



September 3, 1992

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U. S. Nuclear Regulatory Commission
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Subject: Arkansas Nuclear One Units 1 and 2
Docket Nos. 50-313 & 50-368
License Nos. DPR-51 & NPF-6
Response to Inspection Report
50-313/92-18; 50-368/92-18
Motor Operated Valve Program

Gentlemen:

Arkansas Nuclear One (ANO) has initiated a comprehensive program to implement the requirements of Generic Letter 89-10, "Safety-Related Motor Operated Valve (MOV) Testing and Surveillance." As stated in the subject inspection report, this program was developed and properly implemented to verify the capabilities of safety-related MOVs. This response provides the information requested in Inspection Report 92-18 dated June 5, 1992.

During the review of MOV setting capability or "setpoint" calculations the inspector identified what appeared to be marginally sized MOVs in that they possessed less than desirable thrust windows between minimum required and maximum allowable values based on expanded factors to determine switch settings. These margins could be further reduced in light of several other considerations. To address this issue, the subject inspection report requested ANO to "identify all MOVs which can be categorized as marginal and reevaluate the capability of these using supportable assumptions which account for all known sources of inaccuracy. This evaluation should include the use of on-site test results to validate assumptions for valve factor, stem friction coefficient, and rate of loading. The submittal should include a description of any actions planned to correct or enhance the performance of the identified

The ANO MOV testing program contains 284 MOVs. These MOVs were screened using the criteria outlined in Attachment A which utilized the expanded factors to determine switch settings. The screening identified 36 MOVs in Unit 1 (Attachment B) and 33 in Unit 2 (Attachment C), for a total of 69 valves that do not have at least 15% design margin available above minimum thrust requirements. Even though nine (9) of these have successfully passed dynamic testing, the 69 MOVs have been evaluated using operability criteria as defined in Design Engineering Standard MES-01, "Guideline for Preparing Motor Valve Setpoint Calculations". This operability criteria allow the use of some factors which are different than those used for design criteria for periods of

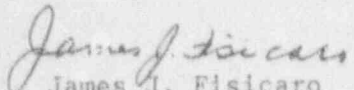
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time to allow appropriate actions to be taken to return the MOV to design criteria status. These criteria are supported by average actual test results as the evaluation basis. The result of these evaluations is that the 69 MOVs have been found to contain sufficient capability to perform their safety function.

Additionally, where applicable, planned actions will be proposed to ANO's Change Review Board to ensure that program MOVs are able to meet the design criteria based on system safety significance. These actions are identified in Attachments B and C with implementation anticipated to occur over the next two (2) refueling outages for each unit. The potential exists for schedule impacts such as long lead time parts availability, plant status, and changes to certain calculational factors. In addition, the planned scope may vary from those detailed as additional scoping is accomplished. It is our intent to meet all existing commitments related to our implementation of Generic Letter 89-10.

Should you have questions or comments please call me at 501-964-8601.

Very truly yours,


James J. Fisicaro
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JJF/RMC/mmg
attachments

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ATTACHMENT

ANO MOV PROGRAM
GENERIC LETTER 89-10 SCOPE
MOV PROGRAM SCREENING OR DESIGN CRITERIA

MOVS SCREENED: Unit 1 - 124 Unit 2 - 160

SCREENING CRITERIA:

- a) Rate of Loading = 15%
(applied to Min. Req. Thrust)
- b) Stem Friction Coefficient = 0.2
- c) Gate Valve Seat Factors
(solid and flex wedge) = 0.5
(parallel disc) = 0.4
- d) Kalsi Thrust Increases Applied
Where Appropriate
- e) Packing Loads = 1,000 lb/in stem dia.
- f) Thrust Margin for Setup = 15%
- g) Torque Margin for Setup = 10% - 90 degree turn
- h) Torque Margin for Setup = 5% - gates and globes

SCREENING METHODOLOGY: As described in MES-01, Rev. 2

SCREENING CRITERIA BASIS:

- a) Rate of Loading: ANO DP test data to date indicate average value of 10.94% for 25 tests with no credit for negative data.
- b) Stem Friction Coefficient: ANO test data from 1R10 indicate average value of 0.162 for 37 static as-left tests.
- c) & d): As stated in MES-01, Rev. 2.
- e) Packing Loads: ANO DP tests to date as well as consultation with another utility show that actual packing loads are well bounded by this value.
- f), g) & h): As stated in MES-01, Rev 2.

