

September 9, 2002

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

10 CFR 50.73

Gentlemen:

**TENNESSEE VALLEY AUTHORITY - SEQUOYAH NUCLEAR PLANT  
UNITS 1 AND 2 - DOCKET NOS. 50-327 AND 50-328 - FACILITY  
OPERATING LICENSE DPR-77 AND DPR-79 - LICENSEE EVENT REPORT  
(LER) 50-327/2002002**

The enclosed report provides details concerning an automatic reactor trip as a result of an undervoltage condition on two reactor coolant pumps and the failure to perform a Technical Specification action within the required timeframe. This event is being reported, in accordance with 10 CFR 50.73(a)(2)(iv), as an event that resulted in an automatic actuation of the reactor protection system and 10 CFR 50.73(a)(2)(i)(B), as an operation prohibited by Technical Specifications. This letter is being sent in accordance with NRC RIS 2001-05.

Sincerely,

*Original signed by*

Richard T. Purcell

Enclosure

U.S. Nuclear Regulatory Commission

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cc (Enclosure):

INPO Records Center

Institute of Nuclear Power Operations

700 Galleria Parkway

Atlanta, Georgia 30339-5957

<b>NRC FORM 366</b> (7-2001)	<b>U.S. NUCLEAR REGULATORY COMMISSION</b>	<b>APPROVED BY OMB NO. 3150-0104 EXPIRES 7-31-2004</b> Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.
<b>LICENSEE EVENT REPORT (LER)</b> (See reverse for required number of digits/characters for each block)		

<b>1. FACILITY NAME</b> Sequoyah Nuclear Plant (SQN) UNIT 1	<b>2. DOCKET NUMBER</b> 05000327	<b>3. PAGE</b> 1 OF 8
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**4. TITLE**  
Automatic Reactor Trip Resulting from a Failure of a Breaker Causing an Undervoltage Condition on Two Reactor Coolant Pumps and Failure to Perform a Technical Specification Required Action

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
07	12	2002	2002	004	00	09	10	2002	SQN Unit 2	05000328
									FACILITY NAME	DOCKET NUMBER

<b>9. OPERATING MODE</b>	1	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §:</b> (Check all that apply)								
		20.2201(b)		20.2203(a)(3)(ii)		50.73(a)(2)(ii)(B)		50.73(a)(2)(ix)(A)		
<b>10. POWER LEVEL</b>	100	20.2201(d)		20.2203(a)(4)		50.73(a)(2)(iii)		50.73(a)(2)(x)		
		20.2203(a)(1)		50.36(c)(1)(i)(A)		X 50.73(a)(2)(iv)(A)		73.71(a)(4)		
		20.2203(a)(2)(i)		50.36(c)(1)(ii)(A)		50.73(a)(2)(v)(A)		73.71(a)(5)		
		20.2203(a)(2)(ii)		50.36(c)(2)		50.73(a)(2)(v)(B)		OTHER Specify in Abstract below or in NRC Form 366A		
		20.2203(a)(2)(iii)		50.46(a)(3)(ii)		50.73(a)(2)(v)(C)				
		20.2203(a)(2)(iv)		50.73(a)(2)(i)(A)		50.73(a)(2)(v)(D)				
		20.2203(a)(2)(v)	X	50.73(a)(2)(i)(B)		50.73(a)(2)(vii)				
		20.2203(a)(2)(vi)		50.73(a)(2)(i)(C)		50.73(a)(2)(viii)(A)				
		20.2203(a)(3)(i)		50.73(a)(2)(ii)(A)		50.73(a)(2)(viii)(B)				

**12. LICENSEE CONTACT FOR THIS LER**

NAME James Proffitt	TELEPHONE NUMBER (Include Area Code) (423) 843-6651
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**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
X	EA	BKR	A020	Y					

<b>14. SUPPLEMENTAL REPORT EXPECTED</b>				<b>15. EXPECTED SUBMISSION DATE</b>			MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)				X	NO				

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

On July 12, 2002, at 2223 Eastern Daylight Time, an automatic reactor trip occurred on Unit 2 as a result of an undervoltage condition on two reactor coolant pumps. The undervoltage resulted from the loss of power to Start Bus 2B, when the alternate feeder breaker attempted to close while being racked into the connect position. This closure attempt caused the normal feeder breaker to trip open, resulting in a loss of bus voltage initiating the reactor trip. When Start Bus 2B deenergized one offsite power source became inoperable. Operations personnel did not verify the availability of the remaining offsite power sources. The main control room operators took appropriate actions to stabilize the reactor in hot standby. The cause of the reactor trip was the failure of the alternate feeder breaker for Start Bus 2B to function properly when being returned to its normal configuration. The cause of failing to verify the availability of the remaining offsite power sources was supervisor duties were improperly focused, as priorities were placed on restoring off-site power and the diesel generators to normal alignment. A diagnostic of the breaker is being performed. The breaker will be repaired or replaced as necessary.

