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Nuclear Operations

May 4, 1988
NRC-88-0142

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

References: 1) Fermi 2
NRC Docket No. 50-341
NRC License No. NPF-43

2) NRC IE Bulletin 85-03, "Motor-Operated Valve Common Mode Failures During Plant Transients Due to Improper Switch Settings."

3) Detroit Edison Letters to the NRC in response to IE Bulletin 85-03 dated May 15, October 1, December 19, 1986 and November 17 and December 9, 1987.

4) NRC Letter to Detroit Edison dated March 30, 1988 requesting additional information regarding IE Bulletin 85-03.

5) BWR Owner's Group Letter No. 8815/OTR1, dated March 28, 1988.

Subject: Additional Information Regarding IE Bulletin 85-03

In response to the NRC letter dated March 30, 1988 (Reference 4) which was received on April 4, 1988, Detroit Edison provides the additional information requested regarding our previous responses to the IE Bulletin 85-03 (Reference 3).

The NRC questions and their response are provided in Enclosure 1 of this letter. Enclosure 2 addresses the deletion of RCIC Valve E5150F059 from the program.

If you have any further questions, please contact Mr. Girija Shukla at (313) 586-4270.

Sincerely,

Enclosures

cc: Mr. A. B. Davis
Mr. R. C. Knop
Mr. T. R. Quay
Mr. W. G. Rogers

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I, WILLIAM S. ORSER, do hereby affirm that the foregoing statements are based on facts and circumstances which are true and accurate to the best of my knowledge and belief.

William S Orser

WILLIAM S. ORSER
Vice President
Nuclear Operations

On this 4th day of May, 1988, before me personally appeared William S. Orser, being first duly sworn and says that he executed the foregoing as his free act and deed.

Shirley L. Carlson

Notary Public

SHIRLEY L. CARLSON
Notary Public, Wayne County, MI
My Commission Expires Jan. 28, 1991

RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION (RAI)
REGARDING IE BULLETIN 85-03

NRC Question 1:

"If MOVATS is planned for application to some MOVs which are not included in its data base, commit to and describe an alternate method for determining the extra thrust necessary to overcome pressure differentials for these valves."

Response to Question 1:

Confirmation testing of MOVs is being performed in compliance with Bulletin 85-03 Action item c. Recommended torque switch settings for the MOVs are tested to measure actual thrust capability against expected actuator performance. The MOVATS database includes a sufficient number of sample MOVs which are similar to Fermi 2 MOVs. Only one RCIC valve with a passive function is not comparable to any MOVs in the MOVATS database. This MOV is being deleted from the Fermi 2 response program as discussed in Enclosure 2.

'Extra' thrust appears to mean a deficiency in the maximum MOV design differential pressures (dPs). The Fermi 2 Bulletin 85-03 response program has included recalculation of maximum dPs and adjustment to revised torque switch settings for the HPCI and RCIC MOVs with active functions. This was described in our November 17, 1987 response to Bulletin 85-03, Action items a and b. The recalculated dPs generally confirmed that the original engineering applications were correct. It is assumed that the valve and actuator manufacturers have sufficient design knowledge to correctly determine size and specify control settings for the motor actuators. Therefore, no alternative method of 'extra' thrust determination is required.

NRC Question 2:

"Revise Table 1 of the response dated 11-17-87 to include values of differential pressure for opening the following MOVs, or justify exclusion of these pressures. As required by Action Item a of the bulletin, assume inadvertent equipment operations."

Response to Question 2:

Table 1 of our response dated November 17, 1987 will be updated to provide complete data for all MOVs. As committed in that response, a final report will be submitted no later than ninety (90) days after the LLRT Cutage ends. This report will include the updated Table 1.

Fermi 2's response program for Bulletin 85-03 is based upon the GE/BWROG report, NEDC-31322, dated September 1986. Action Item a of Bulletin 85-03 required assumption for "determining the maximum differential pressure, those single equipment failure and inadvertent equipment operations that are within the plant design basis". In discussion with the BWROG, it was stated by the NRC that inadvertent valve operation is outside the BWR design basis. At NRC request the BWROG is performing a further evaluation of selected MOVs mispositioning (Reference 5).

The four (4) MOVs listed under this question are included in the selected MOVs being evaluated by the BWROG. In brief, the following response is provided to the questions on these four MOVs based upon the Fermi 2 specific design.

(a) E4150F004, HPCI MOV 3, CST Suction Isolation Valve - receives an open signal when HPCI auto-initiation signal is present; can also be closed or opened by remote pushbutton. Maximum differential pressure (dP) calculated for testing is 104 psid and the original design dP is 75 psid. This valve performed satisfactorily during confirmation testing which was based upon calculated dP.

