



Tennessee Valley Authority  
Post Office Box 2000  
Soddy Daisy, Tennessee 37384-2000

**Timothy P. Cleary**  
Site Vice President  
Sequoyah Nuclear Plant

March 27, 2009

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D.C. 20555-0001

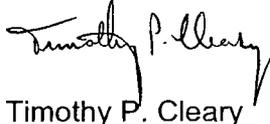
10 CFR 50.73

Gentlemen:

**TENNESSEE VALLEY AUTHORITY - SEQUOYAH NUCLEAR PLANT (SQN) UNITS 1  
AND 2 - DOCKET NOS. 50-327 AND 50-328 - FACILITY OPERATING LICENSE  
DPR-77 AND DPR-79 - LICENSEE EVENT REPORT (LER) 50-327/2009-001-00**

The enclosed LER provides details concerning the discovery of a condition where fire safe shutdown equipment might not be available during a postulated Appendix R fire event. This condition could adversely affect Appendix R safe shutdown capability in the event of a fire in two areas in the Auxiliary Building. This condition is reportable in accordance with 10 CFR 50.73(a)(2)(ii)(B), an unanalyzed condition that significantly degraded plant safety.

Sincerely,



Timothy P. Cleary

Enclosure  
cc: See page 2

IE22  
NRR

U.S. Nuclear Regulatory Commission  
Page 2  
March 27, 2009

Enclosure

cc (Enclosure):

INPO Records Center  
Institute of Nuclear Power Operations  
700 Galleria Parkway, SE, Suite 100  
Atlanta, Georgia 30339-5957

Mr. Tracy J. Orf, Project Manager  
U.S. Nuclear Regulatory Commission  
Mail Stop 08G-9a  
One White Flint North  
11555 Rockville Pike  
Rockville, Maryland 20852-2739

NRC Resident Inspector  
Sequoyah Nuclear Plant  
2600 Igou Ferry Road  
Soddy-Daisy, Tennessee 37379

U.S. Nuclear Regulatory Commission  
Page 3  
March 27, 2009

JWP:NRT:SKD

Enclosure

cc (Enclosure):

G. Arent, EQB 1B-WBN  
P. M. Billingsley, OPS-4C-SQN (For Web posting)  
C. R. Church, POB 2B-SQN  
T. P. Cleary, OPS 4A-SQN  
L. D. Clift, OPS 4G-SQN  
T. Coutu, LP 3R-C  
D. E. Jernigan, LP 3R-C  
K. R. Jones, OPS 4A-SQN  
M. J. Lorek, LP 3R-C  
L. E. Nicholson, BR 4X-C  
NSRB Support, BR 4X-C  
M. A. Purcell, BR 4X-C  
P. D. Swafford, LP 3R-C  
L. E. Thibault, LP 3R-C  
S. A. Vance, ET 10A-K  
E. J. Vigluicci, ET 10A-K  
WBN Site Licensing Files, ADM 1L-WBN  
EDMS, WT CA-K

**LICENSEE EVENT REPORT (LER)**

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

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@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 an 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>1. FACILITY NAME</b> Sequoyah Nuclear Plant Unit 1	<b>2. DOCKET NUMBER</b> 05000327	<b>3. PAGE</b> 1 of 6
--	-------------------------------------	--------------------------

**4. TITLE:**  
Appendix R Unanalyzed Condition Affecting Safety Related Shutdown Boards

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
1	28	2009	2009	- 001	- 00	3	27	2009	Sequoyah Nuclear Plant 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)										
	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)							
<b>10. POWER LEVEL</b>  100	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)							
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)							
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)							
	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)							
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)							
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)							
<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER								
<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A								

**12. LICENSEE CONTACT FOR THIS LER**

<b>NAME</b> Norm Thomas, Licensing Engineer	<b>TELEPHONE NUMBER (Include Area Code)</b> 423-843-7749
--	---

**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

<b>14. SUPPLEMENTAL REPORT EXPECTED</b>	<b>15. EXPECTED SUBMISSION DATE</b>	MONTH	DAY	YEAR
<input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO				

