



PECO NUCLEAR

A Unit of PECO Energy

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August 6, 1996

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

Subject: Peach Bottom Atomic Power Station (PBAPS) Units 2 & 3,
Response to NRC information request concerning the
PBAPS Motor-Operated Valve (MOV) program

Reference: 1) NRC Routine Residents' Combined Integrated Inspection
Report 50-277/96-03 and 50-278/96-03 to D. M. Smith
(PECO Energy Company), dated June 3, 1996.

2) Letter from G. A. Hunger, Jr. (PECO Energy Company) to
NRC, dated August 9, 1995.

Gentlemen:

In response to your letter dated June 3, 1996, which transmitted the request to provide a written response to address several motor-operated valve issues identified during an NRC Generic Letter (GL) 89-10 MOV Program inspection, we submit the following information. As part of that request, we have included an update to the reactor water clean-up (RWCU) motor-operated isolation valve thrust margins which was originally submitted to you on August 9, 1995.

If you have any questions or require additional information, please do not hesitate to contact us.

Garrett D. Edwards
Plant Manager
Peach Bottom Atomic Power Station

cc: B. W. Gorman, Public Service Electric & Gas
R. R. Janati, Commonwealth of Pennsylvania
H. J. Miller, US NRC, Administrator, Region 1
W. L. Schmidt, US NRC, Senior Resident Inspector, Peach Bottom
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NRC Request:

Provide "the plan and schedule for inclusion and verification of capability for the 16 valves, that have active safety features during surveillance testing, into the GL 89-10 Program or a PORC approved safety evaluation stating why the valves need not be included in the program and plans for ensuring that these valves can perform their safety functions".

PECO Energy Response:

Based on conversations with your Inspectors and Nuclear Reactor Regulation Staff during the PBAPS GL 89-10 inspection, it was our understanding that these 16 MOVs would not have to be formally included in the GL 89-10 Program because of the pending discussions between the Boiling Water Reactor Owners' Group (BWROG) and the NRC regarding GL 89-10 scoping issues. Consistent with that understanding, we do not plan to add these 16 valves to the PBAPS GL 89-10 Program at this time. However, we acknowledge your interest in the ability of these valves to return to their normal standby positions from test modes. Therefore, the following actions have been or will be taken concerning the 16 valves in question.

Please note that the following capability assessments will be formally incorporated into the design information / setup criteria for the subject MOVs after the completion of additional instrumented differential pressure (DP) testing. A summary of the following discussion is presented for your information on Attachment 1 to this letter and is subject to change. PECO Energy will make the supporting information available for your review after the formal incorporation.

MO-2/3-13-030 - RCIC Test Return Valve

These are 4 inch globe valves manufactured by Walworth. Adequate as-left MOV thrust capability has been analytically demonstrated using PECO Energy's standard GL 89-10 Program methodology and design inputs, including degraded voltage conditions, modified as noted below:

Valve Factor (VF) = 1.0 (This is supported by PECO Energy and other utility globe valve factor test data.)

Engineering Safety Factor (ESF) = 0 %

An instrumented DP test for each MOV is planned to further quantify available margin and increase our confidence in the MOV's capability. These tests will be performed at the first available opportunity in 1997. (Expected to be 1/97 for the Unit 2 valve and 2/97 for the Unit 3 valve.)

MO-2/3-14-011A/B - Core Spray Outboard Injection Valve

Existing surveillance testing creates a short term maximum DP condition from which MO-2/3-14-011A/B cannot recover without extensive modifications.

Therefore, the Core Spray System will be declared INOPERABLE when these MOVs are placed in a position during surveillance testing from which they can not return to their normal standby position.

MO-2/3-14-026A/B - Core Spray Test Return Valve, PCIV

These are 10 inch globe valves manufactured by Walworth. Adequate as-left MOV thrust capability has been analytically demonstrated using PECO Energy's standard GL 89-10 Program methodology and design inputs, including degraded voltage conditions, modified as noted below:

VF = 1.0

ESF = 0 %

In addition, these MOVs are stroked closed against maximum DP during quarterly system surveillance testing. These quarterly uninstrumented DP tests will continue to be performed to maintain our confidence in these MOVs' capability.

MO-2/3-23-021 - HPCI Test Return Valve

These are 10 inch globe valves manufactured by Walworth. Adequate as-left MOV thrust capability has been analytically demonstrated using PECO Energy's standard GL 89-10 Program methodology and design inputs, including degraded voltage conditions, modified as noted below:

VF = 1.0

ESF = 0 %

An instrumented DP test for each MOV is planned to further quantify available margin and increase our confidence in the MOV's capability. These tests will be performed at the first available opportunity in 1997. (Expected to be 1/97 for the Unit 2 valve and 2/97 for the Unit 3 valve.)

