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J. L. Wilson
Vice President, Sequoyah Nuclear Plant

March 20, 1992

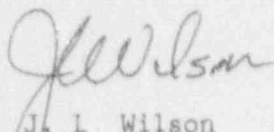
U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Gentlemen:

TENNESSEE VALLEY AUTHORITY - SEQUOYAH NUCLEAR PLANT UNIT 1 - DOCKET
NO. 50-327 - FACILITY OPERATING LICENSE DPR-77 - LICENSEE EVENT REPORT
(LER) 50-327/92005

The enclosed LER provides details concerning the failure to remove an interlock defeat mechanism on one of the upper elevation containment air-lock doors. This event is being reported in accordance with 10 CFR 50.73(a)(2)(i) as an operation prohibited by technical specifications.

Sincerely,



J. L. Wilson

Enclosure
cc: See page 2

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U.S. Nuclear Regulatory Commission

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Sequoyah Nuclear Plant, Unit 1										DOCKET NUMBER (2) PAGE (3) 015101013 2 7 1 0 1 1 0														
TITLE (4) Containment air lock door discovered with the interlock mechanism defeated.																								
EVENT DAY (5)					LER NUMBER (6)					REPORT DATE (7)					OTHER FACILITIES INVOLVED (8)									
					SEQUENTIAL REVISION					FACILITY NAMES					DOCKET NUMBER(S)									
MONTH DAY YEAR YEAR					NUMBER NUMBER					MONTH DAY YEAR					015101013 2 7 1 0 1 1 0									
0 2 1 9 9 2 9 2					0 0 5 0 0 0 3 2 0 9 2					015101013 2 7 1 0 1 1 0														
OPERATING MODE (9)					THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 6: (Check one or more of the following)(11)																			
1					20.402(b)					20.405(c)					50.73(a)(2)(iv)					73.71(b)				
POWER					20.405(a)(1)(i)					50.36(c)(1)					50.73(a)(2)(v)					73.71(c)				
LEVEL					20.405(a)(1)(ii)					50.36(c)(2)					50.73(a)(2)(vii)					OTHER (Specify in				
(10) 0 6 5					20.405(a)(1)(iii)					XX 50.73(a)(2)(i)					50.73(a)(2)(viii)(A)					Abstract below and in				
					20.405(a)(1)(iv)					50.73(a)(2)(ii)					50.73(a)(2)(viii)(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														
C. H. Whittemore, Compliance Licensing										6 1 5 8 4 3 - 7 2 1 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 MONTH DAY YEAR														
										SUBMISSION														
YES (If yes, complete EXPECTED SUBMISSION DATE)										DATE (15)														
X NO																								
ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)																								

During the performance of a preventative maintenance activity on the upper elevation air lock on February 19, 1992, it was discovered that a door interlock defeat mechanism had not been removed following the Unit 1 Cycle 5 refueling outage activities. The defeated interlock would allow the outer door to be opened when the inner door was already open. The air lock door was declared inoperable and the appropriate limiting condition of operation was entered. The defeat mechanism was removed and the doors and their interlocks were tested for operability. The containment air lock doors on both units were also tested. The cause of this event was determined to be an inadequate usage of the configuration log, an inadequate inspection before returning the air-lock doors to normal, and the lack of performance of the designated postmaintenance test (PMT). Corrective action will include: training for personnel on configuration log usage, developing a procedure describing the approved method for breaching the doors, and appropriate personnel will receive additional training on changing and deleting PMTs.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)	PAGE (3)
Sequoyah Nuclear Plant Unit 1		SEQUENTIAL	REVISION
		YEAR NUMBER	NUMBER
	01501003 12 17 19 12	0 0 5	0 0 10 12 10 1 0

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

I. PLANT CONDITIONS

On February 19, 1992, both units were in Mode 1 (Unit 1 at 65 percent power - Unit 2 at 86 percent power, coasting down for a scheduled refueling outage).

II. DESCRIPTION OF EVENT

A. Event

On February 19, 1992, at approximately 0100 hours, the Unit 1 upper elevation containment air lock (EIIS Code AL) was found with a tie wire holding a pawl out of engagement with a ratchet. This assembly comprises the interlock (EIIS Code IMEC) mechanism for the outer door (EIIS Code DR) (i.e., the door on the auxiliary building side). The effect of the tie wire was to disable the interlock. In this condition, the outer door was capable of being opened when the inner door was already open. The tie wire was removed and the interlock verified to work properly. All containment air locks (Units 1 and 2) were tested and found to operate properly.

