

Tennessee Valley Authority, Post Office Box 2000, Soddy-Daisy, Tennessee 37379-2000

R.J. Adney
Site Vice President
Sequoyah Nuclear Plant

October 23, 1996

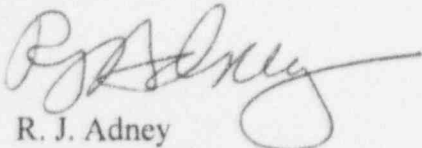
U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Gentlemen:

TENNESSEE VALLEY AUTHORITY - SEQUOYAH NUCLEAR PLANT (SQN)
UNIT 2 - DOCKET NO. 50-328 - FACILITY OPERATING LICENSES DPR-79 -
LICENSEE EVENT REPORT (LER) 50-328/96004

The enclosed report provides details concerning the replacement of a reactor trip breaker. The replacement breaker was later found to have a problem with the linkage for the auxiliary contacts. This caused two of the three relays of the auxiliary contacts to be inoperable. This resulted in a failure to comply with the technical specification (TS) requirements pertaining to reactor trip instrumentation. This condition is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B) as an operation prohibited by the plant TSs.

Sincerely,



R. J. Adney

Enclosure
cc: See page 2

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Enclosure

cc (Enclosure):

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LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)
Sequoyah Nuclear Plant (SQN), Unit 2DOCKET NUMBER (2)
05000328PAGE (3)
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TITLE (4) After a Reactor Trip Breaker was removed it was found to have inoperable auxiliary contacts.

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
09	19	96	96	004	00	10	23	96	FACILITY NAME	DOCKET NUMBER
OPERATING MODE (9)		1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more) (11)							
POWER LEVEL (10)		100	20.402(b)		20.405(c)		50.73(a)(2)(iv)		73.71(b)	
			20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v)		73.71(c)	
			20.405(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vii)		OTHER	
			20.405(a)(1)(iii)		X 50.73(a)(2)(i)		50.73(a)(2)(viii)(A)		(Specify in Abstract below and in Text, NRC Form 366A)	
			20.405(a)(1)(iv)		50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)			
			20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(x)			

LICENSEE CONTACT FOR THIS LER (12)

NAME
S. D. Gilley, Licensing EngineerTELEPHONE NUMBER (Include Area Code)
(423) 843-7427

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYS TEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)

X YES
(If yes, complete EXPECTED SUBMISSION DATE).

NO

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR
11	25	96

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On September 19, 1996, at 1048 Eastern Daylight Time (EDT) with Unit 2 in power operation at approximately 100 percent, Reactor Trip Breaker "B" was placed into service following removal of the original breaker for preventive maintenance. When the replacement breaker was placed into service an annunciation was received in the control room for a "computer alarm rod deviation NIS power range tilts." Management decided to replace the breaker with the original breaker which had been removed earlier in the day. Investigation on the malfunctioning breaker after removal revealed that the linkage necessary to operate the two upper sets of contact stacks was not connected. One of the contacts included in the relays that were inoperable was a P-4 contact that actuates logic for the solid state protection system and is required by technical specifications. As a result, the contacts associated with these stacks were inoperable for approximately 6 hours and 57 minutes while this breaker was installed. This exceeded the LCO 3.3.1 action time of 6 hours for the reactor trip system interlock P-4. A final root cause of this condition has not been determined. Evidence at this time indicates that inadequate evaluation of a procedural change may be the root cause. Procedures have been revised to ensure that steps necessary to verify performance of auxiliary contacts are performed after all work which could affect the contacts including lubrication.

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

I. PLANT CONDITIONS

Unit 2 was in power operation at approximately 100 percent.

