TENNESSEE VALLEY AUTHORITY

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May 10 1986

PDR

50-390/E

U.S. Nuclear Regulatory Commission
Region II
Attn: Dr. J. Nelson Grace, Regional Administrator
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

Dear Dr. Grace:

OFFICE OF INSPECTION AND ENFORCEMENT BULLETIN 85-03 - MOTOR-OPERATED VALVE COMMON MODE FAILURES DURING PLANT TRANSIENTS DUE TO IMPROPER SWITCH SETTINGS - WATTS BAR NUCLEAR PLANT

This letter is to provide a response to IE Bulletin 85-03 dated November 15, 1985. Enclosure 1 contains information required by the referenced bulletin. Enclosure 2 identifies the commitments made in enclosure 1.

If there are any questions, please get in touch with W. C. Ludwig at FTS 858-4882.

To the best of my knowledge, I declare the statements contained herein are complete and true.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

R. H. Shell

R. H. Shell, Supervisor
Licensing Projects Group II

Enclosures
cc (Enclosures):
Mr. James Taylor, Director
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ENCLOSURE 1

WATTS BAR NUCLEAR PLANT (WBN)
RESPONSE TO IE BULLETIN 85-03

WBN has identified 21 valves that have been determined to be applicable to Inspection and Enforcement Bulletin (IEB) 85-03. This list can be found in Attachment 1 and consists of 10 high-head safety injection valves, 6 intermediate head safety injection valves and 5 auxiliary feedwater valves. These valves were selected because they met the intent of the bulletin. TVA representatives discussed the selection of these valves with H. A. Bailey of the Nuclear Regulatory Commission's (NRC) Office of Inspection and Enforcement during a telephone conference on December 5, 1985.

Item a: "Review and document the design basis for the operation of each valve. This documentation should include the maximum differential pressure (DP) expected during both opening and closing the valve for both normal and abnormal events to the extent that these valve operations and events are included in the existing approved design basis (i.e., the design basis documented in pertinent licensee submittals such as Final Safety Analysis Report analyses and fully-approved operating and emergency procedures, etc.). When determining the maximum differential pressure, those single equipment failures and inadvertent equipment operations (such as inadvertent valve closures or openings) that are within the plant design basis should be assumed'.

WBN Effort: After the applicable valves were selected, the design basis for the operation of each valve was reviewed and documented. This review identified that the original design basis is still valid. This design basis DP is given in attachment 1 for each of the 21 valves.

Further effort by the Westinghouse Owner's Group (WOG) has resulted in a methodology for Westinghouse plants to follow in determining maximum fluid DPs across the motor operated valves affected by IEB 85-03. The WOG methodology should provide a more realistic, and in some cases, a less restrictive maximum DP than was specified in the design basis. WBN has just received the WOG methodology and did not use it for the DPs specified in this report. However, it will be reviewed and utilized to the extent practical. Upon completion of a review of the WOG methodology, WBN may revise the results of item "a" and this response as necessary.

Item b: "Using the results from item "a" above, establish the correct switch settings. This shall include a program to review and revise, as necessary, the methods for selecting and setting all switches (i.e., torque, torque bypass, position limit, overload) for each valve operation (opening and closing)".

"If the licensee determines that a valve is inoperable, the licensee shall also make an appropriate justification for continued operation in accordance with the applicable technical specification".

WBN Effort After the adequacy of the original design basis DP for the 21 motor operated valves (MOV) was verified, contracts were issued to the valve vendors to provide maximum required thrust under maximum DP conditions. This data is scheduled to be made available to TVA in July 1986.

By knowing the required thrust and using the motor-operated valve analysis and test system (MOVATS), the correct torque and torque bypass switch settings can then be verified or established as needed. Currently plant procedures (MI-0.6) are in place for the use of MOVATS. Other procedures (MI-0.3 and MI-0.15) will be revised, if necessary, for the verification and adjustment of torque and torque bypass switches and position limit switches.

Of the 21 valves identified in attachment I, only two valves in each unit (1,2-FCV-1-17,18) have torque and torque bypass switches in their opening circuits. These two valves are currently under evaluation to have a jumper installed like the other identified valves that effectively deletes the torque and torque bypass switch. The other 19 vaives have this jumper installed to prevent "active" valves from stopping in mid-travel and not reaching their intended position. For 13 valves on the closing circuit, the torque switch is bypassed at least until the valve is in its seat where they are then allowed to stop on torque. Eight valves have the closing torque switch bypassed for 100 percent of travel and position limit switches control closure.

