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KIESSEL, R. J. Division of Operational Events Assessment (Post 870411)

SUBJECT: Forwards response to NRC 870630 request for addl info needed to assure valve operability before plant program approved, per IE Bulletin 85-003, "Motor-Operated Valve Common Mode Failures. . . ."

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August 12, 1987

U. S. Nuclear Regulatory Commission
Division of Operational Events Assessment
Washington, D.C. 20555

Attention: Mr. Richard J. Kiessel

Dear Sir:

Subject: Docket Nos. 50-361 and 50-362
San Onofre Nuclear Generating Station
Units 2 and 3

References: 1) IE Bulletin 85-03, "Motor-Operated Valve Common Mode Failures During Plant Transients Due to Improper Switch Settings," dated November 15, 1985

2) May 19, 1986 letter from J. L. Rainsberry (SCE) to J. B. Martin (NRC - Region V), Subject: Docket Nos. 50-206, 50-361 and 50-362, San Onofre Nuclear Generating Station, Units 1, 2 and 3

3) June 30, 1987 letter from D. F. Kirsch (NRC - Region V) to M. Medford (SCE)

Reference 1 requested Southern California Edison (SCE) to develop and implement a program to ensure that switch settings on certain safety-related motor operated valves are selected, set and maintained correctly to accommodate the maximum differential pressures expected on these valves during both normal and abnormal events within the design basis. By Reference 2, SCE provided a description of the program requested by Reference 1 for San Onofre Units 1, 2 and 3.

By Reference 3 the NRC requested specific additional information needed to assure valve operability before the San Onofre Units 2 and 3 program (Reference 2) can be approved. Accordingly, SCE hereby provides the responses to the Reference 3 requests for additional information (Enclosure 1) which assure valve operability. Based on the enclosed information, no revisions to

IE11

the San Onofre program (Reference 2) have been made. As committed in Reference 2, the summary report which describes completion of IE Bulletin 85-03 Actions "b" through "d" is scheduled to be submitted to the NRC by August 31, 1987.

If you would like additional information concerning this matter, please let me know.

Subscribed on this 12th day of August, 1987.

Respectfully submitted,

SOUTHERN CALIFORNIA EDISON COMPANY

By: M. O. Medford

M. O. Medford
Manager of Nuclear Engineering
and Licensing

Subscribed and sworn to before me this 12th day of August 1987.

Agnes Crabtree

Notary Public in and for the County of
Los Angeles, State of California

OFFICIAL SEAL
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My Comm. Exp. Sep. 14, 1990

My Commission Expires: Sept 14, 1990

TDM:8758F
Enclosure

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

cc: D. F. Kirsch, Director, Division of Reactor Safety and Projects, Region V
H. Rood, NRR Senior Project Manager, San Onofre Units 2 and 3
J. B. Martin, Regional Administrator, NRC Region V
F. R. Huey, NRC Senior Resident Inspector, San Onofre Units 1, 2 and 3

SCE RESPONSE TO NRC QUESTIONS CONCERNING
IE BULLETIN 85-03, ACTION ITEM "e", RESPONSE

1. Unlisted MOVs 2HV-9340, -9350, -9360 and -9370 in discharge lines of the safety injection tank system are shown normally open (fail locked) on drawings 40113A-4 and 40113B-5 for Unit 2. If power is removed from the motors and these MOVs are locked open, please state this in your response. Otherwise, address the effect of assuming inadvertent equipment operations as required by Action Item a of the bulletin, and revise attachments 2 and 3, pages 1 through 4 of 6, of the response of 05-19-86 to include these valves.

   Note: For Unit 3, see drawings 40113AS03-4 and 40113BS03-5.

Response:

These valves are normally locked open when reactor coolant system (RCS) pressure is greater than 715 psia by use of a key-controlled switch located in the control room. In addition, power is isolated from these valves by locking their circuit breakers in the open position. This is required for plant modes 1, 2, and 3 per Technical Specification 3/4.5.1. This is documented in the San Onofre 2 and 3 FSAR, Table 6.3-1 (Sheet 12) for both Unit 2 and 3. They are also documented as being in this locked open position by the "In-Service Testing of Valves Program," Procedure S023-V-3.5.0. As allowed by the ASME code, these valves are full stroke tested only during cold shutdown. Based on these parameters, the valves are not included in the response to IEB 85-03.

2. Has water hammer due to valve closure been considered in the determination of pressure differentials? If no, please explain.

Response:

Water hammer was not considered in the determination of pressure differentials. Water hammer is not considered a design criterion by the ASME code, nor (due to its transient nature) could it result in a sustained differential pressure (d/p) which would affect motor-operated valve response time. The design characteristics of the valves tested (size, rating, stroke time) remain the same as the original design. If a pressure differential due to water hammer were to occur during a valve open signal, full thrust would be applied until the valve is off its seat, at which time no d/p would exist. Accordingly, it would not be appropriate to consider water hammer in MOV testing.

3. Unlisted MOVs HV-9300 and HV-9301 are shown locked open in suction lines from the RWST to the HPSI pumps, in zones F-8 of drawings 40112A-11 (Unit 2) and 40112AS03-8 (Unit 3). Similarly located MOVs at other C-E plants are listed for inspection in accordance with bulletin requirements.