DESCRIPTION OF EVENT**A. Event**

On September 19, 1996, at 1048 EDT with Unit 2 in power operation at approximately 100 percent, Reactor Trip Breaker "B" (EHS Code JD) was placed into service following removal of the original breaker for preventive maintenance. When the replacement breaker was placed into service an annunciation was received in the control room for a "computer alarm rod deviation NIS power range tilts." In response to the annunciator, Operators determined that no rod deviation or quadrant power tilt ratio condition existed. Rod deviation readings were taken every four hours to verify that no rod deviation condition existed. These readings were continued until the alarm condition was cleared. The annunciation occurred because the software that determines rod deviation was not operating. A computer point was indicating the reactor trip breaker was open. Since the reactor trip breaker has no effect on the calculations in the software, a value was inserted so that the calculation software would run. Since no actual rod deviation condition existed, the alarm cleared. After management was notified of the situation, the decision was made to replace the breaker. The auxiliary contacts on the reactor trip breaker are arranged in three relays. Additional investigation revealed that the linkage necessary to operate the two upper sets of relays was not connected. This resulted in the annunciation in the control room for rod deviation. The other contacts associated with these two relays were inoperable as well but there was no immediate indication that these contacts were not capable of performing their function. This was only discovered after the breaker had been removed from service and examined in more detail. As a result, the contacts associated with these stacks were inoperable for approximately 6 hours and 57 minutes while this breaker was installed. This exceeded the LCO 3.3.1 action time of 6 hours for the reactor trip system interlock P-4.

B. Inoperable Structures, Components, or Systems that Contributed to the Event

None.

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C. Dates and Approximate Times of Major Occurrences

May 12, 1995	After concurrence was received from the vendor, the procedure was changed to use a different type lubricant for the inertia latch on the DB-50 reactor trip breakers.
September 19, 1996 1046 EDT	Following activities to replace the original Reactor Trip Breaker "B" with a replacement breaker, the bypass breaker was opened, returning Reactor Trip Breaker "B" to service. LCO 3.3.2 was exited. After installation the P-4 contacts were verified to be in the correct state.
1048 EDT	LCO 3.3.1 was exited.
1048 EDT	Received annunciation for "computer alarm rod deviation NIS power range tilts."
at approximately 1200 EDT	It was determined that the alarm indication was caused by the rod deviation software program not running because a trip condition was indicated for the reactor trip breaker.
1328 EDT	A value was inserted into the Integrated Computer System to allow the program to run and perform its intended function.
1328-1630	Technical Support personnel evaluated the breaker and the possible causes of the contact problem. They also developed troubleshooting activities which could be performed on the breaker without excessive risk to the plant.

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at approximately 1630 EDT	A management meeting was held to decide on a course of action. A plan was presented for limited troubleshooting on the breaker while it was installed. Management directed that the breaker be removed and the original breaker that was removed earlier in the day be reinstalled.
1745 EDT	LCO 3.3.1 was entered.
1746 EDT	LCO 3.3.2 was entered and the original breaker was put into position and troubleshooting began on the breaker that was removed.
	During troubleshooting activities, it was discovered that the linkage connecting the two upper stacks to the lower stack was disconnected. This was the first time that evidence was available to indicate that contacts in addition to the one associated with the control room annunciation were affected.
1834 EDT	Exit LCO 3.3.2
1835 EDT	Exit LCO 3.3.1
September 23, 1996	Evaluations were completed that indicate P-4 contacts were inoperable for the period of time the breaker was installed. Therefore, a noncompliance with technical specifications existed.

D. Other Systems or Secondary Functions Affected

In addition to the contact designated as P-4, which is the contact required by technical specifications, there were four other contacts which were not functional. These contacts are for the following functions: turbine trip directly from reactor trip breaker contacts; turbine first out annunciator; computer point Y0007D which tells the computer whether the reactor trip breaker is tripped or not tripped; automatic shunt trip test point which is used to allow the breaker to be trip tested.

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E. Method of Discovery

An annunciation was received in the main control room for "computer alarm rod deviation NIS power range tilts." The occurrence of this alarm coincided with the return to service of the breaker and was subsequently traced to the auxiliary contacts for the breaker. At this point, it was evident that there was a problem with one set of contacts. It was not discovered that the two upper stacks of auxiliary contacts were not working until after the breaker was removed from service and troubleshooting was performed.

F. Operator Actions

In response to the annunciator, Operators determined that no rod deviation or quadrant power tilt ratio condition existed. Rod deviation readings were taken every four hours to verify that no rod deviation condition existed. These readings were continued until the alarm condition was cleared. The annunciation occurred because the software that determines rod deviation was not operating. The linkage problem caused an indication to the software that the reactor trip breaker was open. When the reactor trip breaker is open the software does not need to operate. Since the reactor trip breaker has no effect on the calculations in the software, a value was inserted to indicate that the reactor trip breaker was not tripped so that the calculation software would operate. Since no actual rod deviation condition existed, the alarm cleared.

Management decided to replace the breaker in lieu of performing troubleshooting on the installed breaker.

G. Safety System Responses

No safety system response was required.

