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July 12, 1991

U.S. Nuclear Regulatory Commission
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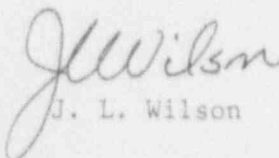
Gentlemen:

TENNESSEE VALLEY AUTHORITY - SEQUOYAH NUCLEAR PLANT UNIT 1 - DOCKET
NO. 50-327 - FACILITY OPERATING LICENSE DPR-77 - LICENSEE EVENT REPORT
(LER) 50-327/91012

The enclosed LER provides details concerning the discovery of an inadvertent breach of the main control room floor into the cable spreading room. The breach appears to have been open since the Unit 2 Cycle 4 refueling outage without applying the action provisions of Limiting Condition for Operation (LCO) 3.7.12. This event is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B) as an operation prohibited by technical specifications, LCO 3.7.12, Action Statement a, and Unit 2 License Condition 2.H. The information in this LER supplements that provided in Special Report 91-09, dated June 26, 1991.

Very truly yours,

TENNESSEE VALLEY AUTHORITY


J. L. Wilson

Enclosure
cc: See page 2

U.S. Nuclear Regulatory Commission
July 12, 1991

cc (Enclosure):

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Sequoyah Nuclear Plant, Unit 1										DOCKET NUMBER (2) PAGE (3) 015101013 12 17 110F 017									
TITLE (4) Inadvertent breach of the main control room and cable spreading room fire barrier and pressurization boundary during the Unit 2 Cycle 4 refueling outage because of inappropriate personnel actions																			
EVENT DAY (5)					LER NUMBER (6)					REPORT DATE (7)					OTHER FACILITIES INVOLVED (8)				
MONTH DAY YEAR YEAR					SEQUENTIAL REVISION NUMBER NUMBER					FACILITY NAME DOCKET NUMBER (5)					MONTH DAY YEAR YEAR				
01 06 11 21					01 01 21 01					01 07 11 21					Sequoyah, Unit 2 0151010131218				
OPERATING MODE (9)					THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5:														
POWER LEVEL (10)					[Check one or more the following] (11)														
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)(v-i)					XX OTHER (Specify in				
20.405(a)(1)(iii)					XX 50.73(a)(2)(i)					50.73(a)(2)(v-ii)(A)					Abstract below and in				
20.405(a)(1)(iv)					50.73(a)(2)(ii)					50.73(a)(2)(v-ii)(B)					Text, NRC Form 366A)				
20.405(a)(1)(v)					50.73(a)(2)(iii)					50.73(a)(2)(x)									

LICENSEE CONTACT FOR THIS LER (12)

NAME										TELEPHONE NUMBER									
AREA CODE																			
Russell R. Thompson, Compliance Licensing Engineer										6 1 5 8 4 3 - 7 4 7 0									

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC

SUPPLEMENTAL REPORT EXPECTED (14)

EXPECTED SUBMISSION DATE (15)										MONTH DAY YEAR									
YES (If yes, complete EXPECTED SUBMISSION DATE)										X NO									

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

On June 12, 1991, at approximately 1250 Eastern daylight time (EDT) with Units 1 and 2 in Mode 1, a breach to the control room pressurization boundary was discovered during the routine performance of a surveillance instruction. Units 1 and 2 applied the action provisions of Limiting Condition for Operation (LCO) 3.7.12, and a work request was written to correct the problem. On June 13, 1991, at approximately 1331 EDT, the breach had been sealed and documented, and Action Statement a of LCO 3.7.12 was exited. Investigation of the event determined that the breach occurred on or about September 8, 1990, during the implementation of the Unit 2 Cycle 4 refueling outage Gamma Metrics modification. Modifications' craft were instructed to install a conduit in the bottom of Panel 2-M-13 Cabinet II, but through inappropriate personnel actions, mistakenly installed the conduit in Cabinet III. Part of the installation procedure required the fire barrier in the bottom of the panel to be breached. The incorrect installation was identified and corrected. However, the inadvertent breach through the fire barrier and pressurization boundary was not recognized, and corrective action was not initiated to repair the breach. This event is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B), LCO 3.7.12, Action Statement a, and Unit 2 License Condition 2.H.