Please revise attachments 2 and 3 of the response of 05-19-86 to include these MOVs, or justify their exclusion. As required by Action Item a of the bulletin, consider the effect of inadvertent equipment operations.

Response:

These valves are normally locked open by use of a key-controlled switch located in the control room. The locked open requirement is documented in the San Onofre 2 and 3 FSAR, Table 6.3-1 (Sheet 1) for both Units 2 and 3. The Procedure "In-Service Testing of Valves Program" (SO23-V-3.5.0) does not require periodic testing of these valves since isolation of the RWST is accomplished by spring loaded check valves (S21204MU001/002 and S31204MU001/002) which are in the In-Service Testing (IST) program. HV-9300 and HV-9301 do not have an active safety-related function. This is taken from the ASME Code Section XI, 1977 Edition, Table IWV-3700-1, where no testing is required for Category B passive valves. This procedure implements 10CFR50.55a(g) and is the specification for valves to be tested for IEB 85-03. Based on these parameters, the valves are not included in the response to IEB 85-03. Because MOVs HV-9300 and HV-9301 are locked open and not included in response to IEB 85-03, the effect of inadvertent operation need not be considered.

4. Please expand the proposed program for action items b, c, and d of the bulletin to include description of a method possibly needed to extrapolate valve stem thrust measured at less than maximum differential pressure.

Response:

As specified in Action Item "b" of the bulletin response, the valve stem thrust is calculated for the tabulated design basis differential pressure. These calculations were performed separately for gate, globe, and butterfly valves. For all valves the calculations included stem blowout force and packing drag (based on design pressure or maximum differential pressure whichever is greater). For gate valves, gate drag was included using maximum differential pressure (double drag calculations were performed for all gate valves since a pressure differential can exist between the body and both the upstream and downstream piping). For globe valves, a plug force was also included. These forces established a minimum required thrust to open and close the valve and a maximum required running thrust. The motor stall thrust values are then used to assure the maximum stem stress intensity will not be exceeded.

As established by the plan for Action Item "c", the valves are tested against full d/p and then correct switch settings are established. The minimum thrust provided to open the valve is a value at least two and a half times the running thrust based on the full flow MOVATS data. If the thrust at torque switch trip is less than the unseating thrust, then the torque switch bypass setpoint is set out further in time than the point of transition to running thrust. The minimum closing thrust setpoint is the opening thrust if the value is based on the design basis test, otherwise the stem blowout force is added. The disk bypass (protection) margin limit switch is based on the above setpoint determination and the valve stroke time. This is then set at 25± 5% for gate valves and 20± 5% for globe valves. For tests that cannot be performed at full d/p, linear extrapolation from the actual test pressure to the design basis test pressure is performed to obtain the maximum thrust. This method is verified as sufficient by ensuring the torque bypass limit switch is set beyond the peak thrust values as shown on the MOVATS valve signature and by utilizing a minimum open thrust value of 2 1/2 times the running thrust which has been demonstrated satisfactory on valves tested with full d/p.

As stated in the response to Action Item "d," the values for minimum required thrust and maximum allowable thrust are approved and documented (see attached) through the engineering design change process, and the elementary electrical wiring diagrams are revised to include these values.

TDM:8758F
Attachment

THRUST SETPOINT DETERMINATION SHEET

VALVE NUMBER _____ VALVE TYPE _____

ACTUAL TEST PRESSURE ____ PSI DESIGN BASIS PRESSURE _____ PSI

AS LEFT DATA	OPEN _____ LB	CLOSE _____ LB
PRESSURE TEST DATA	OPEN _____ LB (unseating thrust)	CLOSE _____ LB (total thrust)
CALCULATION DATA FOR MINIMUM REQUIRED THRUST	OPEN _____ LB	CLOSE _____ LB
RUNNING THRUST	OPEN _____ LB	CLOSE _____ LB

TIME AT TRANSITION TO RUNNING THRUST _____ SECONDS

VALVE STROKE TIME _____ SECONDS

TIME AT WHICH TORQUE SWITCH BYPASS LIMIT SWITCH DROPS OUT OF CIRCUIT _____ SECONDS

****

MINIMUM REQUIRED THRUST OPEN _____ LB CLOSE _____ LB

****

PULLOUT THRUST AT 100% VOLTAGE _____ LB

STALL THRUST AT 75% VOLTAGE _____ LB

STALL THRUST AT 100% VOLTAGE _____ LB

****

MAXIMUM ALLOWABLE THRUST OPEN _____ LB CLOSE _____ LB

****

CORRESPONDING MAXIMUM STEM STRESS INTENSITY _____

MAXIMUM ALLOWABLE STEM STRESS INTENSITY _____

TORQUE SWITCH BYPASS SETPOINT TO BE SET AT ____ ± _____ PERCENT OPEN ON THE OPEN CYCLE. SET AT 99 ± 1% ON THE CLOSE CYCLE.

COMMENTS: _____

_____

_____

_____

_____