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DUKE POWER

May 13, 1996

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

SUBJECT: Duke Power Company
McGuire Nuclear Station - Unit 2
Docket No. 50-370
NRC Bulletin 96-01 - Outage Test Data

The purpose of this letter is to provide information on McGuire Unit 2 actions taken during the current refueling outage (2EOC10) in response to NRC Bulletin 96-01.

NRC Bulletin 96-01, dated March 8, 1996, requested holders of operating licenses for Westinghouse designed plants to take actions and supply information to the NRC regarding recent control rod insertion problems. The initial Duke Power response to this bulletin was provided by letter dated April 4, 1996 and supplemented with additional information by letter dated April 30, 1996.

Restated below are pertinent sections of NRC Bulletin 96-01 requiring actions during the current McGuire Unit 2 refueling outage:

Requested Action (3):

(3) Measure and evaluate at each outage of sufficient duration during calendar year 1996 (end of cycle, maintenance, etc.), the control rod drop times and rod recoil data for all control rods. If appropriate plant conditions exist where the vessel head is removed, measure and evaluate drag forces for all rodded fuel assemblies.

a. Rods failing to meet the rod drop time in technical specifications shall be deemed inoperable.

b. Rods failing to bottom or exhibiting high drag forces shall require prompt corrective action in accordance with Appendix B to Part 50 of Title 10 of the Code of Federal Regulations (10 CFR Part 50).

Required Response Item (3):

(3) Within 30 days after completing Requested Action (3) for each outage, a report that summarizes the data and that documents the results obtained; this is also applicable to Requested Action (4)when any abnormal rod behavior is observed.

IE57

McGuire Response to Item (3):

Included as Attachment 1 and 2 to this letter is a summary report of the McGuire Unit 2 data for Requested Action (3) obtained during testing performed in conjunction with the Unit 2 End-of-Cycle 10 refueling outage. This testing was completed on April 12, 1996.

Further testing will be performed in accordance with the requested information within the NRC Bulletin.

Please direct questions on this matter to James E. Snyder at (704) 875-4447.

Very truly yours,

T. C. McMeekin

Attachment 1

McGuire Unit 2 Control Rod Drive Line Performance Evaluation Analysis

Attachment 2

McGuire Unit 2 RCCA Drag Test Before Fuel Unload

cc: Mr. S. D. Ebneter, Regional Administrator
U. S. Nuclear Regulatory Commission
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101 Marietta St., NW, Suite 2900
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Mr. Victor Nerses
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Mr. George Maxwell
NRC Resident Inspector
McGuire Nuclear Station

McGuire Nuclear Station

NRC Bulletin 96-01

Attachment 1

Unit 2 Control Rod Drive Line Performance Evaluation Analysis

On April 5, 1996 Control Rod Drop Timing was performed in accordance with requirements of NRC Bulletin 96-01. The following is a summary of the data analysis of the Control Rod Drive Line Performance Evaluation for McGuire Nuclear Station Unit 2.

During the Unit 2 EOC10(End of Cycle) outage, Rod Drop Testing was performed on the Drive Lines. This included a detailed analysis of Control Rod Drop Times (see attached data tables).

McGuire Nuclear Station has trended control rod drop times from initial plant startup in 1983. The data has been consistent during all testing on Unit 1 and 2.

The analysis method used consisted of a detailed review of each control rod's time based profile. Four rods, F-10, H-08, H-10 and N-09, were flagged as having slightly longer drop times. All four of these control rods were still well within their required time. The profiles of eight rods were then superimposed on each other and compared. The mean profile was used to compare an additional seven rods. This process was repeated until all of the rods were analyzed. Again the same four control rods exhibited a slight variance in their profiles.

McGuire traces did not reveal any change at the top of the fuel assembly. However, four of the McGuire traces indicated a very slight change at the center of the fuel assembly. Duke Power's analysis of industry data indicates that this is typical of the majority of rods throughout the industry that use Westinghouse fuel. This typical category is a deceleration prior to the Dashpot Region.

Duke Power has detailed information on the testing and analysis methodology and is willing to share with the NRC upon request.

McGuire Nuclear Station

NRC Bulletin 96-01

Attachment 2

Unit 2 EOC-10 RCCA Drag Test Before Fuel Unload

April 18, 1996

The McGuire Unit 2 RCCA (Rod Cluster Control Assembly or control rod) drag test was conducted in conjunction with heavy drive rod unlatching. Drive rod unlatching takes place before the initial removal of the upper internals. The Unit 2 control rod drag test before fuel unload was performed in response to McGuire Evaluation of NRC Bulletin 96-01, Control Rod Insertion Problems. The purpose of the drag test is to address an industry issue of some control rods not fully inserting into the dashpot region during a reactor scram. The dashpot is the lower one and a half feet of a fuel assembly guide thimbles. A control rod is connected to a drive rod which is then lifted, lowered, or released by a CRDM (Control Rod Drive Mechanism). The control rod drag test took place April 11- 12, 1996.