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TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)						PAGE (3)			
		YEAR		NUMBER		REVISION		NUMBER			
Sequoyah Nuclear Plant Unit 1	01501010131217	91	--	0	1	2	--	0	0	0	210101017

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Description of Event

On June 12, 1991, at approximately 1250 Eastern daylight time (EDT), with Units 1 and 2 operating in Mode 1 (100 percent power, reactor coolant system [RCS] pressure at 2,235 pounds per square inch gauge, and RCS average temperature at 578 degrees Fahrenheit), it was discovered, during periodic surveillance testing, that a breach existed between the main control room (MCR) (E11S Code NA) (control building Elevation 732) and the cable spreading room (E11S Code NA) (control building Elevation 706). Investigation of the event concluded that the breach had been inadvertently made during Unit 2 Cycle 4 (U2C4) refueling outage modification activities on September 8, 1990. Limiting Condition for Operation (LCO) 3.7.12 requires all fire barrier penetrations in fire zone boundaries protecting safety-related areas to be functional at all times. Should a fire barrier penetration become nonfunctional, the area must be included in an hourly fire watch patrol, provided that fire detection on at least one side of the barrier is verified to be operable. If the barrier penetration is not restored to a functional status within seven days, a special report is required to be submitted in accordance with Technical Specification (TS) 6.9.2. The provisions of TSs 3.0.3 and 3.0.4 are not applicable to LCO 3.7.12.

On June 12, 1991, at approximately 1250 EDT, a breach to the spreading room in the bottom of 2-M-13 Cabinet III was discovered during the scheduled performance of Surveillance Instruction 0-SI-MIN-302-001.0, "Visual Inspection of Electrical Penetration Fire Barriers - System 302." The Modifications' foreman was notified, and he immediately contacted Fire Operations and requested a breaching permit. Fire Operations determined the breach to meet the requirements of Technical Instruction 0-TI-SXX-000-016.0, "Breaching the Shield Building, ABSCE, or Control Room Boundaries." At this time, Fire Operations contacted the shift operations supervisor (SOS) and notified him of the breach. At 1331 EDT both units entered LCO 3.7.12. Systems Engineering was contacted by the SOS to assist in calculating the size of the breach.

A work request was initiated to correct the problem. At approximately 1600 EDT on June 12, 1991, steps were taken to seal the breach. On June 13, 1991, at approximately 1327 EDT, documentation confirming that the breach had been sealed properly was presented to the SOS, and LCO 3.7.12 was exited.

Subsequent investigation determined that the breach occurred on September 8, 1990, during the implementation of a workplan installing the U2C4 nuclear instrumentation Gamma Metrics modification. Modifications' craft were instructed to install a new conduit 1 1/2 inches in the bottom of Panel 2-M-13 Cabinet II. This installation required the fire barrier in the bottom of the panel to be breached and a hole cut in a steel plate for the installation of the conduit. The proper permits were obtained; a Physical Security Instruction (PHYSI) 13, "Fire Protection Program," breach permit and an emergency control room pressurization boundary (ECRPB) breach permit.

The craft inadvertently proceeded to breach the foam insulation in the bottom of Cabinet III to support the conduit installation. While removing the foam insulation the subject breach (hole in foam insulation to spreading room) was made. A simplified sketch of the breach is attached. It appears that the craft were not aware that they had inadvertently breached the ECRPB through the foam insulation. The craft proceeded to install the conduit in the bottom of the panel and prepared to install the cable.

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On September 9, 1990, the cable installation was started. The cable was pulled from the other termination point to the conduit just below Panel 2-M-13 Cabinet III in the spreading room. At this time, it was discovered that the conduit had been installed in the wrong cabinet. Modifications' craft and engineering supervision were notified of the incorrect installation, but were unaware of the inadvertent ECRPB breach. The original PHYSI-13 permit was still open for the conduit installation and was considered still applicable for the breach in Cabinet II. The craft removed the conduit from the bottom of 2-M-13 Cabinet III, plugged the conduit sleeve, and rerouted the conduit to Cabinet II. The cable installation was then completed.

Paper work for resealing Cabinet III was given to the oncoming shift. Cabinet II was resealed and the PHYSI-13 permit was closed. The conduit in Cabinet III was plugged; however, no actions were initiated to reinsulate the bottom of Cabinet III until it was discovered on June 12, 1991, during the performance of the scheduled surveillance.