(b) E5150F010, RCIC MOV 3, CST Suction Isolation Valve - receives an open signal when RCIC auto-initiation signal is present and can also be closed or opened by remote pushbutton. Maximum calculated dP is 42.6 psid and the original design dP is 60 psid. This valve performed satisfactorily during confirmation testing which was based upon the original dP.

(c) E4150F021, HPCI MOV VI, Turbine Exhaust Steam Isolation Valve - can be opened and closed by remote pushbutton. Maximum calculated dP is 25 psid, original design dP is 125 psid.

This valve performed satisfactorily during confirmation testing which was based upon the origina' dP.

(d) E5150F001, RCIC MOV VI, Turbine Exhaust Steam Isolation Valve - can be opened and closed by remote pushbutton. Maximum calculated dP is 25 psid, original design dP is 150 psid. This valve performed satisfactorily during confirmation testing which was based upon the original dP.

Fermi 2 will review and respond to the BWROG generic evaluation of selected MOVs when the evaluation is completed.

NRC Question 3:

"Revise Table 1 of the response dated 11-17-87 to include RCIC MOV F044, or justify its exclusion. This MOV governs the RCIC Turbine; it is shown normally open in Zone D-10 of drawing 6M721-2045 Revision Q."

Response to Question 3:

E5150F044, RCIC Turbine Governor Control Valve, is a hydraulic-operated valve (HOV); the designation on drawing 6M721-2045 is incorrect. The valve is a part of the turbine hydraulic governor system manufactured by Woodward Governor Company. It is not subject to IE Bulletin 85-03 testing.

NRC Question 4:

"Revise Table 1 of the response dated 11-17-87 to include values of differential pressure for opening the following valves, or justify exclusion of these pressures. According to pages 55 and 59 of the BWROG Report, each of these valves has a safety action for opening. "N/A" is listed for both entries of differential pressure.

(a) HPCI MOV F012 is shown normally closed as MOV 2 on Page 68 of the BWROG Report.

(b) RCIC MOV F019 is shown normally closed as MOV 2 on Page 72 of the BWROG Report."

Response to Question 4:

HPCI MOV 2, E4150F012, used a calculated 1306 psid for both closing and opening dP. RCIC MOV 2, E5150F019, used line pressure of 1280 psid for opening dP and a calculated 1268 psid for closing dP.

Fermi 2 used a more specific definition of "active safety function" regarding Bulletin MOVs than is applied in the report, NEDC-31322. Fermi 2 considers the opening function of the two (2) subject MOVs to be important to component protection. The "N/A" does not mean the MOVs were not to be tested for that stroke direction.

HPCI and RCIC MOVs are considered to perform active safety function for either of:

1. Opening from normal lineup to inject high-pressure makeup into the PRV; or

2. Closing from operating mode or lineup in response to valid isolation or trip signals.

Notwithstanding the above definition, Fermi 2 is testing the applicable MOVs in both opening and closing direction. Details of the tests and results will be submitted as committed in our response dated November 17, 1987, ninety (90) days after the end of the LLRT Outage. The updated Table 1 will also identify stroke-directions of any subject MOVs considered important to component protection.

NRC Question 5:

"The proposed program for action items b, c and d of the bulletin is incomplete. Provide the following details as a minimum:

(a) commitment to justify continued operation of a valve determined to be inoperable,
(b) description of a method possibly needed to extrapolate valve stem thrust determined by testing at less than maximum differential pressure,
(c) justification of a possible alternative to testing at maximum differential pressure at the plant,
(d) consideration of pipe break conditions as required by the bulletin,
(e) stroke testing when necessary to meet bulletin requirements, and
(f) consideration of applicable industry recommendations in the preparation of procedures to ensure maintenance of correct switch settings."

Response to Question 5 (a):

Continued operation with an inoperable component is subject to a Fermi 2 Deviation Event Report (DER) disposition for remedial corrective action. In addition, confirmation testing of MOV torque switch

settings for the Bulletin 85-03 response includes a diagnostic test of overall MOV performance.

Confirmation test evaluations of MOVs for Bulletin 85-03 receive an engineering verification of valve performance. A design document has been established to provide expected performance criteria for these tests. Degradations identified under this review may also be reported in DERs and evaluated for potential inoperable conditions.

Response to Question 5 (b):

Confirmation testing of torque switch settings at Fermi 2 is being conducted with the MOVATS test system. Under contract, MOVATS, Inc. has also provided Fermi 2 a set of target thrusts. These target thrusts represent the upper bound values of single database samplings analyzed for 90% confidence intervals.