A work request (WR) had been used to breach or block open both doors of the Unit 1 upper air lock during the Unit 1 Cycle 5 (U1C5) refueling outage. This breach is necessary during outages to facilitate movement of personnel and material into containment and to prevent unnecessary cycling of the air-lock doors.

The WR as planned did not specify the manner in which to defeat the interlock mechanisms. However, it did specify the postmaintenance test (PMT) to be performed after the interlocks were returned to their normal operating configuration. The specified PMTs were: (1) a interlock functional test, and (2) a door functional test following maintenance. The interlock functional test is listed in the maintenance management instruction for postmaintenance testing as a recommended PMT when the interlocks are disabled.

The doors were last breached on December 2, 1991, by evening shift. The machinist who performed the breach wrote in the configuration control log, "Breached U1 upper air lock doors and tied hand wheels together." This wording was identical to that entered for previous breaches.

The doors were breached as follows:

- The interlock pawls were wired open with the tie wire.
- Both doors were opened.

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		YEAR	NUMBER	NUMBER	NUMBER	NUMBER					
Sequoyah Nuclear Plant Unit 1	01500031217	912	--005	--000	03	01	0	0	0	0	0

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

- The hand wheels located inside the air lock were wired together so that the doors would remain open. The hand wheels located on the auxiliary building side were also wired together.

On December 6, 1991, the outage was nearing completion and preparations were being made to enter Mode 4. To support this, the Mechanical Maintenance Group (MMG) was requested to close the air lock and return it to normal. The machinist removed the tie wires from the hand wheels. As he closed the inner door, he noticed the tie wire on the pawl. He removed the tie wire and closed the door. The machinist was not aware that another tie wire existed because the configuration log did not specify exactly how the interlocks should be defeated nor did the log record the number of tie wires used in the activity. At this point, he felt that the air lock had been returned to normal and, thus, signed the appropriate space in the configuration log, as did the machinist who witnessed the work as the second party.

As Mode 4 approached, all WRs listed as Mode 4 restraints were being evaluated for impact on the mode change. The above WR was evaluated for a postmaintenance test. After review, a Technical Support engineer deleted the interlock functional test as the PMT. The basis for this was an opinion held jointly by the Technical Support engineer and the Corporate Leak Rate Testing (LRT) group; if "maintenance" was not performed, then the interlock functional test was not required. It was their opinion that breaching the doors in itself was not maintenance and, thus, the test was not performed. After deleting this test, only the air-lock, leak-rate test was performed. At this point, Unit 1 was restarted with the interlock for the outer door disabled.

On February 5, 1992, the Unit 1 operators noticed an anomaly in the control room during an exit from containment by craftsmen through the upper air lock. Operations received an alarm and window indication of a breach of the air lock; however, the alarm only sounded for approximately four seconds and reset itself without action by the operators. At this point, the problem was thought to be an isolated case of spurious actuation in the electrical system and no further investigation was warranted. Since an actual breach was not thought to have occurred, the interlock function of the doors was not questioned and not tested. This incident is discussed further in the analysis section.

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

During the period that the interlock was defeated, i.e., December 6, 1991, until February 19, 1992, any potential containment breach would have been identified by the main control room (MCR) annunciator such as the February 5, 1992, event. No further indications were identified.

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

None.

C. Date and Approximate Time of Major Occurrences

December 2, 1991	Doors breached by night shift.
December 6, 1991	Doors returned to normal.
February 5, 1992	Operators noticed an indication in the MCR showing both air-lock doors open; the alarm cleared without operator action.
	WR issued to investigate annunciator anomaly. No electrical problems were discovered.
February 19, 1992	Air-lock door interlock discovered defeated, Limiting Condition for Operation (LCO) 3.6.1.3 entered at 0251 Eastern standard time (EST).
	Tie wire removed. All containment air locks were tested and found acceptable. LCO exited at 0620 EST.

D. Other Systems or Secondary Functions Affected

Not applicable.

E. Method of Discovery

On February 19, 1992, while performing preventive maintenance, MMG personnel found a tie wire holding the pawl located in the air-lock door gear box inside the reactor building. MMG then notified the Unit 1 assistant shift operations supervisor (ASOS).

