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Resident Manager

October 1, 1986
JAFF-86-0833

U. S. Nuclear Regulatory Commission
Region I
631 Park Avenue
King of Prussia, PA 19406

ATTENTION: DR. THOMAS E. MURLEY, REGIONAL ADMINISTRATOR

SUBJECT: SUPPLEMENTAL RESPONSE TO NRC BULLETIN (IEB) NO. 85-03
"MOTOR OPERATED VALVE COMMON MODE FAILURES DURING
PLANT TRANSIENTS DUE TO IMPROPER SWITCH SETTINGS"

References: a) NYPA Letter, R.J. Converse to T.E. Murley, dated
May 14, 1986 (JAFF-86-0437)

b) NRC Letter, R. W. Starostecki to R. J. Converse,
dated July 29, 1986

c) NEAC-31322, "BWR Owner's Group Report on the
Operational Design Basis of Selected
Safety-Related Motor Operated Valves", dated
September 1986

Attachments: A) Itemized Response to IEB 85-03 Requirements
B) Planned Valve Test Methodology

Reference (a) provided an initial response to IEB 85-03. The Authority cited its involvement in the BWR Owners' Group (BWROG) activities at that time. Reference (b) requested more detailed information about the program. Further discussions between Mr. J. Linville of your staff and Mr. W. Fernandez at the plant were conducted to clarify the information requested. The Authority's response is included in Attachments (A) and (B).

The BWROG with General Electric assistance has developed, as described in reference (c), component-specific differential pressure calculational models for those valves within the scope of the bulletin. The Authority will proceed with these calculations as soon as specific valve flow characteristics are made available from

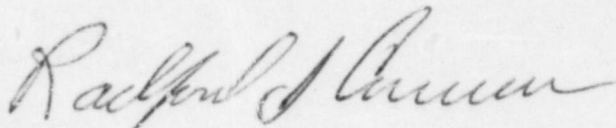
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various vendors. In the event the Authority is unable to obtain this specific valve information, the original design basis data will be used in a scheduled actuator sizing and switch setpoint recalculation effort described in Attachment A. This evaluation will augment an earlier actuator sizing and setpoint calculation program done by Limitorque in 1974 subsequent to the original motor sizing and switch setpoint calculations. Valve testing will be performed in accordance with Attachments (A) and (B).



RADFORD J. CONVERSE
RESIDENT MANAGER

RJC:JRL:mac
cc: W. Fernandez
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ATTACHMENT A

ITEMIZED RESPONSE TO IEB 85-03 REQUIREMENTS

The Authority's program for selecting, setting, and monitoring the actuator switches consists of appropriate site technical, maintenance, and administrative procedures. The specific response to items (a) through (d) and (f) of the bulletin follow.

- a) The original design maximum differential pressures for each valve were reviewed by the Authority and its architect engineer in light of the bulletin criteria. The original design values were found to be acceptable during this review. These values were provided with reference (a). When the additional valve information required to support the BWROG calculational models is received from the appropriate vendors, the Authority will perform the required calculations and compare these results to verify that the original values are conservative. The results of the BWROG valve calculational models in reference (c) will be used as inputs to the actuator sizing and setpoint recalculations scheduled for completion in early 1987.
- b) In 1974, the Authority and its architect engineer, in conjunction with valve manufacturers and Limitorque Corporation, established a complete set of valve operator torque switch settings. This was a recalculation subsequent to the initial actuator sizing. The Limitorque sizing procedures in effect in 1974 were utilized. They took into account differential pressure, seat area, valve factor, stuffing box load, stem area, line pressure, and stem factor. The existing program as contained in Maintenance Procedure MP-59.3, "Limitorque Motor Operators", requires setting of torque, bypass, and limit switch settings as follows:

Torque Switch Settings - The evaluation performed in 1974 established the maximum torque required to seat, unseat, and stroke each valve. For those valves within the scope of the bulletin, this evaluation also determined the maximum torque that the valve itself (bonnet, seat, etc) and valve actuator could withstand without mechanical damage. Limitorque then provided a curve for each actuator which plots torque switch position versus torque generated by the actuator in foot-pounds.

Based on this data, a recommended and maximum torque switch setting was determined. These recommended and maximum values are presently specified and controlled in MP-59.3. These values have been used since plant start-up for maintenance activities.

Open Bypass Switch Settings - All JAF globe and gate valves are torque-seated in the closed position to ensure leak tightness. Consequently, the open torque switch must be bypassed during the initial portion of the opening stroke until the valve unseating forces have been overcome or have decreased.

ATTACHMENT A (cont)

Typical gate and globe valve data provided by Limitorque Corporation indicates that this unseating torque decreases to approximately 40% of its initial value in the first 10% of the opening stroke distance. This torque value is about two times the average torque required during the remainder of the stroke cycle. Based on this, the existing maintenance procedure requires setting the open bypass switch to bypass the torque switch during the first 10% of stroke.

Open Limit Switch Setting - All JAF globe and gate valves are position-limited during the opening stroke. The criteria applied is to provide full process flow through the valve without seating the valve disc against the valve backseat. To accomplish this, the existing maintenance procedure requires setting the open limit switch at a distance from the backseat equal to 5% of stroke length. It is also verified that the valve disc does not coast into the backseat due to inertia after the open limit switch has deenergized the actuator motor.

Case Basis Settings - Some valve or application specifics may require atypical torque bypass or position switch settings. These situations are handled on an individual basis with an engineering evaluation. Approved variations from typical setpoints are documented on controlled electrical drawings for the motor operator.

