NRC FORM 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

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EXPIRES 04/30/98

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), 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.

LICENSEE EVENT REPORT (LER)

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

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Sequoyah Nuclear Plant (SQN) Unit 1	05000327	1 OF 10

TITLE (4)
Operation of Vital Battery Board #4 Without a Battery Source.

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
7	25	97	97	-- 011 --	01	9	17	97	Sequoyah, Unit 2	05000328
									FACILITY NAME: NA	DOCKET NUMBER: 05000

OPERATING	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)					
POWER	100	20.2201(b)	20.2203(a)(2)(v)	X	50.73(a)(2)(i)	50.73(a)(2)(viii)	
		20.2203(a)(1)	20.2203(a)(3)(i)		50.73(a)(2)(ii)	50.73(a)(2)(x)	
		20.2203(a)(2)(i)	20.2203(a)(3)(ii)		50.73(a)(2)(iii)	73.71	
		20.2203(a)(2)(ii)	20.2203(a)(4)		50.73(a)(2)(iv)	OTHER	
		20.2203(a)(2)(iii)	50.36(c)(1)		50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A	
		20.2203(a)(2)(iv)	50.36(c)(2)		50.73(a)(2)(vii)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
J. Bajraszewski, Licensing Engineer	(423) 843-7749

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS
N/A						N/A				

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO				

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

This report was revised to provide changes to the analysis of the event and additional information relative to performance of operator watchstanding. While conducting a walkdown of the Sequoyah Nuclear Plant (SQN) 125 Vdc vital electrical system, Operations training personnel found the 125 Vdc vital battery board #4 improperly aligned. Specifically, in accordance with plant operating instructions, Operations personnel should have connected the 125 Vdc vital battery #5 to battery board #4 to supply battery power when removing the 125 Vdc battery #4 from service. In this event, Operations personnel failed to properly align the 125 Vdc vital battery #5 to the 125 Vdc vital battery board #4 when they misread and incorrectly performed an instruction step in the Operations procedure. This resulted in an improper alignment whereby 125 Vdc vital battery board #4 was in service for a period of time with no battery source connected. This is a condition of operation prohibited by SQN Technical Specifications (TS). Upon discovery of the condition, the control room operators took prompt corrective action and connected the 125 Vdc vital battery #5 to the 125 Vdc vital battery board #4 and exited TS actions. The root cause of the event was personnel error. Corrective actions include appropriate disciplinary action for individuals involved in the event, revision of the appropriate instructions to caution of the possibility of breaker misalignment, and provision of unique identifiers for the 125 Vdc vital battery breakers and the 125 Vdc vital battery board breakers.

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I. PLANT CONDITIONS

Units 1 and 2 were in power operation at approximately 100 percent.

II. DESCRIPTION OF EVENT

A. Event

At approximately 0556 Eastern Daylight Time (EDT) on July 24, 1997, the Unit 2 Unit Supervisor/Senior Reactor Operator (US/SRO) approved the activity of sparing out the 125 Vdc vital battery #4 [EIIS Code BTRY] with the 125 Vdc vital battery #5 for performance of a battery discharge test (See attached diagram).

Standing inside the 125 Vdc vital battery board #4 [EIIS Code BYBD] room, the two operators misread a step and performed the step on the wrong 107 breaker which was on panel 1 of the 125 Vdc vital battery board #4. The correct breaker, also numbered 107, was located outside the 125 Vdc battery board room on a panel identified as "B-S." The Floor SRO realized the 107 breaker on 125 Vdc vital battery board #4 panel was already in the procedurally required position, and discussed the actual and procedural differences with the AUO. The Floor SRO, feeling unsure about the breaker already being in the required position, went inside another 125 Vdc vital battery board room to verify the position by using the location and position of a similar breaker also numbered 107 on another 125 Vdc vital battery board. The Floor SRO assumed, by the breaker being closed on another 125 Vdc vital battery board, that the position of the 107 breaker on the 125 Vdc vital board #4 was correct and proceeded with the sparing out of the 125 Vdc vital battery #4.