The overload heaters (except for 1,2-FCV-1-17,18 which are being evaluated) have a bypass that gets actuated by a safety injection (SI) signal. This prevents the valve from being tripped on overload when an SI signal is present. This method was chosen to comply with Regulatory Guide 1.106 which allows for either bypassing the overload heaters or calibrating the switch settings.

The determination and or verification of correct switch settings for the 21 MOVs will be completed prior to fuel load of each WBN unit.

Item c: "Individual valve settings shall be changed, as appropriate, to those established in item "b". Whether the valve setting is changed or not, the valve will be demonstrated to be operable by testing the valve at the maximum DP determined in item a, with the exception of testing MOVs under conditions simulating a break in the line containing the valve is not required. Otherwise, justification should be provided for any cases where testing with the maximum DP cannot practicably be performed. This justification should include the alternative to maximum DP testing, which will be used to verify the correct settings.

Note: This bulletin is not intended to establish a requirement for valve testing for the condition simulating a break in the line containing the valve. However, to the extent that such valve operation is relied upon in the design basis, a break in the line containing the valve should be considered in the analyses prescribed in items "a" and "b". The resulting switch settings for pipe break conditions should be verified to the extent practical by the same methods that would be used to verify other settings (if any) that are not tested at the maximum DP.

Each valve shall be stroke tested to the extent practical to verify that the settings defined in item "b" have been properly implemented even if testing with DP cannot be performed."

WBN Effort

As stated earlier, Watts Bar has all but two of the torque and torque bypass switches per unit jumpered out in the open circuit and the torque and torque bypass switches in the closing circuit do not come into play until the valve is in the seat (if they are used at all). Therefore, much of the focus of the bulletin is not an issue at Watts Bar for these valves. However, as part of ongoing MOVATS testing, all the valves identified in attachment 1 will be stroke tested under non-DP conditions prior to fuel load for each unit. This non-DP stroke testing in combination with MOVATS and the DP testing listed below will demonstrate the adequacy of the MOV switch settings.

To further demonstrate operability of these MOVs under DP conditions, WBN will perform some limited DP testing. This program will include testing one of each type (size and DP test categories as defined in attachment 1) of the high DP valves identified. One valve in each of the test categories will be tested under full flow DP conditions as indicated below. The suction valves of the centrifugal and safety injection pumps are low DP valves and will not be DP tested. This testing would not provide any further significant insight into valve operability over the non-DP stroke test and it would involve the risk of damage to the pump.

DP Test Category (Attach 1)	Schedule (Each Unit)
1	Before fuel load
2	Before fuel load
3	Before fuel load
4	Before fuel load
5	Before fuel load

Item d: "Prepare or revise procedures to ensure that correct switch settings are determined and maintained throughout the life of the plant. Ensure that applicable industry recommendations are considered in the preparation of these procedures".

WBN Effort: Once the correct switch settings are determined and/or verified (items "b" and "c") a design output document (i.e., engineering drawing, approved engineering calculation, etc.) which specifies and controls these settings will be issued. The plant procedures which govern the testing and adjustment of the switch settings will be revised or developed as needed to reference this document to ensure the switch settings are maintained throughout the life of the plant.

Additionally, a preventive maintenance program is currently in place for the identified MOVs at WBN and consists of the following:

Visual inspection
Lubrication
Electrical contact and wiring inspection and cleaning

A full stroke functional test is also done on these valves except for FCV-63-39,40 (locked open) and FCV-1-51 (manual trip device).

