the Eddy Current Testing Process. This 10% uncertainty was included in the decision to re-examine the thimble tubes at the EOC-5. Westinghouse, through work on an Owners Group project, has determined that the 10% uncertainty can be removed from the wear calculations. Based on this information, Duke has re-calculated the Catawba Unit 1 wear prediction. The new prediction shows that the thimbles should be re-examined at the EOC-6 instead of EOC-5. This prediction may be updated again once the Westinghouse Owners Group Report is released. Find attached the new wear calculations for Catawba Unit 1.

Very truly yours,

M. S. Tuckman

M. S. Tuckman, Vice President
Nuclear Operations

CRL/7/lcs

9012110212 901206
PDR ADOCK 05000413
PDC

IE18
111

U. S. Nuclear Regulatory Commission
December 6, 1990
Page 2

cc: Mr. W. T. Orders
NRC Resident Inspector
Catawba Nuclear Station

Mr. S. D. Ebnetter
Regional Administrator, Region II
U. S. Nuclear Regulatory Commission
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

Mr. R. E. Martin
Office of Nuclear Reactor Regulations
U. S. Nuclear Regulatory Commission
One White Flint North, Mail Stop 9H3
Washington, D.C. 20555

Mr. Stan Kirslis
Office of Nuclear Reactor Regulations
U. S. Nuclear Regulatory Commission
One White Flint North, Mail Stop 9H3
Washington, D.C. 20555

Catawba Unit 1
Incore Instrument Guide Thimble Wear Examination

The first Eddy Current Test (ECT) occurred at the EOC-3 on Catawba 1. The maximum wear detected was 55% through wall at location M-07. This is the only location that showed any detectable wear. Wear occurs to the thimble tubes anytime the reactor coolant pumps are running (Modes 1-4). Based on the data below, it is clear that the ratio of Mode 1-4 days to effective full power days (EFPD) is high for the unit's initial cycle. The average ratio for cycles 2-4 is 1.16. This value will be used to estimate future cycles.

<u>Cycle</u>	<u>No. of Days In Modes 1-4</u>	<u>EFPD</u>	<u>Ratio</u>
1	594	336	1.77
2	351	275	1.28
3	313	300	1.04
4	370	320	1.16

Calculating the wear rate, WR, based on thimble M-07 results in the following:

$$WR = WL/ND$$

Where: WR = Wear Rate

WL = Maximum Indicated Wear Loss from ECT Inspection

ND = Number of Days in Modes 1-4

A linear wear extrapolation for the number of additional days in Modes 1-4 before the thimble wall loss exceeds a 60% wall loss criterion is given by:

$$WL + (WR \times NDA) = WLP < 60\%$$

Where: WLP = Predicted Wall Loss

NDA = Number of Additional Days in Modes 1-4

The calculated wear rate, WR, based on M-07 result is given by the following:

$$WR = 55\%/1258 \text{ days} = 0.04372\% \text{ per day in Modes 1-4}$$

Using this calculated wear rate, it is possible to estimate when other thimbles may reach the 60% wall loss criteria. This is then used to establish the thimble inspection interval.

$$NDA = (60\% - WL)/WR$$

$$NDA = (60\% - 0\%)/0.04372\% \text{ per day in Modes 1-4}$$

$$NDA = 1372 \text{ additional days in Modes 1-4}$$

Note that a value of 0% was used for WL in the above equation. This value was used since the wear prediction is on thimbles that have no wear indicated at the last inspection (it is not necessary to predict wear on M-07 since it has been isolated).

Therefore, after 1372 additional days in Modes 1-4, Catawba 1 should be inspected. Using future estimates of Catawba 1 cycle lengths, the inspection time can be determined.

Future Catawba 1 Cycle Estimates

<u>Cycle</u>	<u>EFPD Including +10 Window</u>	<u>No. of Days In Modes 1-4 (EFPD *1.16)</u>	<u>Accumulative Days In Modes 1-4</u>
4*	320	370	370
5	310	360	730
6	360	418	1148
7	360	418	1566

*Cycle 4 data is actual data.

Catawba 1 can operate to the EOC-6 before needing inspection.