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		YEAR	NUMBER	NUMBER					
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TEXT (If more space is required, use additional NRC Form 366A's) (17)

F. Operator Actions

On February 19, 1992, upon discovery that the interlocks were defeated, operators declared the air-lock doors inoperable and entered LCO 3.6.1.3. The ASOS verified that the outer-door interlock was disabled, both by visual inspection and by attempting to open the inner door while the outer door was open. (The handwheel was rotated but not far enough to actuate the limit switch or to open the equalizing valve.) The tie wire was then removed and retained for investigation.

G. Safety System Response

Not applicable - no safety system responses were required.

III. CAUSE OF EVENT

A. Immediate Cause

The immediate cause of this event was that all of the tie wires used to disable the containment air-lock doors were not removed after the UIC5 refueling outage activities were completed.

B. Root Cause

There are three root causes for this event:

1. Inadequate usage of the configuration control log

The personnel who breached the doors on December 2, 1991, should have recorded precisely how the interlocks were defeated, i.e., the exact location and number of tie wires that were used.

2. Inadequate return to normal activity

The personnel who returned the air-lock doors to normal configuration on December 6, 1991, should have performed a more thorough inspection before signing the configuration log that the air lock was functional.

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

3. Lack of performance of the specified PMT

The lack of performance of the PMT allowed the disabled interlock to go undetected. The deletion of the interlock functional test was inappropriate.

C. Contributing Factors

A lack of a written and formalized procedure describing the method of disabling the interlocks is a contributing factor to this event. A formalized procedure would have ensured that all personnel were disabling the interlocks in a consistent manner.

IV. ANALYSIS OF EVENT

The air locks are designed so that entry into containment can be made without breaching the pressure boundary between containment and the auxiliary building.

Hand wheels for both the inner and outer doors are provided on both sides of the air lock as well as inside the air lock. This allows personnel to close the opposite door, if necessary, before entering the air lock.

The normal operation of the air lock is as follows:

- The outer door is opened and personnel enter the air lock.
- The outer door is fully closed.
- The inner door is opened.
- Personnel exit the air lock into containment.
- The inner door is closed.

To exit containment, the above steps are performed in reverse order.

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

Given this sequence of operation of the doors, there are three credible possibilities for breaching the air lock if the outer-door interlock is disabled. They are:

1. Simultaneous opening of both doors.

This requires a unique set of circumstances; that is, one person attempting to enter containment while another is leaving. Since containment entries require special radiological control (RADCON) precautions, most entries are coordinated in advance so that RADCON support can be optimized. This reduces the possibility of simultaneous entry and/or exit.

2. Opening of the inner door while the outer door has been left open.

This requires abnormal door operation. Personnel who use the air locks are familiar with proper air-lock operation techniques. A view port is provided in both the inner and outer doors to allow a visual check to assure the opposite door is closed.

3. Willful breach or abnormal door operation

This possibility assumes an intent to breach containment without proper authorization. To do this would require prior knowledge that the interlock had been disabled.

The air locks are designed to provide a barrier for escape of radiation products from the reactor building. Since start-up from Mode 4, the only reported incident of a potential breach of containment was the event of February 5, 1992.

On February 5, 1992, the Unit 1 operators noticed an anomaly in the control room during an exit from containment by craftsmen through the upper air lock. Operations received an alarm and window indication of a breach of the air lock; however, the alarm only sounded for approximately four seconds and reset itself without action by the operators. The alarm did not print out on the annunciator computer nor did the alarm appear on the computer screen. The shift operating supervisor (SOS) thought this to be unusual and initiated a WR to check the alarm. At no time did the SOS feel that an actual containment breach had occurred. The WR was planned and all electrical limit switches were checked as well as control room indicators, no problems were found. Since no failure was identified, no further action was taken. At this point, the problem was thought to be an isolated case of spurious actuation in the electrical system and no further investigation was warranted. Since an actual breach was not thought to have occurred, the interlock function of the doors was not questioned and not tested.

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A subsequent inspection of the air-lock door was performed to determine at what point in the door operating cycle the following actions occur:

- Interlock engages.
- Limit switch opens, giving MCR indication of door position.
- Equalizing valve opens.
- Door latch opens.