The existing program as contained in Maintenance Procedure MP-56.1, "600 Volt Emergency Motor Control Maintenance", requires setting of the motor thermal overload devices as follows:

Thermal Overloads - The Authority requires the use of 300% thermal overloads for all safety related valve operators in response to the concerns of Regulatory Guide 1.106.

Recognizing the potential for improvements in calculational methods since 1974, the Authority has initiated a recalculation program of the actuator sizing, torque, torque bypass, switch settings, and position limit. Should this recalculation effort indicate that a switch setting is incorrect and affects valve operability, the Authority will take appropriate action including any action required by Technical Specifications.

- c. Testing will be initiated during the refueling outage scheduled for early 1987. Test methods will include operational testing, (as described in 4.5.3.1 of reference (c)), hydrostatic pressure testing or use of one of the signature analysis units available to the nuclear industry.

ATTACHMENT A (cont)

Hydrostatic pressure testing will involve isolation and pressurization of the upstream side of a valve with water as the process fluid unless no isolation or pressurization facilities are available. If the valve is of a symmetrical design and it is not possible to pressurize the upstream side, the downstream piping will be pressurized. The valve will then be stroked to demonstrate operability. "Type Testing", discussed in section 4.5.2.1 of reference (c), will be used when appropriate to reduce the actual test burden for equivalent valves, operators, and process requirements. Attachment B provides a valve by valve synopsis of presently planned test methodologies. Changes to this planned methodology, if required, will be provided in the summary report.

The Authority expects to begin valve testing during the refueling outage in early 1987, with testing to be completed during a short mid-cycle maintenance outage (scheduled for late 1987 - early 1988). A two phase test program is required due to historical difficulties with vendor timeliness on component specific information. Additional information on valve position vs flow characteristics is required to support the BWROG calculational models.

- d. Although MP-59.3 and MP-56.1 are the maintenance procedures governing switch setpoints, other procedures which control maintenance and modification activities also provide additional assurance that switch setpoints are properly selected and set. These additional procedures are WACP 10.1.1, "Procedure For Control Of Maintenance", and WACP 10.1.6, "Control Of Modifications, Component Changes, and Safety and Environmental Impact Evaluation Reports". WACP 10.1.1 controls work packages to ensure that any applicable maintenance controls and Quality Control procedures are invoked and provides guidelines for post-work testing that verify maintenance has been successful. WACP 10.1.6 contains procedural requirements for engineering, design and installation controls and specifically addresses a mechanism for control of setpoint changes.

These procedures, supplemented by the site's engineering design procedures, provide the framework for the proper selection, setting, verification, and testing of operator switch setpoints. An operating experience review program provides the mechanism for the inclusion of applicable industry recommendations and experience.

- f. A summary report as outlined in the bulletin will be provided within 60 days of the completion of the program.

ATTACHMENT B

PLANNED VALVE TEST METHODOLOGY

<u>JAF ID</u>	<u>DESCRIPTION</u>	<u>STROKE OPEN</u>	<u>STROKE CLOSED</u>	<u>TESTING METHOD</u>			
				<u>OPER (1)</u>	<u>HYDR (2)</u>	<u>SIGN (3)</u>	<u>TYPE (4)</u>
<u>RCIC SYSTEM</u>							
13 MOV-15	Containment Inboard Steam Supply	X	X		X	X	
13 MOV-16	Containment Outboard Steam Supply	X	X		X		
13 MOV-18	Pump Suction From CST	NA	X		X		
13 MOV-20	Pump Discharge Outboard Isolation	X	NA		X(5)		
13 MOV-21	Pump Inboard Discharge to Reactor	X	X		X	X	
13 MOV-27	Minimum Flow To Suppression Pool	X	X	X			
13 MOV-39	Pump Suction From Suppression Pool	X	X		X	X	
13 MOV-41	Pump Suction From Suppression Pool	X	X				X
13 MOV-131	Turbine Steam Inlet	X	NA		X		
13 MOV-132	Cooling Water Isolation	X	X		X	X	
<u>HPCI SYSTEM</u>							
23 MOV-14	Turbine Steam Inlet	X	NA		X		
23 MOV-15	Containment Inboard Steam Supply	X	X		X	X	
23 MOV-16	Containment Outboard Steam Supply	X	X	X	X		
23 MOV-17	Pump Suction From CST	NA	X		X		

ATTACHMENT B (cont)

PLANNED VALVE TEST METHODOLOGY

<u>JAF ID</u>	<u>DESCRIPTION</u>	<u>STROKE OPEN</u>	<u>STROKE CLOSED</u>	<u>TESTING METHOD</u>			
				<u>OPER (1)</u>	<u>HYDR (2)</u>	<u>SIGN (3)</u>	<u>TYPE (4)</u>
<u>HPCI SYSTEM</u>							
23 MOV-19	Pump Inboard Discharge To Reactor	X	X		X X		
23 MOV-20	Pump Discharge Outboard Isolation	X	NA		X(5)		
23 MOV-25	Minimum Flow To Suppression Pool	X	X	X X			
23 MOV-57	Pump Suction From Suppression Pool	X	X		X		X
23 MOV-58	Pump Suction From Suppression Pool	X	X		X(5)		X
23 MOV-60	Outboard Steam Supply Bypass	NA	X		X		

TESTING METHOD DESCRIPTIONS:

- (1) Operational - Valve operability at maximum values is demonstrated during normal system testing.
- (2) Hydrostatic Pressure - Establish the differential pressure by isolation and pressurization with water.
- (3) Signature Acquisition - Obtain a valve thrust signature utilizing an attached load cell.
- (4) Type Testing - Utilize the results for an equivalent valve, operator, and process requirements for setpoint verification.
- (5) Gate valve being pressurized in the reverse direction.