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October 9, 1996

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

Subject: Beaver Valley Power Station, Unit No. 2
Docket No. 50-412, License No. NPF-73
Response to NRC Bulletin No. 96-01:
Control Rod Insertion Problems

Attached is the Duquesne Light Company report summarizing the data and documenting the results for Beaver Valley Power Station Unit No. 2 Fuel Cycle 6 end of life measurements of the control rod drop times and drag forces for all rodded fuel assemblies. This report is being submitted to satisfy the Required Response (3) of NRC Bulletin 96-01: Control Rod Insertion Problems.

Based on the evaluation of the data obtained for control rod testing at the end of Cycle 6 at Beaver Valley Power Station Unit No. 2, no difficulties were encountered with control rods failing to insert completely on a scram signal. Three of the Cycle 6 fuel assemblies exhibited control rod drag forces which exceeded the acceptance criteria in the non-dashpot region of the assembly guide thimbles. These three fuel assemblies were discharged to the spent fuel pool and are not part of the Cycle 7 reactor core. Additional data is included in the attached report.

If you have any questions concerning this response, please contact Mr. Roy K. Brosi at (412) 393-5210.

Sincerely,

Sushil C. Jain

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Attachment

c: Mr. D. M. Kern, Sr. Resident Inspector
Mr. H. J. Miller, NRC Region I Administrator
Mr. D. S. Brinkman, Sr. Project Manager

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA)
) SS:
COUNTY OF BEAVER)

Subject: Beaver Valley Power Station, Unit No. 2
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Before me, the undersigned notary public, in and for the County and Commonwealth aforesaid, this day personally appeared Sushil C. Jain, to me known, who being duly sworn according to law, deposes and says that he is Division Vice President, Nuclear Services of the Nuclear Power Division, Duquesne Light Company, he is duly authorized to execute and file the foregoing submittal on behalf of said Company, and the statements set forth in the submittal are true and correct to the best of his knowledge, information and belief.

Sushil C. Jain

Subscribed and sworn to before me

on this 9th day of October, 1996

Vivian V. Harper

Notary Public

Notarial Seal
Vivian V. Harper, Notary Public
Industry Boro, Beaver County
My Commission Expires June 3, 1999
Member, Pennsylvania Association of Notaries

Attachment 1
Response to NRC Bulletin 96-01

Unit 2 Cycle 6 End of Life Control Rod Testing

Rod Drop Testing

On August 31, 1996, Control Rod Drop Time measurements were performed for all 48 control rods in the core. Drop times were measured from the beginning of voltage decay on the stationary gripper coil to rod entry into the dashpot region and from rod entry into the dashpot region to rod bottom. Each trace was also checked for rod bottom recoil to ensure all rods reached the rod bottom position. All drop times to dashpot entry were within the Technical Specification limit of 2.7 seconds.

All rods demonstrated rod bottom recoil to varying degrees (1 to 5 bounces). The rods with the least number of bounces (1) were at core locations K10, K12, and F12. The control rods at core locations F12 and K12 were located in fuel assemblies with an approximate burnup of 39539 MWD/MTU and the rod drop times to rod bottom increased 0.40 and 0.29 seconds, respectively, from the Beginning of Life (BOL) test. The control rod at core location K10 was located in a fuel assembly with an approximate burnup of 38922 MWD/MTU and its rod drop time to rod bottom increased 0.12 seconds from the BOL test. The fuel assemblies in Cycle 6 core locations K10, F12, and K12 will not be reloaded into the core for Cycle 7. A summary of the Beginning of Life and End of Life (EOL) control rod drop time tests is listed below.

	Time to dashpot (sec)			Time to rod bottom (sec)		
Test	Average	Fastest	Slowest	Average	Fastest	Slowest
BOL	1.40	1.35	1.50	1.86	1.79	1.99
EOL	1.41	1.36	1.53	1.87	1.79	2.29

All control rod drop times for the EOL test with the corresponding fuel assembly burnups are listed in Table 1.