ANO UNIT 1 - MARGINAL MOV ANALYSIS RESULTS/PLANNED ACTIONS

MOV TAG NO	SYST.	LIMIT SETPOINT CRITERIA				OPERABILITY CRIT.			DP Test Done	AVAL MARGINS OVER		Modifications or Other Actions Planned To Meet Design Criteria	NOTE	
		TQR/THR VALVE	VF	SF MU	LSB %	Pack Red.	Gear Ef Ic	Appl Fact		CALC. MIN. THRUST	REQ. TORQUE			
1. CV-2620	EFW	TQR/THR	0.50	0.20	15%	YES	YES	1.00		10.2%	9.5%	Actuator/Red MEDP	1R12	12
2. CV-2626	EFW	TQR	0.50	0.20	15%			1.00		36.6%	12.1%	Gears/Red MEDP	1R12	
3. CV-2627	EFW	TQR/THR	0.50	0.20	15%			0.90		10.2%	5.4%	Actuator/Red MEDP	1R12	12
4. CV-2670	EFW	TQR	0.50	0.20	15%			1.00		36.6%	12.1%	Gear: Reduce MEDP	1R12	
5. CV-2869	EFW	TQR	0.50	0.20	15%			0.90	YES	51.4%	6.1%	None/Reduce MEDP		
6. CV-2870	EFW	TQR	0.53	0.20	15%	YES	YES	1.00	YES	23.3%	5.2%	Motor/Reduce MEDP	1R12	17
1. CV-2613	MS	TQR	0.50	0.20	15%		YES	1.00		66.3%	14.2%	Gears	1R11	
2. CV-2617	MS	TQR	0.50	0.20	15%	YES	YES	1.00	YES	38.1%	12.5%	Actuator	1R11	10
3. CV-2663	MS	TQR	0.48	0.20	15%	YES	YES	1.00		44.7%	7.6%	Actuator	1R11	
4. CV-2619	MS	TQR/THR	0.40	0.20	15%	YES		0.90		39.4%	5.1%	Actuator	1R11	11
5. CV-2676	MS	TQR/THR	0.40	0.20	15%	YES		0.90		39.4%	5.1%	Actuator	1R11	11
1. CV-2624	FW	NONE	0.50	0.20	15%			0.90		176.9%	220.5%	No Mods/Reduce MEDP		14
2. CV-2625	FW	TQR	0.30	0.20	15%		YES	1.00		55.1%	6.5%	Actuator/Raise MEDP	1R11	15
3. CV-2677	FW	TQR	0.40	0.20	15%		YES	1.00		26.2%	6.8%	Gears/Revise MEDP	1R11	13
4. CV-2674	FW	NONE	0.50	0.20	15%			0.90		176.9%	220.5%	No Mods/Reduce MEDP		14
5. CV-2675	FW	TQR	0.30	0.20	15%		YES	1.00		55.1%	6.5%	Actuator/Raise MEDP	1R11	15
6. CV-2680	FW	TQR	0.40	0.20	15%		YES	1.00		26.2%	12.8%	Gears/Revise MEDP	1R11	13
1. CV-1206	MU	TQR/VLV	0.37	0.20	0%	YES		1.00	YES	20.5%	12.8%	Valve disc/Gears	1R11	1
2. CV-1214	MU	NONE	0.40	0.20	15%			0.90	YES	46.2%	17.7%	None		2
3. CV-1216	MU	NONE	0.40	0.20	15%			0.90		46.2%	17.7%	None		2
4. CV-1233	MU	NONE	0.40	0.20	15%			0.90		92.0%	20.3%	None		3
5. CV-1234	MU	TQR/VLV	0.40	0.20	11%	YES		0.90	YES	3.7%	24.7%	Valve/Gears	1R11	4
1. CV-1407	BS	TQR	0.50	0.20	15%			1.00		74.1%	5.1%	Gears	1R12	
2. CV-1408	BS	TQR	0.50	0.20	15%			1.00		74.1%	11.0%	Gears	1R12	
3. CV-1436	BS	TQR	0.45	0.20	15%			0.90		26.4%	5.1%	None		7
4. CV-143	BS	TQR	0.45	0.20	15%			0.90		26.4%	5.1%	None		7
1. CV-2400	CS	TQR	1.10	0.20	15%			1.00		32.0%	15.4%	Gears	1R12	
2. CV-2401	CS	TQR	1.10	0.20	15%			1.00		32.0%	15.4%	Gears	1R12	
3. CV-2800	CS	TQR	0.50	0.20	15%		YES	1.00	YES	189.5%	18.6%	Gears	1R12	18
4. CV-2802	CS	TQR	0.50	0.20	15%	YES		0.90	YES	255.7%	10.9%	Gears/Sp Pack	1R12	
1. CV-3811	SW	TQR	NA	NA	NA			1.00		NA	19.2%	Motor	1R12	
1. CV-1404	DH	TQR	0.46	0.20	15%			0.90		14.1%	7.0%	None		5
2. CV-1416	DH	TQR	1.10	0.20	15%	YES		0.90		52.1%	11.8%	Actuator/Valve	1R11	6
1. CV-2215	ICW	TQR	0.40	0.20	15%			0.90		168.9%	7.2%	Spring Pack	1R12	8
2. CV-2221	ICW	TQR	0.40	0.20	15%	YES		0.90		256.7%	20.7%	Spring Pack	1R12	9
1. CV-6205	AC	TQR	0.50	0.20	15%	YES		0.90		497.8%	51.3%	Spring Pack	1R12	