MO-2/3-23-024 - HPCI Test Return Valve to CST, Secondary Containment Isolation

These are 8 inch gate valves manufactured by Walworth. Their capability is contingent on the MO-2/3-23-021 and MO-2/3-13-030 being demonstrated capable as described above. With these upstream valves providing flow isolation, the DP across MO-2/3-23-024 will be negligible, and adequate as-left MOV thrust capability can be analytically demonstrated using PECO Energy's standard GL 89-10 Program methodology and design inputs, including degraded voltage conditions, with the exception noted below:

The current torque switch settings for MO-2/3-23-024, while sufficient to close the MOV, may not protect the motor at degraded voltage conditions. This MOV will be reset at the first available opportunity. (Expected to be 4/97.)

The DP calculation and setup criteria for MO-2/3-23-024 will be formally revised one month after the completion of the instrumented DP testing for MO-2/3-23-021 and MO-2/3-13-030. No additional DP testing is planned.

MO-2/3-23-031 - HPCI Test Return Valve to Torus, PCIV

These are 4 inch gate valves manufactured by Walworth. Their capability is contingent on the MO-2/3-23-021 and MO-2/3-13-030 being demonstrated capable as described above. With these upstream valves providing flow isolation, the DP across MO-2/3-23-031 will be negligible, and adequate as-left MOV thrust capability can be analytically demonstrated using PECO Energy's standard GL 89-10 Program methodology and design inputs, including degraded voltage conditions, with the exception noted below:

MO-2/3-23-031 has been setup in an overthrust condition. Appropriate corrective actions will be implemented for this valve prior to or during the Unit 2 refueling outage this fall. (Expected to be 10/96.)

The DP calculation and setup criteria for MO-2/3-23-031 will be formally revised one month after the completion the instrumented DP testing for MO-2/3-23-021 and MO-2/3-13-030. No additional DP testing is planned.

Previous DP Testing

In addition to the above described capability assessments, a successful DP test for the Unit 2 HPCI and RCIC valves was performed in 1989 at maximum DP conditions.

NRC Request:

Provide "the plan and schedule for implementation of actions to address valves currently on your marginal performance improvement list".

PECO Energy Response:

In accordance with our ongoing evaluations of MOV performance, PECO Energy expects to complete the engineering assessment of the MOVs currently on the marginal performance list by the end of 1996. However, as acknowledged in Reference 1, PECO Energy has shown these MOVs to be capable of performing their design basis safety function in accordance with the PBAPS GL 89-10 Program. Therefore, no specific commitment has been made or should be inferred regarding further actions beyond the above discussed engineering assessment. Additional margin improvement activities for these MOVs will be based on prudent engineering practices with appropriate consideration of PECO Energy business needs.

NRC Request:

Provide "the revised thrust margins on reactor water cleanup isolation valves, due to the significant differences from the margins contained in your original submittal" (Reference 2).

PECO Energy Response:

The reactor water cleanup isolation valve differential pressure calculations and MOV setup criteria have been revised. The information from our previous submittal (Reference 2) has been updated and is provided as Attachment 2 to this letter.

NRC Request:

Re-affirm the commitment to "dynamically test an additional Unit 3 Core Spray system injection valve to strengthen valve friction factor assumptions during the upcoming refueling outage".

PECO Energy Response:

PECO Energy re-affirms the commitment to dynamically test an additional Core Spray system injection valve during the upcoming refueling outage. However, please note that this commitment is to dynamically test a Unit 2 core spray injection valve. Further, we request that the PBAPS GL 89-10 Program closure not be restrained by this test, based on the existing capability of the untested valves (all have margin at the 0.6 bounding valve factor).

NRC Request:

Re-affirm the commitment to "enhance procedures for including stem rejection loads during valve opening calculations and to correct existing minor non-conservative errors in valve factors as necessary".

PECO Energy Response:

With regard to PECO Energy procedures for calculating valve factors in the open direction, we have completed a re-evaluation of our methodology and concluded that it provides the best available data source and means for empirically deriving an open valve factor and does not require enhancement.

For GL 89-10 MOVs, PECO Energy uses the VOTES diagnostic equipment manufactured by Liberty Technologies. VOTES force points "O5" and "O13" include stem rejection loads combined with packing drag and component weight loads. When evaluating the results of a dynamic test, PECO Energy uses force point O10 and adjusts it with the minimum force value of either point "O5" or "O13" which maximizes the differential pressure effect to ensure the determination of a higher, more conservative open valve factor. No other VOTES trace points between "O5" and "O13" are considered appropriate for use in calculating an open valve factor because the tensile forces resulting from differential pressure across the valve disk mask the stem rejection and/or packing drag loads.

PECO Energy consulted with Liberty Technologies and other utilities during the development of this methodology, and we believe it to be the best available for instrumented dynamic testing using the VOTES diagnostic system.

