

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Sequoyah, U	DOCKET NUMBER (2) 0 5 0 0 0 3 2 8	PAGE (3) 1 OF 0 6
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Spurious Spike on Particulate Channel Of Upper Compartment Radiation Monitor Resulted In Containment Ventilation Isolation

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 NAMES		DOCKET NUMBER(S)
06	21	88	88	029	00	07	14	88			05000
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OPERATING MODE (9) 2	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)									
POWER LEVEL (10) 000	20.402(b)		20.405(c)	<input checked="" type="checkbox"/>	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)(viii)		OTHER (Specify in Abstract below and in Text, NRC Form 366A)			
	20.405(a)(1)(iii)		50.73(a)(2)(i)		50.73(a)(2)(viii)(A)					
	20.405(a)(1)(iv)		50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)					
20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(ix)						

LICENSEE CONTACT FOR THIS LER (12)									
NAME J. L. Long, Plant Operations Review Staff							TELEPHONE NUMBER 615 870-7254		

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)										
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRPDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRPDS	
X	JG	IFY	W11210	Yes						

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

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

On June 19, 1988, at 0730 EDT with unit 2 in mode 3 (0 percent power, 2235 psi, and 546 degrees F), a containment ventilation isolation (CVI) occurred as a result of a spike on the particulate channel of Radiation Monitor (RM) 2-RM-90-112. RM 2-RM-90-112 provides an output into the "B" train solid state protection system (SSPS) directly and into the "A" train SSPS through train separation relays. During this event indications in the main control room were that the "A" train isolation valves had properly isolated but the "B" train valves had not isolated. Subsequent to the CVI, Operations personnel verified that no high levels of radiation existed. They then proceeded to perform the necessary steps for recovery from a CVI.

The cause of the spurious spike could not be determined. At the time of the event no maintenance or modification activities were being performed on unit 2. The improper operation of a latching mechanism on a slave relay in the solid state protection system was the cause of the "B" train equipment not isolating. As a corrective action the latching mechanism will be replaced/repared.

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

DESCRIPTION OF EVENT

On June 19, 1988, at 0730 EDT with unit 2 in mode 3 (0 percent power, 2235 psi, and 546 degrees F), a containment ventilation isolation (CVI) (EIIS Code JM) occurred as a result of a spike on Radiation Monitor (RM) (EIIS Code IL) 2-RM-90-112. RM 2-RM-90-112 consists of three channels that monitor the activity level in the upper compartment area inside unit 2 containment. The "A" channel monitors particulate while the "B" channel monitors noble gas and the "C" channel monitors iodine.

Before this event the particulate channel was indicating an activity level of 35×10^3 counts per minute on recorder RR-90-112. Channel "A" of RM-90-112 is set to actuate a CVI at 1.98×10^5 counts per minute above background in accordance with Technical Instruction (TI)-18. At 0730 EDT, a spurious spike resulted in exceeding the setpoint of the RM with a peak reaching 15×10^5 counts per minute. RM 2-RM-90-112 outputs into the "B" train solid state protection system (SSPS) (EIIS Code JG) directly and into the "A" train SSPS through train separation relays. During this event indications in the main control room were that the "A" train isolation valves had properly isolated but the "B" train valves had not isolated. Also, a malfunction alarm annunciated in the main control room (EIIS Code NA) indicating that the pump for 2-RM-90-106 had tripped. RM 2-RM-90-106 monitors the activity level in the lower compartment area inside containment. The automatic isolation of the "A" train CVI valves resulted in the isolation of flow through the pump for 2-RM-90-106 and its subsequent trip. However, the pump for 2-RM-90-112 continued to run.

Subsequent to the CVI, Operations personnel immediately verified that no high levels of radiation existed. They then proceeded to perform the necessary steps for recovery from a CVI referencing System Operating Instruction (SOI)-88.1 "Containment Isolation System." These actions included resetting the CVI signal, reopening the affected valves, and restarting the pump for RM 2-RM-90-106.

CAUSE OF EVENT

As previously discussed, the cause of the CVI was a spurious spike on the particulate channel of 2-RM-90-112. At the time of the event no maintenance or modification activities were being performed on unit 2.

Subsequent to the event, an investigation was initiated to determine the cause of "B" train valves not isolating. The electrical schematics were reviewed to determine the proper operation of the containment isolation system when the particulate channel of 2-RM-90-112 actuated. Detection of high radiation by 2-RM-90-112 causes relay "K2-R112A" to deenergize (refer to Figure 1 on page 5).

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Relay "K2-R112A" is a time delay drop-out type relay which contacts change state three seconds after the coil becomes deenergized. One set of normally closed contacts between terminal points 1 and 7 of relay "K2-R112A" inputs through RM block switch HS-90-136A2 directly into "B" train SSPS. Another set of normally closed contacts between terminal points 3 and 9 of relay "K2-R112A" are used to control separation relay "K112C", which in turn controls separation relay "K112A."

