

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Sequoyah, Unit 2										DOCKET NUMBER (2) 0 5 0 0 0 3 2 8										PAGE (3) 1 OF 0 8																													
TITLE (4) Two Improper Operability Determinations Relating To A Level Control Valve Resulted In Not Entering The Applicable Limiting Condition For Operation In A Timely Manner																																																	
EVENT DATE (5) 0 3 0 5 8 8										LER NUMBER (6) 8 8 - 0 1 2 - 0 0										REPORT DATE (7) 0 4 0 1 8 8										OTHER FACILITIES INVOLVED (8)																			
MONTH DAY YEAR										YEAR SEQUENTIAL NUMBER REVISION NUMBER										MONTH DAY YEAR										FACILITY NAMES										DOCKET NUMBER(S) 0 5 0 0 0									
OPERATING MODE (9) 3										THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more of the following) (11)																																							
POWER LEVEL (12) 0 0 0										20.402(b)										20.405(c)										50.73(a)(2)(iv)										73.71(b)									
										20.405(a)(1)(i)										50.38(c)(1)										50.73(a)(2)(v)										73.71(c)									
										20.405(a)(1)(ii)										50.38(c)(2)										50.73(a)(2)(vi)										OTHER (Specify in Abstract below and in Text, NRC Form 366A)									
										20.405(a)(1)(iii)										XX 50.73(a)(2)(i)										50.73(a)(2)(viii)(A)																			
										20.405(a)(1)(iv)										50.73(a)(2)(ii)										50.73(a)(2)(viii)(B)																			
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LICENSEE CONTACT FOR THIS LER (12)																																																	
NAME Don Siska J. L. Long, Plant Operations Review Staff																				TELEPHONE NUMBER AREA CODE 6 1 5 8 7 0 - 7 2 5 4																													
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																																																	
CAUSE										SYSTEM										COMPONENT										MANUFACTURER										REPORTABLE TO NRC									
SUPPLEMENTAL REPORT EXPECTED (14)																																																	
YES (If yes, complete EXPECTED SUBMISSION DATE)																				XX NO										EXPECTED SUBMISSION DATE (15)										MONTH DAY YEAR									

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single space typewritten lines) (16)

On March 5, 1988, at approximately 2230 EST, unit 2 was in mode 3 (hot standby) when it was discovered that level control valve (LCV) 2-LCV-3-175 (which supplies auxiliary feedwater (AFW) from the turbine-driven AFW pump to number 4 steam generator) could not be opened from the main control room. However, the Operations shift crew did not immediately enter LCO 3.7.1.2 because they believed that a previous technical specification (TS) interpretation involving LCOs 3.0.5 and 3.7.1.2 allowed this condition to exist without entering the LCO. Following a subsequent evaluation of this event, TVA determined that action statement (b) to LCO 3.7.1.2 had been applicable during this event, and a late entry into the subject LCO was made. A similar event occurred on March 6, 1988, at approximately 2120 EST. In this case, Instrument Maintenance personnel were backfilling an instrument sensing line to correct a deviation in steam generator 4 level indicator LI-3-107. Since this level indicator shares a common sensing line with level transmitter LT-3-175, which controls 2-LCV-3-175 position, the backfilling procedure required the subject LCV to be placed in manual. At this time, the Operations shift crew did not declare the valve inoperable because it was known that an automatic AFW signal would override the manual control mode. However, because the sensing line for 2-LCV-3-175 was inoperable, it could not be assured that the subject valve could properly control steam generator level. Thus, the valve should have been declared inoperable, and LCO 3.7.1.2 should have been entered. The events were caused by an inadequate and improperly utilized TS interpretation. In addition, the procedure that was used to backfill the common sensing line of the subject level instrumentation did not adequately address the applicability of LCO 3.7.1.2. In order to prevent the recurrence of this event, TVA has revised plant procedures, increased operator training, and performed a formal review of all TS interpretations currently in use.