The MOVATS target thrusts and the manufacturer's calculated torque and thrust requirements provided for each actuator are used as relative measures of expected MOV performance. Specific evaluation will be made of the performance at the torque switch setting corresponding to the maximum dP requirement. Additional evaluation of available thrust margin is made by testing up to the limiter plate value of the torque switch. The highest torque available before control switch trip is at the limiter plate setting.

Response to Question 5 (c):

It is Fermi 2's position that the design methods and capabilities of the valve and actuator manufacturers are conservative. The valve stem thrust requirements, actuator size and control settings are adequate for the maximum dP originally specified. Revised dPs for IE Bulletin 85-03 will require some MOV assembly upgrading. Testing performed to date has shown that improved thrust margins are available by spring pack changeout to increase the torque spring duty rating of four (4) MOVs.

In addition, as noted in our response dated November 17, 1987, testing with a MOV diagnostic system has several advantages. The MOVATS test system has been reviewed and approved by the NRC (NUREG 4380). Diagnostic testing under static conditions is fully capable of determining available operator thrust. Diagnostic testing under static conditions allows immediate evaluation, correction and retesting for MOV degradations. This is because system or component availability is not in question.

As noted under response 5 (b), Fermi 2 is evaluating specific performance of each MOV at the manufacturer's recommended torque switch setting. The available thrust margin is also evaluated up to the limiter plate setting. The goal of the Fermi 2 program is to establish sufficient thrust margins to account for expected thrust degradations during plant operational periods. Periodic retesting will be performed if maintenance activities could result in a loss of available thrust. A complete description of the Fermi 2 long-term program will be provided in the final report, due ninety (90) days after the LLRT Outage ends.

Based upon maintaining thrust required by the design, and confirmed by diagnostic testing, Fermi 2 believes that dynamic testing is unnecessary. The stated purpose of the bulletin is (for licensees) to develop and implement a program to establish and maintain correct switch settings on motor-operated, safety-related valves. The Bulletin further requires a review of the engineering applications used for the affected MOVs to ensure that maximum differential pressures calculated for expected MOV functions envelope the complete design bases (normal and abnormal events) for the plant. Dynamic testing is a design engineering responsibility, in regards to the Bulletin requirements, performed by the original manufacturer. Fermi 2's responsibility, to ensure that originally supplied design parameters are maintained, is accomplished by the diagnostic testing performed.

Response to Question 5 (d):

Evaluation of worst-case differential pressures was performed generically by the BWROG and is contained in report NEDC-31322, September 1986. Fermi 2 has followed up with a specific plant design calculation (DC) No. 4685. Because these evaluations envelope the plant design basis, consideration for pipe break conditions is inherent.

Response to Question 5 (e):

All 17 of the subject HPCI MOVs and 11 of 16 subject RCIC MOVs in the Fermi 2 response to Bulletin 85-03 are included in the plant's ISI Pump and Valve Program. In addition, as noted in response 5 (c), retesting to verify thrust available will be performed when maintenance activities could result in a loss of thrust. A complete description of the Fermi 2 long-term program will be provided in the final report, due ninety (90) days after the LLRT Outage ends.

Response to Question 5 (f):

Fermi 2 maintains active contacts with the BWROG, INPO, EPRI and the valve and actuator manufacturers. Fermi 2 also communicates with other nuclear power plants on specific issues regarding IE Bulletin 85-03. Further, Fermi 2 continues to evaluate available diagnostic and monitoring technologies. Information gained from all of these sources will be used in Fermi 2's long-term program for maintaining correct control switch settings.

UPDATE TO FERMI 2 IE BULLETIN 85-03 RESPONSE PROGRAM
DELETION OF E5150F059, RCIC MOV X

MOV E5150F059 will be deleted from the Fermi 2 long-term response program for IE Bulletin 85-03. The BWROG report, NEDC-31322, Table 4, notes that this valve has an active safety action to close. This closure is on a turbine overspeed trip which is effected by a mechanical latching and spring closure subassembly. Section 3.3.4.15 of NEDC-31322 states this MOV was included "for the purpose of completeness" because it was in the ASME XI program of some plants. Likewise, Fermi 2 has tested this MOV during Outage 88-01 for completeness of the initial test program. This valve, however, is not part of Fermi 2's ASME Section XI ISI program for pumps and valves.