A normally open contact of relay "K112A" inputs through RM block switch HS-90-136A1 into "A" train SSPS. Upon an input signal to either train of SSPS, the master relay "K503" of the train energizes, which in turn energizes slave relay "K622." A mechanical latch serves to seal-in the slave relay once it has become energized. A normally open set of contacts of the slave relay closes, causing auxiliary relay "K622B" to energize. Normally closed contacts from relay "K622B" open when the relay energizes, causing solenoids associated with pneumatically operated valves to deenergize. Deenergizing the solenoids allows the valves to close, thus performing their isolation function. Limit switches which are designed to open when the valves are fully closed, prevent the valves from automatically reopening if the CVI signal is reset.

After reviewing the schematics and understanding the proper operation of the circuit, a decision was made to simulate a high radiation signal on channel "A" of 2-RM-90-112, thus deliberately initiating a CVI. Instrument Maintenance technicians monitored the actuation of the SSPS "master" relay contacts during this operation. Subsequent to initiating the CVI signal and returning the RM to normal, it was discovered that the latching mechanism for slave relay "K622" on "B" train SSPS did not function properly and the relay had dropped out when the simulated high radiation signal ceased to exist. After resetting the affected equipment and the CVI signal, the aforementioned sequence was repeated. The second performance of the operation yielded favorable results with the latching mechanism holding the slave relay in as designed.

The improper operation of the latching mechanism supports the conclusion that the cause of the "B" train equipment not isolating was that the spike which occurred on June 19, 1988, was of sufficient duration to exceed the three second time delay associated with timer "K2-R112A", as well as the response time associated with the separation relays and "A" train SSPS, but was not long enough for the "B" train isolation valves to fully close. The actual response time of the "B" train equipment documented on the most recent performance of Surveillance Instruction (SI)-247.100 "Response Time Testing of the Engineered Safety Feature Instrumentation" was 5.878 seconds and the response time of the valves alone was 2.608 seconds.

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TEXT (If more space is required, use additional NRC Form 366A (1) (17))

If the spike on the "A" channel of 2-RM-90-112 had lasted between 3.270 seconds and 5.878 seconds the "A" train valves would have operated normally and the "B" train valves would have been in the process of operating (i.e., valves going closed) but when the signal generated by 2-RM-90-112 cleared, the valves would have automatically reopened if they had not fully closed and if the latching mechanism for the slave relay had not worked properly. Since the mechanical latch provides the seal-in function for the CVI and since the latch functioned erratically during operations subsequent to the CVI it can be concluded that the latch did not operate during the spike on 2-RM-90-112 and resulted in allowing the "B" train isolation valves that were not yet fully closed, to reopen. It should be noted that indicating lights exist in the main control room that provide valve position. However, the lights are controlled by limit switches similar to those associated with the valves such that the indication of valve position will not change until the valve is fully closed. Since it was concluded that the valves began to close but never fully closed, then the on-shift Operations personnel would have had no means of knowing that the valves had started to close.

The cause of the trip for pump motor 2-RM-90-106 was the operation of the thermal overloads. Closing the isolation valves to the RM caused the motor load to increase and resulted in higher current and operation of the thermal overloads. The pump motor for 2-RM-90-112 would also have tripped if the isolation valves to the RM had not been quickly reopened during the recovery from the CVI.

ANALYSIS OF EVENT

A CVI is an engineered safety feature (ESF) actuation. The ESF actuation was not part of a preplanned sequence, and as such, is being reported pursuant to 10 CFR 50.73, paragraph a. .iv.

During this event, it was concluded that the latching mechanism for the slave relay did not operate properly. For events such as this, the inability of the latch to perform its design function poses no safety consequence because high radiation levels did not exist. For design basis events where high radiation levels are anticipated, 2-RM-90-112 would have remained in the trip condition and caused the "B" train isolation valves to fully close. Further, the redundant "A" train valves would have performed the isolation function to ensure containment integrity. As a result, the erratically operating latch did not create a safety consequence.

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CORRECTIVE ACTION

As previously discussed, Operations personnel recovered from the CVI referencing SOI-88.1 by reopening the affected valves, restarting the RM pump, and resetting the CVI signal.

Since the cause of the spurious spike could not be found, then no corrective action is planned regarding recurrence. To correct the problem concerning the latching mechanism, the latching mechanism will be replaced/repared during the next unit 2 refueling outage. Immediate repair/replacement is not desirable because of the potential adverse affect during power operation. The slave relay will still actuate on a CVI signal and operate the isolation valves with the CVI signal present. Since the malfunctioning latching mechanism does not pose any safety consequence, and containment integrity can be maintained for design basis events, then delaying replacement of the latching mechanism until the next refueling outage is justified.

ADDITIONAL INFORMATION

There have been two previous occurrences where only "A" train equipment isolated during a CVI. Those events were reported in LERs SQRO-50-328/87008, and 82141.

The latch mechanism attachment is a Westinghouse type ARLA used with Westinghouse type AR relays.

COMMITMENTS

TVA will replace/repair the mechanical latch mechanism for slave relay "K622" for unit 2 "B" train SSPS during the next unit 2 refueling outage.