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TEXT (If more space is required, use additional NRC Form 365A's) (17)

This report is being submitted to describe two events in which an improper operability determination was made. In both of these events, the Operations shift crew did not declare an auxiliary feedwater (AFW) (EIIS Code BA) level control valve inoperable following indication that the subject valve would not be able to perform its designed function. As a result, the plant did not enter the appropriate action statement to technical specification (TS) Limiting Condition for Operation (LCO) 3.7.1.2 in a timely manner.

DESCRIPTION OF EVENT 1

On March 5, 1988, Sequoyah Nuclear Plant (SQN) unit 2 was in mode 3 (0 percent power, 1750 psig, 535 degrees F) while Operations personnel were assisting in the performance of Surveillance Instruction (SI)-166.8, "Increased Frequency Testing of Category A and B Valves." During the performance of this SI, at approximately 2230 EST, a unit operator (UO) attempted to open level control valve 2-LCV-3-175 (which controls turbine-driven AFW to the number 4 steam generator) and discovered that the valve could not be opened from the main control room by placing the valve controller in manual and ramping up the valve position. To determine why the subject valve could not be opened, the evening shift supervisor (SS) dispatched an assistant unit operator (AUO) to the Auxiliary Building with instructions to operate the valve locally. Upon arriving at the valve, the AUO bypassed the valve controller locally (thereby applying regulated instrument air directly to the diaphragm of the valve rather than through the valve positioner and associated pneumatic relay) and successfully stroked the valve. Subsequently, the valve was successfully stroked from the main control room, and at approximately 0230 EST on March 6, 1988, SI-166.8 was completed and 2-LCV-3-175 was declared operable.

On March 6, 1988, at approximately 0130 EST, a Nuclear Regulatory Commission (NRC) inspector questioned why 2-LCV-3-175 had not been declared inoperable when it initially failed to stroke from the main control room and, as a consequence, why LCO 3.7.1.2 had not been entered. The night shift SS justified this action by referring to TS Interpretation (TSI) log number 8. This TSI provides guidelines for determining the operability of the turbine-driven auxiliary feedwater (TDAFW) pump when one diesel generator (D/G) (EIIS Code EK) is out of service and TS LCO 3.0.5 is being utilized. (D/G 2B-B was out of service from approximately 0310 EST on March 5, 1988, to approximately 0625 EST on March 7, 1988, to perform SI-102, "Diesel Generator Monthly Mechanical Inspections".) As applied to this event, TSI log number 8 interpreted LCO 3.0.5 as allowing all three AFW pumps to be considered operable provided that (1) the train A motor-driven AFW pump was operable and capable of being powered by both normal and emergency power sources and (2) AFW could be supplied to at least three steam generators by the TDAFW pump. Thus, since all the requirements of this TSI were satisfied, the night shift SS reasoned that LCO 3.0.5 was applicable and entry into LCO 3.7.1.2, which requires both motor-driven AFW pumps and the TDAFW pump to be operable, was not necessary. However, after discussing this event with personnel from the Plant Operations Review Staff, the night shift SS determined that LCO 3.7.1.2 was applicable and, at approximately 0530 EST on March 6, 1988, made a late entry into LCO 3.7.1.2.

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U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

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A subsequent investigation into this event determined that on March 5, 1988, at approximately 2230 EST, the evening shift SS did not correctly declare level control valve 2-LCV-3-175 inoperable when it could not be opened from the main control room. SI-166.8 requires a valve to be declared inoperable (and subsequently repaired) whenever the actual stroke time of the valve exceeds the maximum allowable stroke time (MAST). Since the valve did not actuate, the MAST was exceeded, and 2-LCV-3-175 should have been declared inoperable.

Because the subject valve was not declared inoperable, the applicable LCO for the resulting system configuration was not entered. That is, LCO 3.0.5 cannot be utilized to declare the "B" train motor-driven AFW pump operable when D/G 2B-B is out of service unless all redundant AFW systems and subsystems are operable. Since the inoperable condition of 2-LCV-3-175 resulted in the TDAFW flow path to the number 4 steam generator being inoperable (hence, the TDAFW pump no longer provided redundant AFW flow to steam generator number 4), LCO 3.0.5 was no longer applicable and action statement (b) to LCO 3.7.1.2 should have been entered.

