TENNESSEE VALLEY AUTHORITY

NUCLEAR SAFETY REVIEW STAFF

NSRS INVESTIGATION REPORT NO. I-85-612-SQN

EMPLOYEE CONCERN XX-85-020-001 (SQN APPLICABILITY)

SUBJECT: RCS PRESSURIZER RELIEF FLOW CONTROL VALVES - FAILURE TO MAKE TORQUE SWITCH BYPASS MODIFICATIONS

DATES OF INVESTIGATION: OCTOBER 15-17, 1985, and JANUARY 15-22, 1986

INVESTIGATOR: M W Alexander — M. W. ALEXANDER — 3/5/86 — DATE

REVIEWED BY: R. E. McClure — R. E. MCCLURE — 3/6/86 — DATE

APPROVED BY: L. E. Brock for — W. D. STEVENS — 3/6/86 — DATE

I. BACKGROUND

A Nuclear Safety Review Staff (NSRS) investigation was conducted to determine the validity of an expressed employee concern as received by Quality Technology Company (QTC)/Employee Response Team (ERT). The concern of record, as summarized on the Employee Concern Assignment Request Form from QTC and identified as XX-85-020-001, stated:

> An ECN # 5971 was issued at Sequoyah in 1979 that required a bypass of the over-torque limit switches on certain limitorque operators. It was recently discovered (3-4 months ago) that this had not been accomplished for SIS valve # 332 and 333. CI is concerned about ECN's applicability to WBNP.

The ERT follow-up group was contacted to obtain additional clarification of the concern. No additional information was available.

II. SCOPE

A. The scope of the investigation was determined from the stated concern of record to be that of two issues requiring investigation:

1. Were torque switch modifications to the valve operator circuits on valves FCV-68-332 and FCV-68-333, which were required by a 1979 ECN, made? If not, what is the current status of these valves?

2. Is Watts Bar Nuclear Plant (WBN) aware of this potential problem?

B. This investigation entailed the review of historical documentation related to motor operated valve (MOV) problems including Nonconformance Reports (NCRs), Engineering Change Notices (ECNs), drawings, and workplans. Cognizant TVA personnel were also interviewed.

III. SUMMARY OF FINDINGS

A. Requirements and Commitments

1. ECN 2257, dated March 12, 1979, on modification to "active" MOV operator circuits to address operational problems identified at Browns Ferry Nuclear Plant (BFN) (Ref. 2).

2. U.S. NRC IE Circular 81-13, dated September 25, 1981, "Torque Switch Electrical Bypass Circuit for Safeguard Service Valve Motors," contains recommended actions for licensees relative to assuring that required torque switch bypasses are installed and maintained properly (Ref. 9).

B. Findings

1. A review of historical documentation revealed that Sequoyah Nuclear Plant (SQN) ECN 2257 (Ref. 2) was issued in 1979 to address valve operator problems that had been experienced at BFN. ECN 2257 required removing the torque switch from the opening circuits of all "active" valves and bypassing the closing torque switch with a closing limit switch. From the nature of the stated concern and the associated timeframe, it was assumed for purposes of this investigation that the CI meant ECN 2257 and not ECN 5971 (which was issued in 1983). Furthermore, "SIS valves 332 and 333" were assumed to be FCV-68-332 and FCV-68-333 which are RCS Pressurizer Relief Flow Control Valves, commonly called PORV block valves. These valves are in the Reactor Coolant System (RCS) and not in the Safety Injection System (SIS).

2. The "active" valves referred to in ECN 2257 are "those valves whose operations are necessary to mitigate particular accident conditions." The "active" SQN valves required to be modified in accordance with ECN 2257 were identified to be the same valves as listed in WBN FSAR Tables 3.9-17 and 3.9-25 (earlier revision of Ref. 7) since the valve numbers are the same at both plants, and this valve list is not in the SQN FSAR. Approximately 222 valves were to be modified.

3. From information provided by reference 21, RCS Pressurizer Relief Flow Control Valves FCV-68-332 (both units) and FCV-68-333 (both units) were not identified as "active" valves in the initial WBN FSAR Tables 3.9-17 and therefore not required to be modified in accordance with SQN ECN 2257.

4. A review of documentation associated with implementation of SQN ECN 2257 [WP No. 2912 (Ref. 3) and WP No. 2963 (Ref. 4)] indicated that several workplans were prepared to rework all the valves identified in the WBN FSAR Tables 3.9-17 and -25.