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

**I. PLANT CONDITION(S)**

Units 1 and 2 were in Mode 1 operating at approximately 100 percent reactor power.

**II. DESCRIPTION OF EVENT**

**A. Event:**

On July 12, 2002, at 2223 Eastern Daylight Time (EDT), an automatic reactor trip occurred on Unit 2 as a result of an undervoltage condition on Reactor Coolant Pumps (RCPs) (EIIS Code AB) 2 and 4. The undervoltage resulted from the loss of power to Start Bus 2B (EIIS Code EA). Prior to the trip, Operations personnel had racked the alternate feeder breaker (EIIS Code BKR) into the connect position for Start Bus 2B following relay functional testing. When the disconnect switch for the closing spring charging motor was closed, the springs charged and the breaker unexpectedly attempted to close. This closure attempt caused the normal feeder breaker to trip open, resulting in a loss of bus voltage. The plant electrical system responded as expected after the trip actuation with the loss of voltage to these boards. The emergency diesel generators started automatically and the 2A-A DG automatically re-energized the 2A-A 6.9 kV Shutdown board. The main control room operators took appropriate actions to stabilize the reactor in hot standby (Mode 3).

Additionally, the above described event resulted in a loss of offsite power affecting both units. When Start Bus 2B deenergized, one offsite power source became inoperable. SQN Technical Specification 3.8.1.1 Action a requires that with one offsite power source inoperable the remaining offsite power source must be demonstrated operable within one hour. Offsite power was restored at 2355 EDT without the requirements of Technical Specification 3.8.1.1 Action a being met (i.e., Operations personnel did not verify the availability of the remaining offsite power sources within one hour).

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

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

The 6.9 kV Start Buses distribute power from Common Station Service Transformers (CSST) A, B, and C, to the 6.9 kV Unit Boards. Start Bus 2B provides the normal feeder to Unit Boards 2B and 2D. This Start Bus is normally fed from Common Station Service Transformer C with an alternate feed from Common Station Service Transformer B. At the time of the event CSST B was not energized and, therefore, not available as an alternate supply.

**C. Dates and Approximate Times of Major Occurrences:**

- June 23, 2002            A work order was initiated to investigate why the alternate feeder breaker for Start Bus 2B closed when going to the test position.
- July 12, 2002            Troubleshooting of the breaker determined that the breaker functioned properly. Operations personnel placed the breaker in test position for performance of a functional test, then cycled the breaker closed and open. No problems were identified.
- July 12, 2002 at        Operations personnel racked the alternate  
2223 EDT                feeder breaker into the connect position for Start Bus 2B. The breaker unexpectedly attempted to close, causing the normal feeder breaker to trip open, resulting in loss of bus voltage and subsequent reactor trip. Additionally, one of the offsite power sources was lost.
- July 12, 2002 at        Operations personnel stopped the 1B-B  
2305 EDT                Diesel Generator in response an inverse time overcurrent alarm. Operations entered Limiting Condition for operation (LCO) 3.8.1.1 Action b for the inoperable

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

July 12, 2002 at 2348 EDT diesel generator. LCO 3.8.1.1 Action b was exited when the shutdown relay was reset.

July 12, 2002 at 2355 EDT Offsite power was restored.

July 13, 2002 at 0356 EDT Operation verified that the required offsite power sources were available.

**D. Other Systems or Secondary Functions Affected:**

Steam Generator No.4 atmospheric relief valve went full open following the reactor trip. This was caused by a problem with the controller. The controller was replaced.

The loss of Start Bus 2B caused a loss of power to the Unit 1 glycol system resulting in an increase in the Unit 1 ice condenser maximum temperature based on one indicator being above the operability setpoint of 27 degrees for approximately 2 minutes.