The investigation into this event also revealed deficiencies in the documentation of the performance of SI-166.8. The initial failure of 2-LCV-3-175 to stroke was not properly logged in SI-166.8 at the time of occurrence nor was this failure noted in the Operations shift log at that time. In addition, the chronological test log in SI-166.8 did not properly identify the test director.

DESCRIPTION OF EVENT 2

On March 6, 1988, at approximately 2120 EST, SQN unit 2 was in mode 3 (0 percent power, 1700 psig, 450 degrees F) when Operations personnel declared steam generator number 4 level indicator 2-LI-3-107 inoperable because it was deviating more than six percent from the other two level indicators on steam generator 4. As a result, unit 2 entered and complied with the appropriate action statements of LCOs 3.3.2 (the LI-3-107 bistables were tripped in accordance with action statement 16 at 2146 EST) and 3.3.3.7. A UO then initiated a work request to investigate and correct the level deviation.

At approximately 0157 EST on March 7, 1988, Instrument Maintenance (IM) personnel received approval from the unit 2 assistant SS to backfill the 2-LI-3-107 sensing line in accordance with Appendix D of Maintenance Instruction (MI)-19.1.5, "Backfilling Sensing Lines for System 3 Transmitters Located on Panel L-184 (Accumulator Room 3)." During a discussion of the backfill procedure between Operations and IM personnel, it was determined that the work on the 2-LI-3-107 sensing line would also affect steam generator 4 level transmitter 2-LT-3-175 because the sensing line for the two instruments are

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common. As a result, the assistant SS declared unit 2 level transmitter LT-3-175 inoperable and entered LCO 3.3.3.5. The assistant SS did not enter LCO 3.7.1.2 at this time because he determined that 2-LCV-3-175 could still be operated in the manual mode, and moreover, an AFW actuation signal would override the manual operation of the subject valve and return it to the automatic mode.

At approximately 1515 EST on March 7, 1988, motor-driven AFW pump 2A-A was taken out of service for testing, and the plant entered and complied with action statement (a) to LCO 3.7.1.2. During the subsequent shift turnover, the shift technical advisor (STA) reviewed the LCO logs and identified the potential for the plant actually being in action statement (b) to LCO 3.7.1.2 (i.e., two AFW pumps inoperable) since it was not clear if the TDAFW flow path could be considered operable with the work being performed on the subject sensing line. Following an investigation of this event, the following conclusions were reached.

- Action statement (b) to LCO 3.7.1.2 should have been entered at 0157 EST when backfilling of the common sensing line was authorized. Entering action statement (b) to LCO 3.7.1.2, as opposed to action statement (a), was necessary because D/G 2B-B was also inoperable at this time (see Description of Event 1).
- Action statement (b) to LCO 3.7.1.2 should have been exited at 0625 EST when D/G 2B-B was returned to service, and action statement (a) to LCO 3.7.1.2 should have been in effect.
- Action statement (b) to LCO 3.7.1.2 should have been reentered at 1515 EST when motor-driven AFW pump 2A-A was taken out of service for testing.
- Action statement (b) to LCO 3.7.1.2 should have been exited at 1832 EST when 2-LT-3-175 and 2-LT-3-107 were returned to operable status, and action statement (a) should have been in effect.

At approximately 1932 EST, the evening shift SS made a late entry into the Operations shift log noting that unit 2 had entered action statement (b) to LCO 3.7.1.2 at 1515 EST. This log entry also stated the unit had exited action statement (b) at 1832 EST and entered action statement (a). However, for purposes of complying with the 72 hour time requirement associated with action statement (a), Operations personnel started the "LCO time clock" at 1515 EST rather than 0157 EST, when the action statement was first applicable.