The resulting data was compared to the actual opening and closing times for the February 5, 1992, event. Based on this data, no credible possibility exists for an actual breach of the air locks to have occurred. It is believed that the annunciator system performed in an anomolous manner and is being further investigated.

It is, therefore, concluded that although the interlock for the outer door was disabled, the air lock was not breached while the unit was in Modes 1, 2, 3, or 4. Accordingly, this event did not adversely effect the health and safety of plant personnel or the public.

V. CORRECTIVE ACTIONS

A. Immediate Corrective Actions

The tie wire was removed and the door was tested according to the appropriate technical specification (TS) surveillance instruction (SI) that functionally tests the interlocks. The other doors and interlocks for both units were also tested and verified to be functional.

B. Actions Taken to Prevent Recurrence

1. Training for MMG personnel on configuration log usage will be conducted. This training will include the need for detailed entries, responsibilities for second party verifications, and return to normal activities.
2. The SI-159.4 series, which implements the TS surveillance requirements, will be revised to include provisions for interlock testing prior to a mode change for which the air lock must be operable.
3. A procedure will be developed and implemented describing the appropriate method for breaching the containment air-lock doors. This procedure will include detailed instructions for disabling the interlocks, methods to assure the doors remain open, returning the doors to normal, PMTs, and specific configuration log entries.

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4. The Sequoyah Standard Practice maintenance procedure, SQM-66, "Maintenance Management System Pre- or Post-maintenance Testing," will be revised to require performance of PMTs, when practical, and to perform independent verification of configuration changes, which are not subject to the PMTs.
5. A training letter has been issued to personnel qualified, per SQM-66, to specify, change, or delete PMTs to evaluate the need to perform independent verification of configuration changes if a PMT is waived, deleted, or changed.
6. The personnel qualified, per SQM-66, to specify, change, or delete PMTs will be provided additional training. This training will include the revision mentioned above, the causes of this event, a "user's orientation" for the PMT matrices, and the need to review configuration logs for independent verification when PMTs are not performed.
7. Training has been completed for appropriate personnel on configuration control and the value of a signature.
8. The airlock work orders for the U2C5 refueling outage have been revised to include detailed planning of the methods to be used to disable the interlocks and to specify return to normal verifications.

VI. ADDITIONAL INFORMATION

A. Failed Components

None.

B. Previous Similar Events

This event was compared to other events within TVA. The similarities between a recent main steam isolation valve event (LER 50-327/91-025) are listed below.

- Both events involved inadequate usage of a configuration log including the fact that lack of detailed information in the log was a major contributor to the event,
- Both events involved inadequate return to normal activities, and
- Both events involved inadequate performance of PMTs. The proper PMT, if performed, would have prevented the event.

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	050003 12 17 19 2	0 0 5	0 0 1 0 10 1 0

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

Several of the corrective actions to prevent recurrence of the main steam isolation valve (MSIV) event are applicable for this event. However, the corrective actions for the MSIV event were not implemented when this event occurred.

VII. COMMITMENTS

1. Additional training for MMG personnel on configuration log usage will be conducted. This training will include the need for detailed entries, responsibilities for second party verification, and return to normal activities. This will be accomplished by May 1, 1992.
2. The SI-159.4 series, which implement the TS surveillance requirements, will be revised to include provisions for interlock testing prior to a mode change for which the air lock must be operable. This will be accomplished by May 11, 1992.
3. A procedure will be developed and implemented describing the appropriate method for breaching the containment air-lock doors. This procedure will include detailed instructions for disabling the interlocks, methods to assure the doors remain open, returning the door to normal, PMTs, and specific configuration log entries. This will be accomplished by July 6, 1992.
4. Procedure SQM-66 will be revised to require performance of PMTs, when practical, and to perform independent verification of configuration changes that are not subject to the PMTs. SQM-66 will also be revised to require second party verification of changes and deletions of PMTs and to clarify the matrix for air-lock PMTs. SQM-66 will also be revised to include a requirement to perform a functional test on the containment air-lock door interlocks after they have been defeated and returned to normal. This will be accomplished by May 1, 1992.
5. The personnel qualified, in accordance with SQM-66, to specify, change, or delete PMTs will be provided additional training. This training will include the revision mentioned above, the causes of this event, a "user's orientation" for the PMT matrices, and the need to review configuration logs for independent verification when PMTs are not performed. This will be accomplished by June 1, 1992.