LEGEND: VF = Valve Friction Factor
 SF MU = Stem Thread Friction Coefficient
 LSB = Load Sensitive Behavior
 Pack Red. = Packing Load Reduction
 Gear Ef Ic = Increase in Gear Efficiency for Motor Pullout Equation
 Appl Fact = Application Factor Removal

NOTES:

1. CV-1206 - DP test successfully completed. Actual test results for VF, LSB, Packing used for operability.
2. CV-1214/1216 - AD parallel disc valves. DP test successful on 1214. Test data bounded by evaluation assumptions
3. CV-1233 - AD parallel disc valve.
4. CV-1234 - DP test successfully completed. Actual data used for VF, LSB & Packing. Valve seats limiting.
5. CV-1404 - VF of 0.46 acceptable for Design Criteria since valve is low pressure, cold water service.
Present analysis assumes no inadvertent operation. If IO remains in program, mod will be needed IR12.
6. CV-1416 - Actuator replacement required to meet Design Criteria. Valve replacement to eliminate obsolete design
7. CV-1436/1437 - VF of 0.45 acceptable for Design Criteria since MEDP is low (320) in cold water service.
Used 100% voltage since operation is during Rec. Mode more than 3 minutes after ES initiation.
8. CV-2215 - AD parallel disc valve.
9. CV-2221 - AD parallel disc valve.
10. CV-2617 - DP Test successfully completed. Design Criteria envelopes test data.
11. CV-2619/2676 - VF acceptable for temporary use (Non-Blowdown).
12. CV-2620/2627 - Limited by actuator thrust rating.
13. CV-2630/2680 - AD parallel disc valves.
14. CV-2624/2674 - MEDP reduced since ADV downstream closes first. Will pursue program removal as MOVs are non-Q.
15. CV-2625/2675 - AD parallel disc valve, two speed actuator. Low speed meets Design Criteria.
16. CV-2800 - DP Test successfully completed. Test data enveloped by Design Criteria.
17. CV-2870 - Full MEDP test successfully run. Test data used where above Design Criteria.
Mods recommended to restore setup margin.