High Pressure Coolant Injection

Centrifugal Charging Pumps (CCP) - High-Head Injection System:

Valve ID	Valve Size/Type	Valve Function	Original Design Basis DP	Test Category
1, 2-LCV-62-135	8"/Gate	CCP suction from refueling	200 PSID	N/A (see note 1)
1, 2-LCV-62-136	8"/Gate	water storage tank (RWST)	200 PSID	N/A (see note 1)
1, 2-LCV-62-132	4"/Gate	CCP suction from volume	200 PSID	N/A (see note 1)
1, 2-LCV-62-133	4"/Gate	control tank (VCT)	200 PSID	N/A (see note 1)
1, 2-FCV-63-39	4"/Gate	Discharge of CCP to inlet	2750 PSID	1 (see note 3)
1, 2-FCV-63-40	4"/Gate	of Boron Injection Tank (BIT)	2750 PSID	1 (see note 3)
1, 2-FCV-63-25	4"/Gate	Outlet of BIT to Reactor	2750 PSID	1
1, 2-FCV-63-26	4"/Gate	Coolant System (RCS) cold leg injection	2750 PSID	1
1, 2-FCV-62-90	3"/Gate	Discharge of CCP to	2750 PSID	2
1, 2-FCV-62-91	3"/Gate	normal charging path	2750 PSID	2

Safety Injection (SI) Pumps - Intermediate Head Injection System:

Valve ID	Valve Size/Type	Valve Function	Original Design Basis DP	Test Category
1, 2-FCV-63-5	8"/Gate	Common suction to SI pumps from RWST	200 PSID	N/A (see note 1)
1, 2-FCV-63-47	6"/Gate	Individual suction valves	200 PSID	N/A (see note 1)
1, 2-FCV-63-48	6"/Gate	to SI pumps from RWST	200 PSID	N/A (see note 1)
1, 2-FCV-63-152	4"/Gate	Cold leg injection	2750/1500 PSID	3 (see note 2)
1, 2-FCV-63-153	4"/Gate	flow path from discharge	2750/1500 PSID	3 (see note 2)
1, 2-FCV-63-22	4"/Gate	of SI pumps	2750/1500 PSID	3 (see note 4) (see note 2)

Attachment (Continued)
IE Bulletin 85-03 - Motor Operated Valves
Tennessee Valley Authority
Watts Bar Nuclear Plant

High Pressure Coolant Injection

Auxiliary Feedwater (AFW) System:

Valve ID	Valve Size/Type	Valve Function	Original Design Basis DP	Test Category
1, 2 FCV-1 15	4"/Gate	SG loop 1 main steam supply to turbine-driven (TD) AFW pump, turbine	1209 PSID	4
1, 2-FCV-1-16	4"/Gate	SG loop 4 main steam supply to TD AFW pump, turbine	1209 PSID	4
1, 2 FCV-1 17	4"/Gate	Series isolation valves for main steam to TD AFW pump, turbine	1209 PSID	4
1, 2-FCV-1-18	4"/Gate		1209 PSID	
1, 2-FCV-1-51	3"/Globe	Trip and throttle valve - Inlet to TD AFW pump, turbine (Terry Turbine)	1209 PSID	5

Total of 21 MOVs in each unit.

Notes:
1. The centrifugal charging and safety injection pump suction flow-path MOVs are considered to be low DP valves and will not be tested under DP conditions.
2. The original design basis DP for which this valve was purchased was 2750 PSID, but the actual design basis is expected to be reduced to 1500 PSID by the Westinghouse Owners Group methodology.
3. Valves 1, 2 FCV-63 39,40 are locked open according to ECN 5457.
4. Valve 1, 2-FCV-63-22 is locked open and power removed to valve operator (see technical specification 3/4.5.2).

ENCLOSURE 2

LIST OF COMMITMENTS IN ENCLOSURE 1

The following list of items represent the commitments intended by this submittal.

1. Evaluate 1,2-FCV-1-17,18 for having the torque and torque bypass switches jumpered out in the opening circuit and bypassing the overload heaters on an SI actuation. This item is being handled by nonconformance W-368-P.

2. Determination/verification of correct switch settings for the 21 MOVs per unit in attachment 1 prior to fuel load.

3. Stroke test the identified MOVs in concurrence with using MOVATS under non-DP conditions prior to fuel load.

4. Stroke test one MOV in each of the test categories 1, 2, and 3 (attachment 1) under full flow DP conditions (total of 3 MOVs) prior to fuel load.

5. Stroke test one MOV in each of the test categories 4 and 5 (attachment 1) under full flow DP conditions (total of 2 MOVs) prior to fuel load.

6. Issue a design output document which specifies and controls switch settings prior to fuel load.

7. After issuing a design output document, revise or develop plant procedures to reference this document prior to fuel load.