After approximately 30 hours had elapsed, the Main Control Room (MCR) operators were notified by Operations training personnel performing a dc electrical system [EIIS Code EJ] walkdown that the 125 Vdc vital battery board #4 was incorrectly aligned for emergency power per Technical Specifications (TS). At 1108 EDT on July 25, 1997, after verification of design drawings and Operations instruction review, TS action 3.8.2.3 was entered. At 1226 EDT, the 125 Vdc vital battery board #4 was declared operable, and TS action 3.8.2.3 was exited.

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

None.

C. Dates and Approximate Times of Major Occurrences

07-24-97

0556 EDT	Approved #4 vital battery to be spared out.
0613 EDT	Enter/exit LCO for sparing out #4 battery.

07-25-97

1100 EDT	Misalignment noticed during operator training class system walkdown. MCR notified.
1108 EDT	Shift crew verification of drawings/procedure. Entered LCO.
1226 EDT	Exit LCO, #5 battery connected to #4 board.

D. Other Systems or Secondary Functions Affected

None.

E. Method of Discovery

While conducting a walkdown of the SQN 125 Vdc vital dc electrical systems, operations training personnel found the 125 Vdc vital battery board #4 improperly aligned.

F. Operator Actions

The control room operators took prompt corrective action and connected the #5 battery to vital battery board #4, as required, and exited TS actions.

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G. Safety System Responses

None

III. CAUSE OF THE EVENT

A. Immediate Cause

The immediate cause of the condition was failure to properly perform steps of the Operations instruction being used for sparing out a vital battery.

B. Root Cause

The root cause of the event was personnel error. The operations personnel performing the Operations instruction to spare out the vital battery #4 misread an instructional step resulting in an incorrect plant component position and subsequent incorrect breaker position verification.

C. Contributing Factors

- A significant contributor to the event was insufficient unique identification for breakers on the 125 Vdc vital battery board.
- Additionally, the Operations instruction used in the event was deficient in that Independent Verification was not specified for the steps requiring breaker manipulation.
- The MCR alarm associated with the sparing out of 125 Vdc vital battery boards was not referenced in the procedure. The alarm indicates that the 125 Vdc vital battery #5 is connected to a vital battery board. Absence of the alarm would have alerted the operators that the 125 Vdc vital battery #5 was improperly connected.

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IV. ANALYSIS OF THE EVENT

The safety-related vital battery system consists of four channels, all required by the TSs to be operable for either unit to operate, each with a battery and charger. Additionally, a fifth vital battery and a spare charger are provided through manual transfer breakers to substitute for any of the other vital batteries. The design basis of the vital battery system provides for a single failure such that three of the four channels can safely mitigate design basis events.

The actual safety significance of this event was minimal. The plant response with offsite power available would not have been affected due to the 125 Vdc battery board #4 not being connected to a battery source. The battery charger has the capability to deliver full rated load plus 25 percent without the voltage dropping below the nominal value. The subject battery charger 125 percent load would be 187.5 amps. The pre-event load for this charger is approximately 30 amps, and the additional load placed on the charger by the DC control load due to simultaneous starting of the safety-related loads during an accident is approximately 75 amps. Therefore, the total load placed on the charger would be approximately 105 amps which is much less than the charger capability. The charger would have supplied the required DC voltage to operate all the required safety loads.

The potential safety significance of the event is minimal with a loss of offsite power during the time the charger was supplying the 125 Vdc battery board #4. Upon a loss of offsite power, the diesel generators (D/Gs) would have started. D/Gs 1A, 1B and 2A would have connected to the 6.9 kV shutdown boards. D/G 2B would not have connected to its associated 6.9-kV shutdown board resulting in the loss of Channel IV of the 125-V vital AC channels for each unit. Therefore, three D/Gs and three AC and three DC 125 V vital channels are sufficient to mitigate the consequences of design basis events during a loss of offsite power event.

A station blackout (SBO) is the loss of AC power to the shutdown boards. The SQN licensing basis is that an SBO can occur concurrently on both units. From the onset of an SBO, the residual heat decay in both reactor cores is removed via the steam generators and the turbine driven auxiliary feedwater pump. The control power for these systems is provided from 125 Vdc vital battery #1 for Unit 2 and from 125 Vdc vital battery #3 for Unit 1. The alternate DC control for Unit 1

turbine driven auxiliary feedwater pump is provided by 125 Vdc vital battery #4; however, no credit is taken for the alternate supply during a SBO. Additionally, a channel of reactor protection would be lost, but three other channels remain available to monitor core parameters. A train of the reactor vessel level indicating system and one channel of Unit 2 control room annunciation would be lost but are not required to mitigate a SBO. Therefore, the plant configuration was sufficient to mitigate the consequences of a SBO.