E5150F059 is a Shutte & Koerting Company, 3" X 4" Top Mechanical Throttle and Trip Valve. The valve was originally supplied as part of the RCIC turbine assembly. An extract of the relatching operation is attached. The Limitorque motorized actuator serves two functions for the operation of the valve. First, it is primarily used for the relatching and valve resetting function. The screw spindle is a fixed, hollow shaft with internal and external threads. The internal threading drives the valve stem; external threads are driven by the actuator. This stem is non-rising and cannot be used to calibrate thrust-to-spring pack displacement, as required for the MOVATS 2150 Test System.

On turbine trip, the E5150F059 closure spring provides a downward impulse to the valve stem. The flow-over-disk configuration assures closure and tight seating. The upstream MOV, E5150F045 (MOV 1), RCIC Steam Admission Valve, closes subsequently to turbine trip. Steam pressure on both sides of E5150F059 is vented to the barometric condenser. Relatching is a local-manual activity coordinated with the control room for actuator positioning. The maximum opening force experienced by the actuator is that required to compress the trip-closure spring.

The second function of the actuator is for using E5150F059 as a manual turbine throttle. This was intended to be used from a second division remote shutdown panel. A startup test (STUT.01A.028) was performed which demonstrated this throttle capability. The second division remote shutdown panel has since been removed from service. Starting RCIC with E5150F059 has been demonstrated to be unreliable; all starts use the electro-hydraulic governor valve, E5150F044 and steam admission valve E5150F045. Any throttling performed will begin with the valve in the full-open position.

In summary, E5150F059 closes on spring force and upstream pressure. It opens during valve manual-relatching/reopening only against the trip closure spring force. RCIC operation, particularly startup or trip, is independent of the E5150F059 motor-operated capacity for opening or closing the valve. Therefore, this valve does not meet the criteria for inclusion in the IE Bulletin 85-03 response program and will be deleted from the program. No further programmatic testing will be performed on E5150F059 for the IE Bulletin 85-03 long-term response.

VMR4-14.1 EXTRACT

OPERATING PRINCIPLE

After tripping, run the operator to the closed position. The rotation of the screw spindle will move the sliding nut to return the latch up lever (part 27) to its relatching position. To relatch, the latch hook must be released to permit the trip hook (part 23) to rotate and hold the latching lever.

After the latching lever has been engaged with the trip hook and the operator is turned in the opening direction, the disc is lifted from the seat. The end of the coupling (part 7) acts as a limit stop contact with the bottom of the sliding nut (part 47). These parts, even though jammed, move downward together when the valve is tripped, and cannot impede the free closing motion of the valve.

In no case is the top of disc permitted to come in contact with the underside of the valve cover as that would impose a heavy reaction load on the trip hook which the trip gear would be unable to disengage.

DR____ DATE____	SCHUTTE & KO[illegible] CO.	
CHKD____ DATE____	[illegible]	
APP'D____ DATE____	INSTRUCTIONS FOR INSTALLING AND OPERATING MOTOR OPERATED THROTTLE TRIP VALVE.	
APP'D____ DATE____		
[illegible]O.	SIZE	CODE IDENT NO.
S. O. [illegible]	DRAWING NO. 70-3-[illegible]	
B. M.	SCALE	WT
MADE FROM		
FILED		