During a control rod drag test, the weight will gradually increase or decrease as the control rod is raised or lowered. The reference weight of 923 pounds is the average load cell reading with the control rod raised six (6) inches and at rest. Because of buoyancy effects, the gradual weight change during a normal drag test is from 923 pounds to 965 pounds after 10 feet of travel.

The control rod drag test arrangement consists of a digital load cell attached to the manipulator crane auxiliary hoist. The load cell is attached to the lifting bail of the unlatching tool. The unlatching tool is then attached to each drive rod.

The recorded weights in Tables 1 and 2 are from visual observations of a digital load cell. Table 3 is a summary of the dashpot drag loads during withdrawal and insertion.

During control rod withdrawal drag tests, all control rods were within the Westinghouse F-Spec No. 7.1 tolerance of plus or minus 100 pounds (Table 1). The greatest weight delta of 71 pounds occurred on core locations H-8 and N-9 followed by H-10 at 69 pounds and C-9 at 59 pounds. Three of these locations correspond to those locations with the longest drop times noted in Attachment #1. Both the rod drop times and the drag test data were within acceptable criteria.

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Attachment 2
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Table 1 - Maximum Dash Pot Withdrawal Weights During Control Rod Drag Test
Reference weight: 923 pounds

Control Rod Core Location	Maximum Dashpot Weight Reading (Pounds)	Control Rod Core Location	Maximum Dashpot Weight Reading (Pounds)	Control Rod Core Location	Maximum Dashpot Weight Reading (Pounds)
B-4	932	F-8	962	K-14	930
B-6	922	F-10	974	L-3	944
B-8	930	F-14	944	L-13	932
B-10	930	G-3	966	M-2	936
B-12	960	G-13	962	M-4	934
C-5	942	H-2	938	M-8	940
C-7	944	H-4	960	M-12	935
C-9	982	H-6	958	M14	935
C-11	956	H-8	994	N-5	934
D-2	930	H-10	992	N-7	944
D-4	948	H-2	950	N-9	994
D-8	938	H-14	924	N-11	950
D-12	972	J-3	956	P-4	946
D-14	936	J-13	936	P-6	930
E-3	946	K-2	938	P-8	942
E-13	970	K-6	964	P-10	934
F-2	930	K-8	948	P-12	942
F-6	962	K-10	974	**Average Wt.**	**948**

Table 2 - Minimum Dash Pot Insertion Weight During Control Rod Drag Test
Reference Weight: 923 pounds

Control Rod Core Location	Minimum Dashpot Weight Reading (Pounds)	Control Rod Core Location	Minimum Dashpot Weight Reading (Pounds)	Control Rod Core Location	Minimum Dashpot Weight Reading (Pounds)
B-4	900	F-8	874	K-14	900
B-6	904	F-10	858	L-3	886
B-8	902	F-14	882	L-13	900
B-10	894	G-3	*	M-2	894
B-12	868	G-13	870	M-4	892
C-5	892	H-2	850	M-8	890
C-7	886	H-4	882	M-12	900
C-9	850	H-6	874	M14	886
C-11	874	H-8	844	N-5	898
D-2	900	H-10	842	N-7	894
D-4	888	H-12	842	N-9	840
D-8	896	H-14	884	N-11	884
D-12	864	J-3	890	P-4	898
D-14	896	J-13	896	P-6	898
E-3	880	K-2	884	P-8	888
E-13	862	K-6	886	P-10	888
F-2	856	K-8	886	P-12	890
F-6	872	K-10	862	**Average Wt.**	**880**

* Invalid data was obtained for position G-3 due to a recording error. Location G-3 showed no drop time anomaly.

Table 3 - Withdrawal and Insertion Dashpot Weight Differences from the Reference Weight

Control Rod Core Location	Withdrawal Weight Delta (Pounds)	Insertion Weight Delta (Pounds)	Control Rod Core Location	Withdrawal Weight Delta (Pounds)	Insertion Weight Delta (Pounds)	Control Rod Core Location	Withdrawal Weight Delta (Pounds)	Insertion Weight Delta (Pounds)
B-4	9	23	F-8	39	49	K-14	7	23
B-6	0	19	F-10	51	65	L-3	21	37
B-8	7	21	F-14	21	41	L-13	9	23
B-10	7	25	G-3	43	*	M-2	13	29
B-12	37	55	G-13	39	53	M-4	11	31
C-5	19	31	H-2	15	73	M-8	17	33
C-7	21	37	H-4	37	41	M-12	12	23
C-9	59	73	H-6	35	49	M14	12	37
C-11	33	49	H-8	71	79	N-5	11	25
D-2	7	23	H-10	69	81	N-7	21	29
D-4	25	35	H-12	27	81	N-9	71	83
D-8	15	27	H-14	1	39	N-11	27	39
D-12	49	59	J-3	33	33	P-4	23	25
D-14	13	27	J-13	13	27	P-6	7	25
E-3	23	43	K-2	15	39	P-8	19	35
E-13	47	61	K-6	41	37	P-10	11	35
F-2	7	67	K-8	25	37	P-12	19	33
F-6	39	51	K-10	51	61			

* Invalid data was obtained for position G-3 due to a recording error. Location G-3 showed no drop time anomaly.