**E. Method of Discovery:**

The reactor and turbine trips annunciated on the main control room panels. The missed action to verify offsite power sources was identified by the oncoming shift crew.

**F. Operator Actions:**

Control room operators responded to the event in accordance with plant procedures. They promptly diagnosed the plant condition, took the actions necessary to stabilize the unit, and maintained the unit in hot standby, Mode 3. Offsite power was restored and subsequently, a verification of the availability of the remaining offsite power sources was completed.

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**G. Safety System Responses:**

The equipment required to respond to the reactor trip operated as designed. The emergency diesel generators started automatically and the 2A-A diesel generator automatically re-energized the 2A-A 6.9 kV Shutdown board. However, Diesel Generator 1B-B was stopped in response an inverse time overcurrent relay alarm. The relay was determined to be invalid and the diesel generator was available, if needed. Following the reactor trip, the turbine tripped, feedwater isolation occurred, and the auxiliary feedwater system started as designed.

Following the reactor trip, RCS pressure rapidly decreased because of the decreasing RCS average temperature and the associated shrinking of coolant volume. Operation of pressurizer heaters and decay heat restored RCS pressure. The operation of steam generator No. 4 atmospheric relief valve delayed this response. With loss of the Loop No. 2 RCP, normal pressurizer spray was degraded. As a result, RCS pressure increased to 2335 psig at which time a pressurizer PORV actuated, 22 minutes after the reactor trip, and reseated approximately 2 seconds after actuation. Operations placed the pressurizer auxiliary spray in service. RCS pressure was then controlled within the normal operating band.

**III. CAUSE OF THE EVENT**

**A. Immediate Cause:**

The immediate cause of the reactor trip was the loss of power to Start Bus 2B. The loss of the start bus resulted in the undervoltage condition on RCPs 2 and 4 initiating the reactor trip.

The immediate cause of failing to perform verification of the remaining offsite power sources was the failure to recognize that Technical Specification 3.8.1.1 actions should have been entered.

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

**B. Root Cause:**

The root cause of the reactor trip was the failure of the alternate feeder breaker for Start Bus 2B to function properly when being returned to its normal configuration.

The root cause of failing to properly implement the required actions of LCO 3.8.1.1 for loss of an off-site AC power source was supervisor duties were improperly focused, as priorities were placed on restoring off-site power and the diesel generators to normal alignment.

**C. Contributing Factors:**

A contributing factor to the missed actions was task and individual accountability were not made clear, as no individual was specifically assigned to address technical specification actions.

**IV. ANALYSIS OF THE EVENT**

The plant safety systems responses during and after the unit trip were bounded by the responses described in the Final Safety Analysis Report.

**V. ASSESSMENT OF SAFETY CONSEQUENCES**

Based on the above Analysis of The Event, this event did not adversely affect the health and safety of plant personnel or the general public. The failure to verify that the remaining offsite power source is operable within one hour did not affect the health and safety of plant personnel or the general public since it was subsequently demonstrated that the remaining offsite power source was available throughout the event.

**VI. CORRECTIVE ACTIONS**

**A. Immediate Corrective Actions:**

The normal feeder breaker for Start Bus 2B was returned to service and the unit was restarted.



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**B. Corrective Actions to Prevent Recurrence:**

A cause analysis of the breaker is being performed and the breaker will be repaired or replaced, as necessary.

Counseling of the involved supervisor and licensed individuals concerning the missed actions was performed.

The plant procedure governing transient crew briefs was revised to require discussion of applicable technical specifications actions.

Lessons learned describing the event and how to help prevent recurrence in similar situations will be discussed with the licensed operators.

An evaluation of simulator training to include implementation of LCO actions will be performed.

**VII. ADDITIONAL INFORMATION**

**A. Failed Components:**

An ASEA-Brown Boveri (ABB) 15HK -1000-3000A breaker attempted to close when the breaker was being racked into the connect position. This unexpected closure attempt caused the normal feeder breaker to trip open, resulting in a loss of bus voltage.

**B. Previous LERs on Similar Events:**

A review of previous reportable events for the past three years did not identify any similar events.

**C. Additional Information:**

None.

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**D. Safety System Functional Failure:**

This event did not result in a safety system functional failure in accordance with NEI 99-02.

**VIII. COMMITMENTS**

None.