VMR4-14.1 EXTRACT

IDENTITY LIST FOR
3" TOP MECH. THROTTLE TRIP VALVE

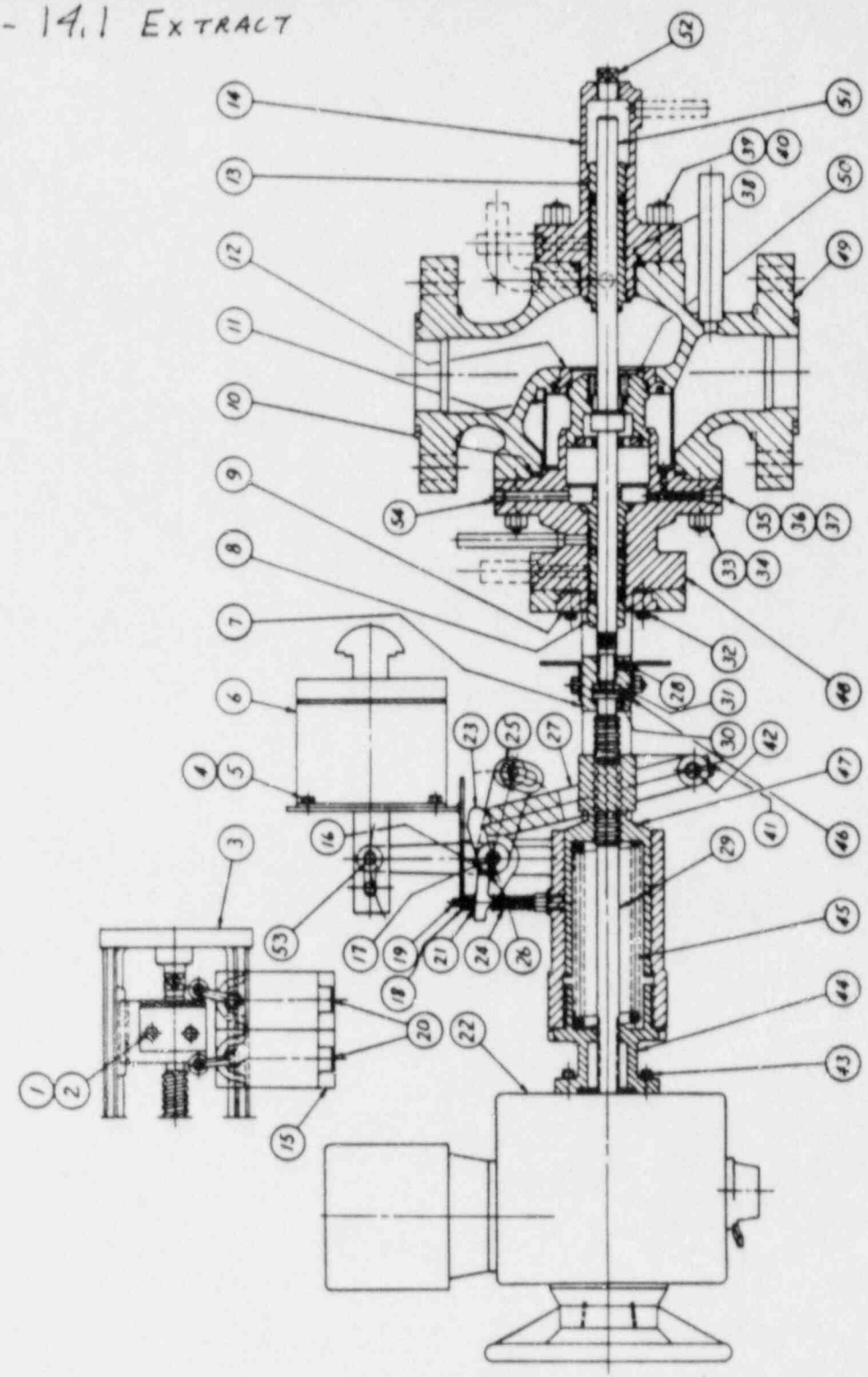
Part No.	Description	Part No.	Description
1	Capscrews	28	Hdl. Setscrew
2	Hex Nuts	29	Screw Spindle
3	Yoke	30	Split Washer
4	Capscrews	31	Friction Washer
5	Hex Nuts	32	Soc. Hd. Capscrew
6	Solenoid Assembly	33	Studs
7	Half Coupling (Two)	34	Hex Nuts
8	Leak Off Bushing	35	Flat Setscrew
9	Yoke Flange	36	Hollow Lockscrew
10	Flexitallic Gasket	37	Soc. Pipe Plug
11	Strainer Basket	38	Flexitallic Gasket
12	Seat	39	Studs
13	Leak Off Bushing	40	Hex Nuts
14	Bottom Stuffing Box	41	Hdl. Setscrew
15	Switch Mounting Plate	42	Latching Pin
16	Soc. Hdl. setscrew(cone point)	43	Soc. Hd. Capscrews
17	Trip Hook Pin	44	Yoke Nut
18	Hex Nuts	45	Compression Spring
19	Spring Pin	46	Alemite Fitting
20	Switch Assembly	47	Sliding Nut
21	Washers	48	Cover with Cylinder
22	Limitorque Motor Operator	49	Body
23	Trip Hook	50	Disc
24	Compression Spring	51	Pilot Valve with Stem
25	Radius Lever	52	Std. Pipe Plug
26	Hdl. Setscrew	53	Link Pin/Cotters
27	Latching up Lever	54	Std. Pipe Plug

Microfilmed
6 19

ckb

	IDENTITY LIST FOR 3" TOP MECH. THROTTLE TRIP VALVE	SCHUTTE & KOERTING CO. MANUFACTURING ENGINEERS CORNWELLS HEIGHTS BUCKS COUNTY, PA.
12-9-69	PARTS LIST 69-XC-113	69-S-241

VMR4-14.1 EXTRACT



FOR PARTS IDENTITY
SEE DWG 69-3-241

69-XC-113

PIECE LIST
OF
3" TOP MECH. THR. TRIP VALVE