AND UNIT 2 - MARGINAL MOV ANALYSIS RESULTS/PLANNED ACTIONS

MOV TAG NO	SYST.	LIMIT TQR/THR VALVE	SETPOINT CRITERIA			OPERABILITY CRIT.			DP Test Done	AVAL MARGINS OVER		Modifications or Other Actions Planned		NOTE
			VF	SF MU	LSB %	Pack Red.	Gear Ef ic	Appl Fact		CALC.	MIN. REQ.	To Meet Design Criteria		
1. 2CV-0795	EFW	TQR	0.50	0.20	15%		YES	1.00		146.8%	6.8%	Gears-----2R10		
2. 2CV-1026	EFW	TQR	0.40	0.20	15%		YES	1.00		47.9%	7.1%	Motor/Spg Pack-----2R10	4	
3. 2CV-1036	EFW	TQR	0.40	0.20	15%			1.00		27.1%	13.0%	Gears/Spg Pack-----2R10	4	
4. 2CV-1037	EFW	TQR	0.50	0.20	15%			1.00		37.7%	14.1%	Gears-----2R10		
5. 2CV-1038	EFW	TQR	0.40	0.20	15%			1.00		27.1%	13.0%	Gears/Spg Pack-----2R10	4	
6. 2CV-1039	EFW	TQR	0.50	0.20	15%			0.90		37.7%	7.6%	None		
7. 2CV-1076	EFW	TQR	0.40	0.20	15%		YES	1.00		22.0%	7.1%	Motor/Spg Pack-----2R10	4	
1. 2CV-1418	SW	TQR	NA	NA	NA			1.00		NA	6.4%	No Mods/Reduce MEDP	5	
2. 2CV-1419	SW	TQR	NA	NA	NA			0.90		NA	6.5%	No Mods/Reduce MEDP	5	
3. 2CV-1421	SW	TQR	NA	NA	NA			1.00		NA	10.8%	No Mods/Reduce MEDP	5	
4. 2CV-1422	SW	TQR	NA	NA	NA			1.00		NA	10.8%	No Mods/Reduce MEDP	5	
5. 2CV-1425	SW	TQR	NA	NA	NA			1.00		NA	7.4%	No Mods/Reduce MEDP	5	
6. 2CV-1427	SW	TQR	NA	NA	NA		YES	1.00		NA	9.3%	No Mods/Reduce MEDP	5	
7. 2CV-1511	SW	TQR	NA	NA	NA		YES	1.00		NA	22.4%	None	6	
8. 2CV-1513	SW	TQR	NA	NA	NA		YES	1.00		NA	20.2%	Motor/HBC/Spg Pack---2R9	7	
9. 2CV-1519	SW	TQR	NA	NA	NA		YES	1.00		NA	22.4%	Motor/HBC/Spg Pack---2R9	7	
1. 2CV-0340	MS	NONE	0.50	0.20	15%			0.90	YES	57.3%	9.3%	None		
2. 2CV-1000	MS	TQR	0.50	0.20	15%			1.00		52.6%	6.9%	Gears/Sp Pack-----2R9		
3. 2CV-1002	MS	TQR/VLV	0.40	0.17	15%		YES	1.00		23.9%	6.8%	Actuator-----2R9	1	
4. 2CV-1050	MS	TQR	0.50	0.20	15%			0.90		52.6%	6.6%	Gears/Sp Pack-----2R9		
5. 2CV-1052	MS	TQR/VLV	0.40	0.17	15%		YES	0.90		23.9%	6.8%	Actuator-----2R9	1	
1. 2CV-5612	BS	TQR	0.45	0.20	15%		YES	0.90		113.8%	5.4%	None	10	
2. 2CV-5613	BS	TQR	0.45	0.20	15%		YES	0.90		113.8%	8.0%	None	10	
3. 2CV-5628	BS	NONE	0.50	0.20	15%			0.90		58.1%	23.1%	Reduce MEDP		
1. 2CV-1023	MFV	TQR	0.50	NA	5%		YES	0.90		10.8%	12.3%	None	2	
2. 2CV-1024	MFV	TQR	0.50	NA	10%			0.90		14.3%	23.6%	None	3	
3. 2CV-1073	MFV	TQR	0.50	NA	5%		YES	0.90		10.8%	15.5%	None	2	
4. 2CV-1074	MFV	TQR	0.50	NA	10%			0.90		14.3%	23.6%	None	3	
1. 2CV-5081	LPSI	TQR	0.50	0.20	15%		YES	0.90		138.3%	44.1%	None	9	
1. 2CV-4820	CVCS	TQR	1.10	0.20	15%			0.90				No results available	8	
2. 2CV-4824	CVCS	NONE	1.10	0.20	15%			0.90		16.6%	50.5%	None		
3. 2CV-4827	CVCS	NONE	1.10	0.20	15%			0.90		14.6%	30.8%	No Mods/Reduce MEDP		
4. 2CV-4831	CVCS	NONE	1.10	0.20	15%			0.90		14.6%	30.8%	No Mods/Reduce MEDP		

LEGEND: VF = Valve Friction Factor
 SF MU = Stem Thread Friction Coefficient
 LSB = Load Sensitive Behavior
 Pack Red. = Packing Load Reduction
 Gear Ef ic = Increase in Gear Efficiency for Motor Pullout Equation
 Appl Fact = Application Factor Removal

NOTES:

1. 2CV-1002/1052 - Reduced VF, SF MU and Packing based on DP test results averages to date. Act. replacement 10/92.
2. 2CV-1023/1073 - Lower LSB acceptable - ball screw stem nut design. Lower packing based on average test results.
3. 2CV-1024/1074 - Lower LSB acceptable - ball screw stem nut design.
4. 2CV-1026/1036/1038/1076 - VF reduced from 0.50 to 0.40 pending modifications. (NON-BLOWDOWN MOVES)
5. 2CV-1418/1419/1421/1422/1425/1427 - No mods recommended. MEDP to be revised to allow for alternate flowpaths.
6. 2CV-1511 - No mods recommended since mods are a result of inadvertent operation. Mods may be ren. 2R11.
Operability also includes taking credit for increased HBC unit capability based on test program.
7. 2CV-1513/1519 - Operability also include taking credit for increasing HBC capability based on test program.
8. 2CV-4820 - Correct valve component calculation on order. Initial evaluation used inappropriate calculation.
9. 2CV-5081 - No operability concerns. 2R9 test to confirm use of lower packing for design.
10. 2CV-5612/5613 - VF reduced from 0.50 to 0.45 pending further test information. Considered acceptable for design since valves are low pressure, cold water service with safety direction to open.