Control Rod Drag Test

Control rod drag tests in the reactor vessel were performed on September 9, 1996. All 48 control rods were drag tested by withdrawing the control rod approximately ten feet out of the assembly and reinserting it. During this time the initial dead weight, maximum weight during withdrawal, and minimum weight during insertion were measured using a spring scale and recorded. The maximum drag measurements in the dashpot region of the fuel assemblies for all control rods was equal to or less than the acceptance criteria value of 100 pounds. Maximum drag measurements in the non-dashpot region for all control rods are listed in Table 1.

During the drag test the control rods at core locations F12, K12, K10, F4, and G13 failed the 40 pound acceptance criteria in the non-dashpot region. All of the above rods were retested. During the retest the maximum drag for the rods at core locations F4 and G13 was determined to be 40 pounds. The table below illustrates the drag results for the above rods.

Drag Test Trial 1 (in reactor vessel)

Core Location	Assembly ID	Maximum Drag (Pounds)			
		Withdraw		Insertion	
		Dashpot	Non-Dashpot	Dashpot	Non-Dashpot
F12	G46	60	65*	75	50*
K12	G16	20	10	90	85*
K10	G38	45	30	65	55*
F4	G23	40	0	75	50*
G13	H37	40	45*	25	15

Drag Test Trial 2 (in reactor vessel)

Core Location	Assembly ID	Maximum Drag (Pounds)			
		Withdraw		Insertion	
		Dashpot	Non-Dashpot	Dashpot	Non-Dashpot
F12	G46	35	30	100	80*
K12	G16	25	40	95	90*
K10	G38	60	55*	50	35
F4	G23	60	40	55	40
G13	H37	35	40	20	15

*Indicates Acceptance Criteria exceeded.

All of the above fuel assemblies with the exception of H37 will be discharged to the Spent Fuel Pool. Assembly H37 will be reloaded into Cycle 7 but will be in a non-rodded core location. Additional drag tests for these control rods were also performed in the spent fuel pool using a load cell and recorder. These tests were performed before and after control rod changeouts for Cycle 7 reload. The results of these tests as shown below indicate that the control rods are acceptable for use in their Cycle 7 reload assemblies.

Drag Test Cycle 6 Assemblies (in spent fuel pool)

Control Rod ID	Assembly ID	Maximum Drag (Pounds)			
		Withdraw		Insertion	
		Dashpot	Non-Dashpot	Dashpot	Non-Dashpot
R25 (F12)	G46	65	40	70	45*
R20 (K12)	G16	65	50*	65	48*
R24 (K10)	G38	64	45*	65	40
R19 (F4)	G23	65	45*	65	45*
R35 (G13)	H37	25	20	25	15

*Indicates Acceptance Criteria exceeded.

Drag Test Cycle 7 Assemblies (in spent fuel pool)

Control Rod ID	Assembly ID	Maximum Drag (Pounds)			
		Withdraw		Insertion	
		Dashpot	Non-Dashpot	Dashpot	Non-Dashpot
R25 (M6)	H45	40	30	35	25
R20 (G7)	H15	10	10	5	3
R24 (F4)	H55	10	10	10	10
R19 (F6)	H10	10	5	5	3
R35 (M4)	J37	10	5	5	1

The results of the control rod drop timing test and rod drag testing reported above and in Table 1 demonstrate that all of the control rods were operable at Cycle 6 EOL despite several fuel assemblies exceeding the rod drag acceptance criteria in the non-dashpot region of the assemblies.

A drag test in the reactor vessel of all Cycle 7 control rods including those identified above will be performed for startup as part of the required testing for Unit 2 Cycle 7. A control rod drop timing test will also be performed for Cycle 7 startup. The results of these tests will be reported by separate submittal to meet NRC Bulletin 96-01 requirements and will demonstrate the operability of the control rods for Unit 2 Cycle 7.