Cause of Event

Investigation into the cause of the inadvertent breach concluded that inappropriate personnel actions lead to this event. The first inappropriate action occurred when Cabinet III of Panel 2-M-13 was incorrectly entered to install a conduit in accordance with Workplan 6186-09. The lack of a prejob briefing is considered to have contributed to this action. The workplan contained general direction to install a conduit. No specific instructions, other than conduit routing drawings, were provided concerning field locations. This may not have been sufficient detail relative to the experience level of the craft performing the task. For example, although the detail of the 2-M-13 panel was included in the workplan, the general plan drawing that shows the orientation of 2-M-13 to other equipment was not. The detail of 2-M-14 does not identify the front and back of the panel. A briefing would have afforded the involved individuals an opportunity to question the location and orientation of equipment to ensure successful completion of the activity. This could also serve to identify and resolve discrepancies between worker experience and workplan detail. Schedule pressure to complete the task may have led to the lack of a briefing.

Inadequate overview and supervision of the conduit installation also contributed to the inappropriate action. Review and checking by oversight and support positions may have quickly identified and escalated the error. It was noted that the field engineer was not involved with this activity in the field. Also, a lack of experienced personnel from which to select a foreman led to the selection of a foreman that may not have been experienced to the desired level for this modification task.

A second inappropriate action that occurred was that the foreman did not obtain or revise the breaching permit for the conduit that was inadvertently installed in Cabinet III of panel 2-M-13. A permit specific for the breach in Cabinet III could not have been closed without first properly sealing the breach.

A contributing factor to this inappropriate action is that the breach of the pressurization boundary through the foam may not have been recognized by the foreman. The breach through the foam is not easily identified (it is not a straight vertical hole). The plugging of the conduit may have been considered adequate. This was the

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result of two factors. First, the foreman had not received breach training. Second, the lead foreman who held the breach permit was not present when the actual breach in Cabinet III occurred.

A third inappropriate action that occurred was no documentation was generated to address and correct the problems caused by the installation of the conduit in the wrong cabinet. After being reported to management, the fact that an additional breach had been created was not recognized. Discussions of the problem centered around the fact that the conduit was installed in the wrong cabinet.

As described in LER 50-327/91011 concerning a breach of the ECRPB, while there were several different factors and causes contributing to this event, the underlying cause is considered to be a lack of a rigorous, disciplined approach to the accomplishment of activities. This led to inappropriate actions, such as the failure to obtain a second breach permit or initiate appropriate problem identification paper.

Analysis of Event

This event is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B) as an operation prohibited by technical specifications, in accordance with LCO 3.7.12, Action Statement a, and in accordance with Unit 2 License Condition 2.H.

The safety implications of this event were evaluated by considering the potential degradation of MCR habitability zone due to loss of positive pressure in the MCR, and the breach of a fire barrier. These have been determined to have no significant impact on nuclear safety for the following reasons.

During the U204 outage, the administrative limit on ECRPB breach area was 9.6 square inches. This limit was calculated from data that indicates that the MCR could be maintained at its design positive pressure with up to 18.9 square inches breached. During this same timeframe, the largest identified breach area was 9.28 square inches. Combining this area with the nine square inches of the inadvertent breach does exceed the administrative breach area limit, but is within the safety limit for maintaining the functional capability for MCR pressurization.

Additionally, the surveillance test that determines the positive pressure of the MCR during an emergency was performed in March of 1991. Evidence points to the fact that the subject breach existed at this time. A portion of the excess pressurization capacity in O-TI-SXX-000-016.0 was used to determine the maximum breach size in the ECRPB for which the 1/8-inch pressure requirement can be met. The administrative limit was determined to be 13.8 square inches for this tested configuration. The safety limit for this test data was calculated to be 20.5 square inches. Again, during this timeframe, there were instances when the combination of known breach area with the inadvertent breach would have exceeded the revised administrative limit. However, total breach area never exceeded the safety limits of the system. As such, the MCR pressurization system was always capable of performing its intended function.

Although there was a breach in the fire barrier between the MCR and the spreading room, effects of a fire would not have prevented the safe shutdown of the plant. Because the size of the breach was relatively small, (it was conservatively estimated to be 9 square

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inches) and was not a straight path from one elevation to the other, it was not likely to transmit a fire from one floor to the next. Aside from this, in the spreading room there are fire detectors and sprinkler systems, which would mitigate the effects of a fire, preventing the spread of the fire to the MCR. In the MCR, there are fire detectors and extinguishers, personnel were always within a short distance of the breach, and would have used the extinguishers to prevent the spread of the fire to the spreading room.