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

On January 28, 2009, during an audit of the Fire Protection Program, a postulated Appendix R fire scenario was identified that could potentially cause a loss of power to fire safe shutdown equipment in two areas of the Auxiliary Building. As part of the Appendix R common power supply analysis, coordination between load breakers and feeder breakers is required to protect the power supply because of a fire generated fault on the load power cable. The fire scenario identifies how this coordination could be defeated on the 6900-volt shutdown boards. The scenario occurs when the load breaker's 125 volt direct current (DC) control circuit is damaged in the fire and could potentially open the control circuit fuses, subsequently disabling the breaker's trip circuit containing the over-current relay protection. The same fire could damage the 6900-volt power cables, causing a phase-to-phase fault. The load breaker cannot clear the fault with the trip circuit control power fuses blown. Opening the feeder breaker causes a loss of the 6900 volt shutdown board and associated electrical loads. The two fire areas have operable detection and suppression systems. Compensatory measures (fire watches) have been initiated in the two fire areas. A modification has been initiated to remove the local control switch portion of the circuit to resolve this potential fire related failure.

**LICENSEE EVENT REPORT (LER)**

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Sequoyah Nuclear Plant (SQN) Unit 1	05000327	YEAR	SEQUENTIAL NUMBER	REVISION	2 OF 6
		2009	-- 001	-- 00	

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

I. PLANT CONDITION(S)

Unit 1 and Unit 2 were operating at 100 percent power.

II. DESCRIPTION OF EVENT

A. Event:

On January 28, 2009, a review of the load breaker cables for the 6900-volt shutdown boards [EIS Code EA] identified two fire areas where a postulated fire scenario could cause a loss of the shutdown board that is credited as part of the Appendix R safe shutdown strategy.

A postulated fire scenario in the elevation 669 Auxiliary Building corridor and the elevation 690 Auxiliary Building General Area could cause the breaker coordination to be defeated on the 6900-volt shutdown boards. Inside these two fire areas, the power cable is routed in close proximity to the 125-volt direct current (DC) [EIS Code EJ] control circuit cable for the local control handswitch for pumps fed from the 6900 volt shutdown boards.

This event requires a complex sequence of events for a loss of the electrical board. First, the load breaker must be closed and in most cases a spurious actuation of the control circuit cable must close the breaker. Second, the trip circuit fuses must be blown/opened such that over-current protection is defeated for the load breaker. Then the power cable must be damaged to cause an over-current fault. The feeder breaker opens to clear the fault and the 6900-volt shutdown board and electrical loads fed from that bus are lost.

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

None.

C. Dates and Approximate Times of Major Occurrences:

2000-2001 SQN transitioned from a diagnostic to a prescriptive analysis for Appendix R safe shutdown strategy.

January 28, 2009 During an audit of the SQN Fire Protection Program, a postulated fire scenario was identified where the 6900V-shutdown board could potentially be lost that affects safe shutdown equipment in two fire areas.

**LICENSEE EVENT REPORT (LER)**

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Sequoyah Nuclear Plant (SQN) Unit 1	05000327	YEAR	SEQUENTIAL NUMBER	REVISION	3 OF 6
		2009	-- 001	-- 00	

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

January 28, 2009 at 1425 EST SQN entered Fire Protection Report Limited Condition for Operation 3.7.12 for inoperable fire barriers and established hourly fire watches in the two areas affected.

D. Other Systems or Secondary Functions Affected:

No other systems or secondary functions were affected by this condition.

E. Method of Discovery:

The condition was discovered during an audit of the SQN Fire Protection Program.

F. Operator Actions:

No operator actions were required.

G. Safety System Responses:

Not applicable - no safety system response was required.

III. CAUSE OF THE EVENT

A. Immediate Cause:

The immediate cause of the condition was failure to adequately protect the 6900 volt shutdown board from the effects of a postulated Appendix R fire.