5. In July 1983, during component Environmental Qualification (EQ) reviews it was determined that the limitorque motor operators on the PORV block valves contained class B insulation which is not qualified for postaccident conditions inside containment per NUREG 0588 requirements. This condition was documented in NCR SQN NEB 8157 (Ref. 10), and operator replacement was recommended.

6. In October 1983, SQN ECN L5971 (Ref. 11) was prepared to evaluate and document the operator replacement for the PORV block valves.

7. In January 1984, as a result of reviewing the WBN final design it was determined that 15 additional WBN valves (Refs. 21, 22, and 23) should be added to the WBN "active" valve list and should therefore be subject to the torque switch bypassing initially required by SQN ECN 2257. Valves FCV-68-332 and FCV-68-333 were included in these additional valves. From a review of reference 21, it appears this information was not made available to SQN.

8. In June 1984, workplans 11066 [unit 1 (Ref. 12)] and 11065 [unit 2 (Ref. 13)] were prepared to replace the electric motor valve operators per SQN ECN L5971.

9. In November 1984, during the U2-C2 refueling outage, workplan 11065 was completed including quality control (QC) inspections and functional testing of the unit 2 valves.

10. On March 23, 1985, Shift Engineer and Unit Operator Logs (Ref. 17) indicate that 2-FCV-68-332 and 2-FCV-68-333 failed to close from the Main Control Room hand switches during routine stroke testing (under operating conditions) in accordance with Surveillance Instruction (SI) 166.1 (Ref. 20). The valves could only be closed at the MOV boards. The valves were tagged out, and power was removed. Potential Reportable Occurrence 2-85-045 and Commitment Action Tracking 85-163 were then initiated. Unit 2 continued to operate under Limiting Condition for Operation (L.C.O.) 3.4.3.2 (Ref. 19) until the cause of the trouble could be determined and unit conditions permitted repair.

11. In early May 1985, unit 2 tripped off line. The plant staff prepared Category D FCR 3489 (Ref. 14) to request that modifications be made to the valve operators for the PORV block valves (both units) to eliminate the function of the torque switches from the opening circuit and bypass the closing torque switch with a limit switch. ECN L6416 (Ref. 15) was issued to revise the necessary drawings and document these modifications.

12. Workplan 11620 (Ref. 16) was prepared to accomplish the torque switch modifications on both units per ECN L6416.

13. Also in May 1985, valve operator replacements for class A wiring on unit 1 were completed (with exceptions) in accordance with workplan 11066. The exceptions dealt with postponing postmodification functional testing which would be conducted under workplan 11620.

14. A review of completed workplan 11620 indicates that the modification to the motor operator torque switches per ECN L6416 was completed for both units including QC inspections and functional testing.

15. A review of subsequent SI 166.1 test data showed that PORV block valves FCV-68-332 and FCV-68-333 are functioning properly.

IV. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

Although there are discrepancies in the employee concern as stated on the Employee Concern Assignment Request Form it is substantiated. FCV-68-332 and -333 were not included in initial torque switch bypassing requirements established in 1979 for WBN and SQN. However, in January 1984, additional valves (including FCV-68-332 and -333) were added to the WBN "active" valve list but apparently overlooked at SQN. Because of subsequent operational problems at SQN, FCV-68-332 and -333 have now been appropriately modified. Surveillance test data indicates the valves are functioning properly. From information reviewed in the course of this investigation and discussions with cognizant TVA personnel, it appears that all WBN "active" valves have now been appropriately modified.

B. Recommendations

I-85-612-SQN-01, Verification of SQN "Active" Valve List

Since there is a possibility that other important valves added to the WBN "active" valve list were not considered at SQN, the SQN plant staff should verify that all SQN "active" valves requiring torque switch bypassing have been modified appropriately. Any difference between the list of WBN active valves and the list of SQN active valves should be justified. [P-1]

I-85-612-SQN-02, Document Failure to Adequately Identify "Active" Valves

OE should document by a significant condition report (SCR) the failure to adequately identify the required "active" valves at SQN. Consider the SQN initial notification (ECN 2557), the apparent failure to notify SQN when WBN recognized the need to include an additional 15 valves, and when SQN FCR 3489 was approved. [P-2]

DOCUMENTS REVIEWED IN INVESTIGATION I-85-612-SQN
AND REFERENCES

1. SQN NCR 280 dated June 6, 1977, evaluates swollen motor leads on limitorque valve operators

2. SQN ECN 2257 dated March 12, 1979, on modification to "active" MOV operator circuits to address problems identified at Browns Ferry Nuclear Plant