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On March 10, 1988, at 0157 EST, the 72 hours associated with action statement (a) to LCO 3.7.1.2 expired, and unit 2 had 6 additional hours to reduce RCS temperature to mode 4 (hot shutdown) conditions. However, because of the confusion relating to the exact times when the action statements were entered, Operations personnel were not aware that the 72 hour "LCO time clock" had expired. At approximately 0330 EST on March 10, 1988, motor-driven AFW pump 2A-A was returned to service, and all action requirements of LCO 3.7.1.2 were exited. Thus, although not specifically identified in the Operations shift logs, the time requirements associated with action statements (a) and (b) of LCO 3.7.1.2 were satisfied during this event, and no mode reduction (i.e., RCS cooldown) was required.

CAUSE OF EVENT 1

Immediate Causes

- SI-166.8 was not performed correctly in that the acceptance criteria were not properly evaluated. That is, level control valve 2-LCV-3-175 should have been declared inoperable when it failed to stroke from the main control room as required by SI-166.8.
- The Operations shift logs did not reflect the failure of 2-LCV-3-175 to stroke at the time of occurrence.
- LCO 3.7.1.2 was not entered when 2-LCV-3-175 failed to stroke because the subject valve was not declared inoperable.
- TSI log number 8 allowed an unacceptable system configuration. That is, when 2-LCV-3-175 failed to stroke, the TDAFW pump was no longer redundant to motor-driven AFW pump 2B-B with regard to providing AFW flow to steam generator number 4. Since D/G 2B-B was already out of service for testing, an AFW flow path to steam generator number 4 could not be assured if a loss of offsite power had occurred. Hence, LCO 3.0.5 was no longer applicable.

Root Causes

- Management direction regarding the detail of operator log entries was less than adequate. This resulted in inadequate log entries regarding the failure of the level control valve to stroke in both the Operations shift log and the chronological test log of SI-166.8.
- TSI log number 8 was inadequate and improperly utilized. This TSI did not define the redundant AFW loops for the motor-driven AFW and TDAFW pumps. As a result, the operators did not have adequate information to determine the applicability of LCO 3.0.5.

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CAUSE OF EVENT 2

Immediate Causes

- a. Level control valve 2-LCV-3-175 was not declared inoperable following the authorization to backfill the common sensing line. The assistant SS determined that the subject valve was still operable while in the manual mode because an automatic AFW signal would override the manual control mode and return the valve to automatic operation. However, because the sensing line for 2-LCV-3-175 was inoperable, it could not be assured that the valve would properly control steam generator level.
- b. LCO 3.7.1.2 was not entered when the common sensing line was being backfilled because 2-LCV-3-175 was not declared inoperable.
- c. TSI log number 8 allowed an unacceptable system configuration (see Cause of Event 1).
- d. After Operations personnel made a log entry stating that action statement (b) to LCO 3.7.1.2 had been in effect since 1515 EST on March 7, 1988, they did not calculate the length of time that action statement (a) had been in effect (i.e., since 0157 EST on March 7, 1988). In this LCO, action statement (b) is actually a subset of action statement (a); hence, when it was determined that action statement (b) was applicable at 1515 EST, an additional log entry should have been made to document the length of time action statement (a) had been in effect.

Root Causes

- a. The procedure used to backfill the common sensing lines of instruments LI-3-107 and LT-3-175 did not specifically address the applicability of LCO 3.7.1.2 when instrument loop L-3-175 was declared inoperable.
- b. TSI log number 8 was inadequate and improperly utilized (see Cause of Event 1).
- c. Management direction regarding the detail of operator log entries was less than adequate. This resulted in the "72 hour time clock" associated with action statement (a) to LCO 3.7.1.2 being initiated at 1515 EST rather than 0157 EST.

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ANALYSIS OF EVENTS

These events are being reported in accordance with 10 CFR 50.73, paragraph a.2.i.b, as an operation prohibited by the plant's TS.