In summary, because the capability of emergency pressurization of the MCR was not lost and because a fire in either the MCR or cable spreading room could have been quickly detected and responded to, this event did not adversely affect the health and safety of plant personnel or the general public.

Corrective Action

Upon discovery of the breach on June 12, 1991, steps were initiated to comply with the action provisions of LCO 3.7.12. A work request was initiated to seal the breach. Documentation of the repair was completed, and LCO 3.7.12 exited at 1327 EDT on June 13, 1991.

The use of prejob briefings will be institutionalized to provide the opportunity to identify and resolve discrepancies between worker experience, understanding, and workplan detail. Requirements will be included so that prejob briefings are held and documented for each workplan. This is consistent with commitments made in Special Report 91-06 dated June 14, 1991.

To increase accountability, the Modifications' field engineers are now assigned to a particular lead foreman and are responsible for support of that foreman's work in entirety; this action also reinforces communication between the engineers and craft.

To ensure that supervisory personnel have adequate training to effectively oversee work involving breaches, the Modifications Management Directive 91-001 training matrix has been revised to require training on breaching procedures for personnel in the appropriate supervisory positions.

Additionally, the supervisory personnel involved in this event have been counseled concerning the importance of initiating the proper problem identification paper when problems of this and a similar nature are encountered.

As described in LER 50-327/91011, a common deficiency has been identified in review of several recent events where appropriate rigor and follow-through are not being applied in accomplishment of activities, leading to inappropriate actions and undesirable results. It is believed that this situation results from a lack of full understanding of expectations. A communications plan has been developed to ensure that the expectations are clearly conveyed, understood, and concurred with by working level personnel, and enforced by line supervision and middle level management.

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Sequoyah Nuclear Plant Unit 1		YEAR	NUMBER	NUMBER			
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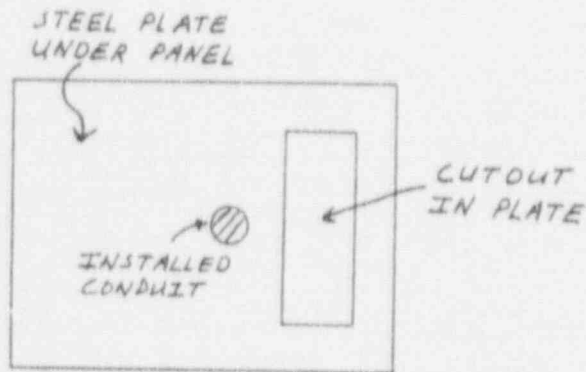
Additional Information

LERs 327/85018, 327/86032, and 328/85003 each described events in which conduit or cable trays were discovered to penetrate fire barriers and were not properly sealed. The cause of the unsealed conduits described in LERs 327/85018 and 328/85003 was attributed to inadequate conduit drawings. (The conduits described in 327/85018 were discovered during walkdowns committed to in 328/85003.) The cause of the unsealed cable tray described in LER 327/86032 was attributed to personnel error at the time of original construction.

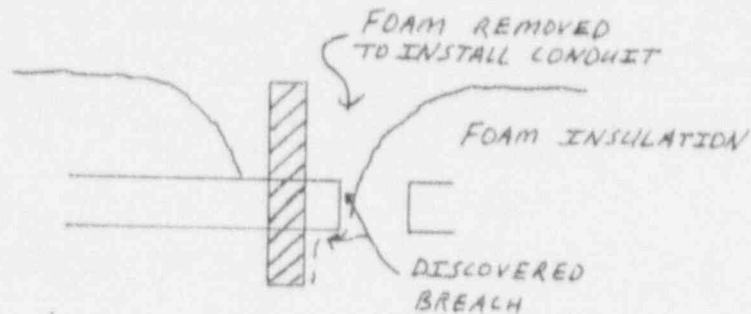
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Sequoyah Nuclear Plant Unit 1	0500031217	SEQUENTIAL	REVISION		
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TOP VIEW OF CABINET
III FLOOR



SIDE VIEW