3. SQN WP No. 2912 dated March 23, 1979, prepared by Construction to implement ECN 2257 for several system 63 (SIS) valves

4. SQN WP No. 2963 dated March 24, 1979, prepared by Construction to implement ECN 2257 for several system 63 (SIS) valves

5. SQN wiring diagrams revised by ECN 2257:

45N1750-14, R7	1-FCV-68-332
45N1749-14, R12	1-FCV-68-333
45N2750-14, R11	2-FCV-68-332
45N2749-13, R11	2-FCV-68-333

6. SQN wiring diagrams for valves 332 and 333, current revision:

45N1750-14, R12	1-FCV-68-332
45N1749-14, R14	1-FCV-68-333
45N2750-14, R20	2-FCV-68-332
45N2749-13, R17	2-FCV-68-333

7. Watts Bar FSAR, Tables 3.9-17 and 3.9-25, as revised by Amendment 55

8. Design Change Request SQ-DCR-972 dated December 11, 1980, authorizing Engineering Design to proceed with necessary engineering and analysis required to meet environmental qualification requirements of NUREG 0588

9. U.S. NRC IE Circular 81-13 dated September 25, 1981, "Torque Switch Electrical Bypass Circuit for Safeguard Service Valve Motors"

10. NCR SQN NEB 8157, R1, dated September 26, 1983, documents that internal wiring in the electric motor operators on valves FCV-68-332 and FCV-68-333 does not meet NUREG 0588 insulation requirements

11. SQN ECN L5971 dated October 7, 1983, evaluates electric motor operator replacement for FCV-68-332 and FCV-68-333

12. SQN WP No. 11066 dated June 25, 1984, covers replacement of valve operators on unit 1

13. SQN WP No. 11065 dated June 25, 1984, covers replacement of valve operators on unit 2

14. SQN Category D FCR 3489, dated May 8, 1985, requested wiring changes to FCV-68-332 and FCV-68-333 motor operators

15. SQN ECN L6416 dated May 8, 1985, evaluates wiring changes to FCV-68-332 and FCV-68-333 motor operators (both units)

16. SQN WP No. 11620 dated May 8, 1985, implements wiring changes called for in ECN L6416 (both units)

17. Shift Engineer and Unit Operator Logs for April and May 1985

18. U.S. NRC IE Bulletin 85-03 dated November 15, 1985, "Motoroperated Valves Common Mode Failures During Plant Transients due to Improper Switch Settings"

19. SQN Technical Specifications Limiting Conditions for Operation (L.C.O.) 3.4.3.2

20. SQN Surveillance Instruction (SI) 166.1, Revision 34, dated December 6, 1985, "Full Stroking of Category 'A' and 'B' Valves During Operation"

21. Informal communications from A. Heacock entitled "Active Valves"

22. WBN ECN 4551 (unit 1) dated January 26, 1984, adds 15 additional unit 1 valves (including FCV-68-332 and FCV-68-333) to the WBN "active" valve list

23. WBN ECN 4552 (unit 2) dated January 26, 1984, adds 15 additional unit 2 valves (including FCV-68-332 and FCV-68-333) to the WBN "active" valve list

TVA 64 (OS-9-65) (OP-WP-5-85)

UNITED STATES GOVERNMENT

Memorandum

To NRC

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TENNESSEE VALLEY AUTHORITY

TO: H. L. Abercrombie, Site Director, Sequoyah Nuclear Plant

FROM: K. W. Whitt, Director of Nuclear Safety Review Staff, E3A8 C-K

DATE: MAR 05 1986

RPD-

WATTS BAR NUCLEAR PLANT SITE DIRECTOR'S OFFICE MAR 05 '86

SUBJECT: NUCLEAR SAFETY REVIEW STAFF INVESTIGATION REPORT TRANSMITTAL

Transmitted herein is NSRS Report No. I-86-180-SQN

Subject SQN DRAWING CONTROL

Concern No. SQM-6-003-001; -002; -003; -004; -005; -006

No response or corrective action is required for this report. It is being transmitted to you for information purposes only. Should you have any questions, please contact W. D. Stevens at telephone 6231.

Recommend Reportability Determination: Yes _____ No X

W D Stevens

Director, NSRS/Designee

WDS:GDM
Attachment
cc (Attachment):
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