B. Root Cause:

The cause of the event was that this fire scenario was not considered when SQN transitioned from a diagnostic to a prescriptive analysis for Appendix R safe shutdown strategy. The division of responsibilities between Engineering groups during the transition led to not performing adequate circuit analysis resulting in the load breaker and handswitch cable interaction not being adequately evaluated. There was not clear program ownership of the Fire Protection Program at the time of the transition.

**LICENSEE EVENT REPORT (LER)**

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Sequoyah Nuclear Plant (SQN) Unit 1	05000327	YEAR	SEQUENTIAL NUMBER	REVISION	4 OF 6
		2009 --	001 --	00	

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

**IV. ANALYSIS OF THE EVENT**

The cable issue identified at SQN during a Nuclear Assurance audit can be summarized as a potential cable interaction issue. The design change to remove this unanalyzed condition lifts the leads to the local handswitch to eliminate the potential cable interaction.

The original analysis of the local handswitch circuits did not address this potential cable interaction issue. An evaluation determined that cables in the control circuit trays (no separation) have the necessary neutral to cause the failure. These cables were not protected from the potential cable to cable faults in the trays.

A single cable fault will not impact the Appendix R safe shutdown strategy.

Initially, the pump(s) must be running (or spuriously started) that requires the breaker to be closed. Next, a cable to cable fault must blow the control fuse (disable the over-current protection) before tripping the breaker. Finally, the power cable for this breaker must have a phase to phase fault causing an over-current condition on the 6900-volt shutdown board. This sequence will cause a loss of the 6900-volt shutdown board and electrical loads fed from that bus.

Plant cable routing methodology places the power cable trays very close to the ceiling of the room and one to three feet above the control cable trays. Failure of the power cable prior to the control circuit/over-current protection would prevent loss of the 6900-volt shutdown board. Because of the vertical cable locations, a hot gas layer cannot cause the required sequence of failures to affect the board.

The identified condition requires specific, sequential, multiple cable faults. The likelihood of occurrence of this scenario is very small. Therefore, for most fire scenarios in the two subject fire areas the safe shutdown strategy would be unaffected.

The two subject fire areas have full area automatic detection and suppression. Additionally, SQN has a full onsite fire department. These two areas have low to moderate in-situ combustible loading and the site has implemented strict transient combustible control and housekeeping programs. The likelihood that a floor level Auxiliary Building fire could progress to encompass the multiple cable trays, sequentially including ceiling level power trays as described in the analysis above is very small.

Because of the factors influencing this analysis, it can be concluded that the level of effectiveness and reliability for the safe shutdown strategy is essentially unchanged. The implementation of the design change to remove the local handswitch circuit will restore the level of effectiveness and reliability for the safe shutdown strategy.

**LICENSEE EVENT REPORT (LER)**

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Sequoyah Nuclear Plant (SQN) Unit 1	05000327	YEAR	SEQUENTIAL NUMBER	REVISION	5 OF 6
		2009	- 001	- 00	

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

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.

VI. CORRECTIVE ACTIONS

A. Immediate Corrective Actions:

Compensatory measures (fire watches) have been initiated in these two fire areas.

B. Corrective Actions:

A modification has been initiated to remove the local control switch portion of the circuit to resolve this potential fire-related failure.

In addition, to ensure all fire scenarios are appropriately considered during various activities, the Fire Protection Program is being revised to clarify owner responsibilities.

VII. ADDITIONAL INFORMATION

A. Failed Components:

None.

B. Previous LERs on Similar Events:

A review of previous reportable events did not identify any previous similar events at SQN. The review of previous reportable events identified that this is an industry issue, which was previously identified at the Point Beach Nuclear Plant.

C. Additional Information:

None.

### LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Sequoyah Nuclear Plant (SQN) Unit 1	05000327	YEAR	SEQUENTIAL NUMBER	REVISION	6 OF 6
		2009 --	001 --	00	

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

**D. Safety System Functional Failure:**

This event did not result in a safety system functional failure in accordance with 10 CFR 50.73(a)(2)(v).

**E. Unplanned Scram with Complications:**

This condition did not result in an unplanned scram with complications.

**VIII. COMMITMENTS**

None.