Table 1.
Beaver Valley Power Station Unit 2
Cycle 6 EOL Rod Drop and Drag Test Results

Core Location	Assembly ID	Assembly Burnup (MWD/MTU)	Drop Time to Dashpot (sec.)	Dashpot to Rod Bottom (sec)	Drop Time Total (sec)	Dead Weight (lbs)	Max.or Min. Weight (lbs)	Max. Drag Non-Dashpot (lbs)
D6	G35	39539	1.38	0.44	1.82	420	445	25
M6	G29	39539	1.37	0.45	1.81	430	425	5
D10	G39	39539	1.39	0.44	1.83	410	435	25
M10	G34	39539	1.40	0.47	1.87	440	415	25
F4	G23	39539	1.46	0.57	2.03	425	465	40
K4	G15	39539	1.39	0.47	1.85	425	440	15
F12	G46	39539	1.53	0.66	2.19	455	375	80 *
K12	G16	39539	1.53	0.76	2.29	460	370	90 *
E5	G36	39518	1.42	0.45	1.87	420	450	30
L5	G21	39518	1.40	0.43	1.83	440	425	15
E11	G40	39518	1.44	0.42	1.87	430	410	20
L11	G43	39518	1.38	0.46	1.84	420	455	35
F6	G45	38922	1.37	0.46	1.83	450	415	35
K6	G14	38922	1.38	0.46	1.83	445	415	30
F10	G27	38922	1.39	0.45	1.84	450	410	40
K10	G38	38922	1.44	0.54	1.98	420	475	55 *
D4	G12	33527	1.46	0.45	1.91	415	440	25
M4	G11	33527	1.37	0.44	1.81	425	440	15
D12	G10	33527	1.38	0.43	1.81	410	445	35
M12	G09	33527	1.41	0.41	1.82	425	435	10
B6	G67	30716	1.50	0.45	1.95	425	430	5
P6	G57	30716	1.36	0.44	1.80	420	430	10
B10	G68	30716	1.41	0.45	1.86	425	435	10
P10	G59	30716	1.39	0.42	1.81	425	435	10

*Exceeds Acceptance Criteria

Table 1
Beaver Valley Power Station Unit 2
Cycle 6 EOL Rod Drop and Drag Test Results

Core Location	Assembly ID	Assembly Burnup (MWD/MTU)	Drop Time to Dashpot (sec.)	Dashpot to Rod Bottom (sec)	Drop Time Total (sec)	Dead Weight (lbs)	Max.or Min. Weight (lbs)	Max. Drag Non-Dashpot (lbs)
F2	G63	30649	1.41	0.49	1.39	420	450	30
K2	G62	30649	1.43	0.47	1.90	425	440	15
F14	G60	30649	1.40	0.45	1.85	420	450	30
K14	G58	30649	1.46	0.48	1.94	425	435	10
G7	H66	22064	1.36	0.47	1.83	420	460	40
J7	H65	22064	1.38	0.43	1.81	425	445	20
G9	H68	22064	1.36	0.52	1.88	430	460	30
J9	H67	22064	1.39	0.44	1.83	425	445	20
C7	H28	21704	1.41	0.40	1.81	415	430	15
N7	H40	21704	1.37	0.46	1.82	425	435	10
C9	H36	21704	1.39	0.42	1.81	420	430	10
N9	H35	21704	1.39	0.44	1.84	415	435	20
G3	H30	21605	1.43	0.46	1.89	415	450	35
J3	H27	21605	1.39	0.40	1.79	415	440	25
G13	H37	21605	1.40	0.52	1.91	420	460	40
J13	H25	21605	1.36	0.43	1.79	425	435	10
H6	H23	21426	1.39	0.42	1.81	420	435	15
F8	H07	21426	1.36	0.47	1.84	420	455	35
K8	H12	21426	1.38	0.42	1.80	445	420	25
H10	H05	21426	1.40	0.47	1.87	420	435	15
H2	H08	18220	1.42	0.44	1.86	425	435	10
B8	H09	18220	1.49	0.45	1.95	415	450	35
P8	H11	18220	1.36	0.43	1.79	425	435	10
H14	H16	18220	1.41	0.47	1.88	425	435	10

*Exceeds Acceptance Criteria