SUMMARY OF MOV CAPABILITY DURING SURVEILLANCE TESTING -- ATTACHMENT 1

MOV NUMBER	SIZE/TYPE	ACTUATOR	VALVE FACTOR/ESF	AS-LEFT TORQUE SWITCH SETTING	AS-LEFT TSS THRUST/TORQUE	AS-LEFT THRUST MARGIN	AS-LEFT MOTOR MARGIN	COMMENTS
MO-2-13-030	4 INCH GLOBE	SMB-0-15	1.0 / 0%	1.50	19258 / 200 ⁽¹⁾	4.5%	86.7%	⁽¹⁾ SEE NOTE 1
MO-3-13-030	4 INCH GLOBE	SMB-0-15	1.0 / 0%	1.25	18252 / 162	5.6%	133%	
MO-2-14-026A	10 INCH GLOBE	SMB-2-60	1.0 / 0%	1.50	43304 / 867	<1.0%	38.5%	
MO-2-14-026B	10 INCH GLOBE	SMB-2-60	1.0 / 0%	2.00	60095 / 978	38.8%	16.0%	
MO-3-14-026A	10 INCH GLOBE	SMB-2-60	1.0 / 0%	2.75	66579 / 1082 ⁽¹⁾	36.7%	25.4%	⁽¹⁾ SEE NOTE 1
MO-3-14-026B	10 INCH GLOBE	SMB-2-60	1.0 / 0%	2.00	64354 / 767	48.6%	45.0%	
MO-2-23-021	10 INCH GLOBE	SMB-3-100	1.0 / 0%	2.00	124247 / 1703 ⁽¹⁾	18.2%	24.7% ⁽¹⁾	⁽¹⁾ SEE NOTE 1
MO-3-23-021	10 INCH GLOBE	SMB-3-100	1.0 / 0%	1.25	112769 / 1063 ⁽¹⁾	7.2%	93.3% ⁽¹⁾	⁽¹⁾ SEE NOTE 1
MO-2-23-024	8 INCH GATE	SMB-0-25	0.6 / 5%	2.25	21239 / 298	105% ⁽²⁾	28.6%	⁽²⁾ SEE NOTE 2
MO-3-23-024	8 INCH GATE	SMB-0-25	0.6 / 5%	2.75	23956 / 450 ⁽³⁾	131% ⁽²⁾	SEE NOTE 3	⁽²⁾ SEE NOTE 2
MO-2-23-031	4 INCH GATE	SMB-00-10	0.6 / 5%	1.00	10703 ⁽⁴⁾ / 170 ⁽¹⁾	98.8% ⁽²⁾	11.1% ⁽¹⁾	⁽¹⁾ SEE NOTE 1 ⁽²⁾ SEE NOTE 2 ⁽⁴⁾ SEE NOTE 4
MO-3-23-031	4 INCH GATE	SMB-00-10	0.6 / 5%	1.50	10774 / 130 ⁽¹⁾	105% ⁽²⁾	39.6% ⁽¹⁾	⁽¹⁾ SEE NOTE 1 ⁽²⁾ SEE NOTE 2

GENERAL NOTES: UNLESS NOTED OTHERWISE, THE STANDARD PECO ENERGY GL 89-10 METHODOLOGY AND DESIGN INPUTS ARE USED.

GATE VF = 0.6, GLOBE VF = 1.1

RATE OF LOADING (ROL)= 16%

ENGINEERED SAFETY FACTOR (ESF)= 5%

TORQUE SWITCH REPEATABILITY (TSR) = 5, 10, OR 20%, DEPENDING ON THE TORQUE SWITCH SETTING AND OUTPUT TORQUE.

AS-LEFT THRUST MARGIN IS MARGIN OVER MINIMUM REQUIRED THRUST WHICH INCLUDES A FACTOR THAT COMBINES MEASUREMENT ERROR, ROL, ESF, AND TSR.

AS-LEFT MOTOR MARGIN IS BASED ON MOTOR LIMITED TORQUE (MLAT) MARGIN ABOVE MEASURED/CALCULATED TORQUE AT TST. MLAT IS CALCULATED AT DESIGN BASIS DEGRADED VOLTAGE AND ELEVATED TEMPERATURE.

- NOTES: 1) CALCULATED FROM AS-LEFT TORQUE SWITCH SETTING AND SPRING PACK CURVE.
- 2) THRUST MARGINS CALCULATED BASED ON AN ASSUMED DP OF 100 PSID. THIS IS CONSERVATIVE. THE APPROPRIATE DP WILL BE ESTABLISHED BY A CALCULATION REVISION.
- 3) THE CURRENT TORQUE SWITCH SETTINGS FOR MO-3-023-024, WHILE SUFFICIENT TO CLOSE THE MOV, MAY NOT PROTECT THE MOTOR AT DEGRADED VOLTAGE CONDITIONS. THIS MOV WILL BE RESET AT THE FIRST AVAILABLE OPPORTUNITY. (EXPECTED TO BE 4/97.)
- 4) MO-2-23-031 HAS BEEN SETUP IN AN OVERTHRUST CONDITION. APPROPRIATE CORRECTIVE ACTIONS WILL BE IMPLEMENTED FOR THIS VALVE PRIOR TO OR DURING THE UNIT 2 REFUELING OUTAGE THIS FALL. (EXPECTED TO BE 10/96.)

UPDATED RESPONSE TO NRC QUESTIONS REGARDING RWCU MOTOR OPERATED ISOLATION VALVES -- ATTACHMENT 2

REVISED 7/05/96 USING HIGHER MAX D-PS TO CLOSE BASED ON LOWEST MSRV SETPOINT

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