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III. CAUSE OF EVENT

A. Immediate Cause

The immediate cause of this condition was that the linkage which connects the bottom auxiliary switch to the two remaining auxiliary switches became disconnected during lubrication activities for the breaker and was not discovered until after the breaker was installed and subsequently removed from service. However, the breaker had remained in service for approximately fifty-seven minutes longer than the LCO action time of 6 hours.

B. Root Cause

Recently, additional information has come to light to indicate that approximately one year ago the type of lubricant used on the inertia latch was changed. The change appears to have been made to resolve binding problems which had occurred previously. It appears that application of the new lubricant requires some disassembly of the inertia latch which was not required for the previous lubricant. The evidence at this point indicates that the procedure change which incorporated the new type of lubricant failed to evaluate the possible effects of the disassembly. Therefore, the maintenance procedure did not identify the possibility of linkage disengagement while removing the inertia latch. This led to the decision by the craft personnel and foreman that removal of one key lock on the mechanical linkage could not affect the function of the other auxiliary contacts if the key lock was properly reinstalled. The actual configuration is such that removal of the outer linkage and its key lock can affect the adjacent linkage because the adjacent linkage is held into position by the outer linkage. The procedure did contain the steps necessary to verify proper operation of the contacts; however, these steps were located before the section on lubrication of the inertia latch. Thus the checks necessary to ensure proper operation of the auxiliary contacts were performed by procedure prematurely.

While a final root cause has not been determined at this time, the investigation is continuing.

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IV. ANALYSIS OF EVENT

The replacement breaker that was installed would have performed its function of tripping the reactor had it been called upon to do so. However, two of the three relays for the auxiliary contacts on Reactor Trip Breaker "B" would not have changed state if Reactor Trip Breaker "B" had opened. The auxiliary contacts on the "B" breaker include a P-4 contact required by technical specifications to be operable. The P-4 contact performs the following functions: Feedwater isolation on a reactor trip and lo-lo Tavg.; after a safety injection signal, a reset will block the safety injection signal from recurring; the feedwater isolation, turbine trip, and main feedpump trip signal would be maintained after a high steam generator level trip. Therefore, because of the problem with the linkage, feedwater isolation would not have occurred from this contact, the safety injection signal could not be reset, and the feedwater isolation, turbine trip and main feedpump trip signals would not be maintained on a high steam generator signal. These functions would not have occurred from the "B" breaker but Reactor Trip Breaker "A" was fully functional during this period of time and would have performed its safety function including operation of its auxiliary contacts had it been called upon to do so. Based on the above considerations, it can be concluded that there were no adverse consequences to plant personnel or to the public as a result of this event.

V. CORRECTIVE ACTIONS

A. Immediate Corrective Action

The replacement breaker was removed and the original breaker was reinstalled. Upon discovery of the linkage problem, the other Reactor Trip Breakers on Units 1 and 2 were inspected to verify that this linkage was connected. This verification was completed and no linkage problems were found.

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B. Corrective Action to Prevent Recurrence

Management held a meeting with the involved personnel to stress that in addition to performing tasks in accordance with procedures, it is also every employee's responsibility to evaluate whether those procedural steps are successful in accomplishing their objectives. It was also reemphasized that every employee will exercise diligence in the use of their skills and training to make sure that the actions prescribed in a procedure are the correct actions. Additional meetings were held with maintenance personnel not directly involved with this breaker replacement to discuss lessons learned from this event.

The Maintenance procedures for the DB 50 Reactor Trip Breakers and the DB 50 Reactor Trip Bypass Breakers were revised to move the testing and checking of the auxiliary contact to the end of the procedures after all steps involving partial disassembly are completed. Caution notes were added to warn of the possible disengagement of the auxiliary contact linkage when the inertia latch is removed. Additionally, the procedures were clarified as to which sections could be worked out of sequence.

The maintenance procedure for DS type breakers was also enhanced to test the main and auxiliary contacts prior to placing the breaker in service. Type DS breakers have a different linkage than the DB breakers and this particular problem could not occur on the DS breakers, but this event did bring to light the fact that the test of the auxiliary contacts was not performed immediately prior to placing the breaker in service.

A discussion of this event was added to the training course material for circuit breakers to increase performer awareness of potential problems.

VI. ADDITIONAL INFORMATION

A. Failed Components

None.

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B. Previous Similar Events

A review of previous reportable events identified no LERs associated with the auxiliary contact linkage of the reactor trip breakers.

II. COMMITMENTS

None.