To better understand the impact of going beyond the two hour TS allowed outage time, a rigorous risk analysis was performed for this event. The new analysis applied actual plant conditions including the ability of the chargers to supply power during non-loss of offsite power events. This removed the overly conservative risk for loss of the entire Train B 125 Vdc power supply as applied in the previous analysis. As a result, the new analysis correctly modeled the decreased risk associated with the capability of the spare charger and function of Train B 125 Vdc power supply. Additionally, the new analysis included the increased risk impacts for other risk important equipment that was out of service for maintenance. The risk analysis was then factored into the Probabilistic Safety Assessment (PSA) in accordance with EPRI Report TR105396, "PSA Application Guide" guidance for core damage probability. The new analysis concluded that disconnecting a vital battery from 125 Vdc vital battery board #4 for 30.5 hours resulted in a mean core damage probability that is non-risk significant. Therefore, this event is considered not safety significant.

The analysis takes no credit for operator actions to place either the #4 or #5 batteries in service. Additionally, the 125 Vdc vital battery #5 was available during the entire event.

This event is considered not safety-significant and therefore, the condition did not adversely affect the health or safety of plant personnel or the general public.

V. CORRECTIVE ACTIONS

A. Immediate Corrective Actions

- The Operations training personnel immediately informed the unit control room operators of the condition. The control room operators took prompt corrective action and connected the #5 battery to #4 vital battery board as required.
- A Caution Order was established for breakers identified as number 107, warning of multiple breaker identification.
- Lessons learned, expectations for use of verification methods, and an Operations Standing Order describing the event were issued.

B. Corrective Actions to Prevent Recurrence

- TVA has provided appropriate disciplinary action for individuals involved in the event.
- TVA has revised the Operations instruction to include Cautions concerning manipulation of breakers with the same numbers and ensure that the alarm function is referenced to alert the operators that a 125 Vdc vital battery is spared out.
- TVA will provide unique identification for the breakers on the 125 Vdc vital battery boards, 250 Vdc battery boards, and 120 Vac vital instrument boards.[1]
- TVA will evaluate the MCR alarm logic for loss of a 125 Vdc vital battery from a 125 Vdc vital battery board.[1]
- TVA will develop and implement a "Job Performance Measures" for sparing out the 125 Vdc vital batteries with vital battery #5.[1]
- TVA will review appropriate plant procedures to ensure verification requirements are correct and standardized.[1]

[1] TVA does not consider this corrective action a regulatory commitment. TVA's corrective action program will track completion of the action.

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VI. ADDITIONAL INFORMATION

A. Failed Components

None

B. Previous LERs on Similar Events

An event which closely resembled the current event was described in LER 50-327/95008. In that event, instead of opening breaker 48 on the 120 Vac vital instrument power board 1-II, the individual opened breaker 48 on the 120 Vac vital instrument power board 1-I. As a result, a unit trip occurred. Corrective actions for this event included disciplinary action for the involved individual, a standing order to require the use of concurrent verification for manipulations involving electrical components, and an evaluation of Operations personnel relative to the implementation of management expectations. In the current event, the individuals utilized concurrent verification by verifying the position of other similar breakers. The corrective actions of the previous event would not have prevented the condition described by this report.

C. Additional Information

The subsequent evaluation of this condition determined that before the condition was identified a single operator round had been performed in the area after the condition occurred. One of the attributes recorded by the operator round is whether the battery voltage is within an acceptable range. The operator performing this round documented that voltages were within the acceptance range. Subsequent review of the round performance determined that management expectations were not met with regard to identification of a potentially degrading condition and the pace that specific readings were taken. Management continues to reinforce performance expectations including the need to conduct thorough operator rounds.

Operations identified that on July 24, 1997, during initial realignment of the #5 vital battery to the #4 battery board, Operations personnel entered an inappropriate TS action. Operations entered TS 3.8.2.1 which has an 8-hour LCO action. TS 3.8.2.3 should have been entered which has a 2-hour action.

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VII. COMMITMENTS

None

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ATTACHMENT
(Battery board # s are Roman Numerals on this drawing)