In both of these events, the applicable TS action requirements for both one and two AFW pumps out of service (i.e., action statement (a) and (b) to LCO 3.7.1.2) were satisfied. That is, during event 1, action statement (b) to LCO 3.7.1.2 should have been in effect from approximately 2230 EST on March 6, 1988 (when 2-LCV-3-175 failed to open), to approximately 0230 EST on March 7, 1988, when the subject valve was verified to be operable. Since this time interval was less than the six hours allowed by action statement (b) to LCO 3.7.1.2 before a plant cooldown was required to be initiated, the action requirement was satisfied. Similarly, for event 2, the time intervals in which action statement (b) to LCO 3.7.1.2 were determined to be in effect did not exceed six hours. For both events, the time interval in which action statement (a) to LCO 3.7.1.2 was in effect did not exceed the 72 plus 6 hours allowed by the subject action statement before a plant cooldown to mode 4 conditions was required to be completed. Thus, although entry into the specific action statements was not properly logged in the Operations shift log, all LCO action requirements were satisfied.

In both of the previously described events there was always at least one operable motor-driven AFW pump capable of supplying AFW to two steam generators, and one TDAFW pump capable of supplying AFW to at least three steam generators. Thus, if the most severe design basis accident had occurred concurrent with a loss of offsite power and single active failure (e.g., failure of one train of emergency onsite power), adequate (and redundant) AFW would still have been available to provide a secondary heat sink and subsequent RCS heat removal through at least two steam generators. The accident analyses described in Chapter 15 of the SQN Final Safety Analysis Report (FSAR) have shown acceptable consequences for all design basis accidents provided at least two steam generators are available for RCS heat removal. Therefore, since the LCO action requirements were satisfied and adequate AFW flow to at least two steam generators was available, there were no safety consequences associated with this event.

CORRECTIVE ACTIONS

TVA has instituted several corrective actions to prevent the recurrence of these events. These actions include changes to plant procedures, increased operator training, and a formal review of all SQN TSIs currently in use. Specifically, the following corrective actions have been (or will be) taken by TVA.

1. Administrative Instruction (AI)-6, "Log Entries and Review," (for operator log entries) has been revised to delineate the level of detail necessary for log entries.

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2. TSI log number 8 has been revised to specify the equipment that must be operable in order to utilize LCO 3.0.5 for the AFW system.
3. A formal review of all SQN TSIs has been performed for technical adequacy and clarity, and the SQN TSI manual has been temporarily removed from the main control room. No changed TSIs will be returned to the main control room until training of Operations personnel on TSI changes has been completed. The training on TSI changes will be complete before restart (mode 2) of unit 1.
4. Training has been given to Operations personnel on the AI-6 procedure change.
5. MI-19.1.5 will be revised to clarify the effect of backfilling the common sensing line for LT-3-175 and LT-3-107. This MI revision will also include LCO 3.7.1.2 in the list of LCOs that must be satisfied when the above common sensing line is out of service. This procedure revision will be complete before restart (mode 2) of unit 1.
6. Scenarios emphasizing the use of TSs will be incorporated into the operator simulator training program before restart (mode 2) of unit 1.

ADDITIONAL INFORMATION

Previous occurrences of similar events - 3 - SQRO-50-327/84024, -328/88008, and 88010.

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TENNESSEE VALLEY AUTHORITY
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April 1, 1988

U. S. Nuclear Regulatory Commission
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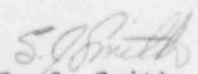
Gentlemen:

TENNESSEE VALLEY AUTHORITY - SEQUOYAH NUCLEAR PLANT UNIT 2 - DOCKET NO.
50-328 - FACILITY OPERATING LICENSE DPR-79 - REPORTABLE OCCURRENCE REPORT
SQRO-50-328/88012

The enclosed licensee event report provides details concerning two improper operability determinations relating to an auxiliary feedwater level control valve. As a result, the applicable technical specification Limiting Condition for Operation was not entered in a timely manner. This event is reported in accordance with 10 CFR 50.73, paragraph a.2.i.b.

Very truly yours,

TENNESSEE VALLEY AUTHORITY


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Plant Manager

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