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TEXT (If more space is required, use additional NRC Form 308A's) (17)

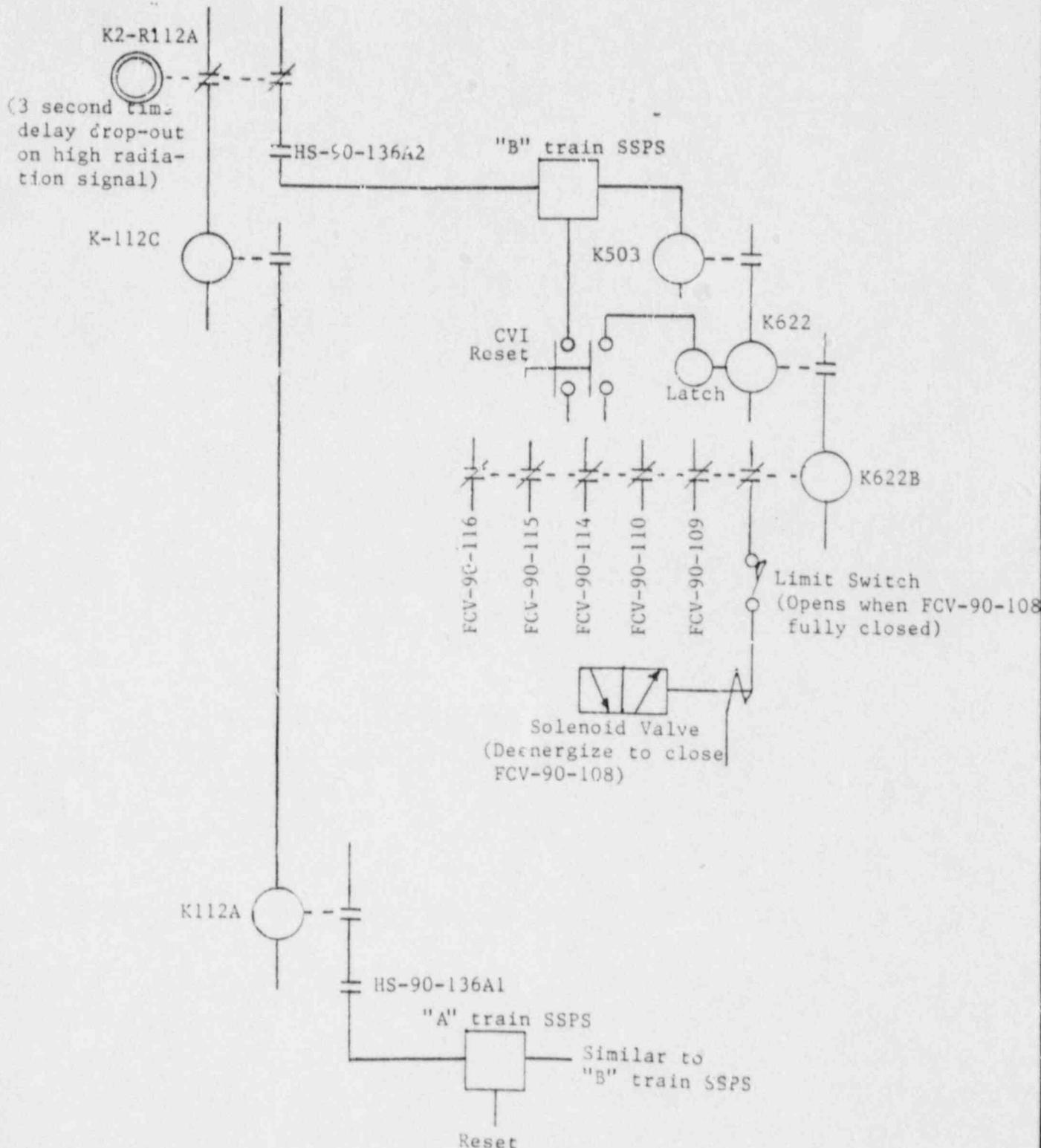


Figure 1
(Simplified Schematic)

TENNESSEE VALLEY AUTHORITY
Sequoyah Nuclear Plant
Post Office Box 200G
Soddy-Daisy, Tennessee 37379

July 14, 1988

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

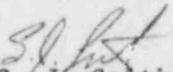
Gentlemen:

TENNESSEE VALLEY AUTHORITY - SEQUOYAH NUCLEAR PLANT UNIT 2 - DOCKET NO.
50-328 - FACILITY OPERATING LICENSE DPR-70 - REPORTABLE OCCURRENCE REPORT
SQRO-50-328/88029

The enclosed licensee event report provides details concerning a containment ventilation isolation that was the result of a spurious spike on a radiation monitor. This event is reported in accordance with 10 CFR 50.73, paragraph a.2.4v.

Very truly yours,

TENNESSEE VALLEY AUTHORITY


S. J. Smith
Plant Manager

Enclosure
cc (Enclosure):

J. Nelson Grace, Regional Administrator
U. S. Nuclear Regulatory Commission
Suite 2900
101 Marietta Street, NW
Atlanta, Georgia 30323

Records Center
Institute of Nuclear Power Operations
Suite 1500
1100 Circle 75 Parkway
Atlanta, Georgia 30339

NRC Inspector, Sequoyah Nuclear Plant

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