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April 5, 1991

U.S. Nuclear Regulatory Commission
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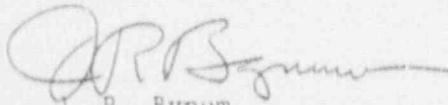
Gentlemen:

TENNESSEE VALLEY AUTHORITY - SEQUOYAH NUCLEAR PLANT UNIT 1 - DOCKET
NO. 50-327 - FACILITY OPERATING LICENSE DPR-77 - LICENSEE EVENT REPORT
(LER) 50-327/91-004

The enclosed LER provides details concerning a Limiting Condition for
Operation (LCO) 3.0.3 entry caused by more than one rod position
indicator (RPI) per bank indicating greater than 12 steps lower than the
group demand position counters. The event resulted from a circuit board
failure in a Solatron voltage regulator to the RPI system and is being
reported in accordance with 10 CFR 50.73(a)(2)(i)(B) as a condition
prohibited by the plant technical specifications. This report also
documents a subsequent LCO 3.0.3 entry to replace the failed circuit
board.

Very truly yours,

TENNESSEE VALLEY AUTHORITY


J. R. Bynum

Enclosure
cc: See page 2

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U.S. Nuclear Regulatory Commission
April 5, 1991

cc (Enclosure):

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Sequoyah Nuclear Plant, Unit 1 DOCKET NUMBER (2) 05101013 PAGE (3) 27 OF 05

TITLE (4) LCO 3.0.3 entry resulting from multiple rod position indicators indicating greater than 12 steps from the group demand position counters and caused by a voltage regulating circuit board failure.

EVENT DAY (5)				LER NUMBER (6)				REPORT DATE (7)				OTHER FACILITIES INVOLVED (8)					
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	MONTH	DAY	YEAR	FACILITY NAMES					
0	3	0	9	0	0	0	3	0	0	3	0	5	9	DOCKET NUMBER (5) <u>05101013</u>			

OPERATING MODE (9) 1 THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following)(11)

<u>1</u>	<u>20.402(b)</u>	<u>20.405(c)</u>	<u>50.73(a)(2)(iv)</u>	<u>73.71(b)</u>
<u>POWER</u>	<u>20.405(a)(1)(i)</u>	<u>50.36(c)(1)</u>	<u>50.73(a)(2)(v)</u>	<u>73.71(c)</u>
<u>LEVEL</u>	<u>20.405(a)(1)(ii)</u>	<u>50.36(c)(2)</u>	<u>50.73(a)(2)(vi)</u>	<u>OTHER (Specify in</u>
<u>(10) 1 0 0</u>	<u>20.405(a)(1)(iii)</u>	<u>XX 50.73(a)(2)(i)</u>	<u>50.73(a)(2)(vii)(A)</u>	<u>Abstract below and in</u>
	<u>20.405(a)(1)(iv)</u>	<u>50.73(a)(2)(ii)</u>	<u>50.73(a)(2)(vii)(B)</u>	<u>Te: NRC Form 366A)</u>
	<u>20.405(a)(1)(v)</u>	<u>50.73(a)(2)(iii)</u>	<u>50.73(a)(2)(x)</u>	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
<u>Melissa Meade, Compliance Licensing Engineer</u>	<u>515 843-7766</u>

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRRDS
<u>C</u>	<u>A</u>	<u>A</u>	<u>E C B D S</u>	<u>2 4 5</u>	<u>Y</u>				

SUPPLEMENTAL REPORT EXPECTED (14)

EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
<u>063091</u>	<u>0</u>	<u>6</u>	<u>3 0 9 1</u>

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

On March 6, 1991, at 0422 Eastern standard time (EST), with Unit 1 operating in Mode 1, Limiting Condition for Operation (LCO) 3.0.3 was entered after actuation of multiple P250 plant computer Rod Position Indication (RPI) deviation alarms and the associated control board annunciator. All RPIs had dropped and approximately 25 of the RPIs were indicating low by more than the allowed 12 steps from the rod control system group demand step counters. This deviation was caused by a failure in the Solatron voltage regulator which provides the input power to the RPI instrument racks. Adjustments were made to the Solatron's output voltage, and the RPIs increased to within the acceptable range. LCO 3.0.3 was exited at 0635 EST. Although the RPI system was operable, the Solatron output voltage and associated RPI readings were not as stable as normal. Therefore, on March 7, 1991, at 1805 EST, the RPI system was removed from service and LCO 3.0.3 was again entered in order to replace the voltage regulating circuit board. The board replacement was successfully completed and the RPI stability problem was corrected. At 1855 EST, the RPI System was declared operable and LCO 3.0.3 was exited. Corrective actions include sending the failed board to Sola Electric for failure evaluation and instituting PMs for periodic inspections and replacements.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (5)			PAGE (3)								
		SEQUENTIAL	REVISION										
		YEAR	NUMBER	NUMBER									
Sequoyai Nuclear Plant Unit 1	015101013 12 17 19 11	--	0	0	4	--	0	0	0	2	OF	0	5

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

DESCRIPTION OF EVENT

On March 6, 1991, at 0422 EST, with Unit 1 operating in Mode 1 (100 percent power, 2235 psig and 578 degrees Fahrenheit) the P250 plant computer alarm typer and associated annunciator were actuated indicating multiple rod positioning indicator (RPI) (EIIS Code AA) deviation alarms. All RPIS were indicating low and approximately 25 of the RPIS were indicating low by more than the allowed 12 steps from the group demand step counters. The applicable Technical Specification (TS) LCO 3.1.3.2 action statements could not be met with more than one inoperable RPI per bank; therefore, LCO 3.0.3 was entered immediately.

Operations and Maintenance evaluated the available parameters and determined the problem was in the power supply to the RPI System. During the subsequent troubleshooting, the nominal 120 VAC input to the Unit 1 RPI instrument racks was measured and found to be approximately 115 VAC. The same voltage on Unit 2 was measured at 125 VAC. The output voltage of the Unit 1 Solatron voltage regulator (EIIS RG) (manufactured by Sola Electric, Model 31-16-250-6), which provides the input power to the RPI instrument racks, was then adjusted to 125 VAC. The RPIS increased to within the acceptable range and LCO 3.0.3 was exited at 0635 EST.

Although the plant was able to exit LCO 3.0.3, a potential problem still existed because the RPIS were not as stable as normal, and some of the RPI deviation alarms would occasionally actuate and clear (i.e., momentarily "bounce" in and out of the alarm state). Additional troubleshooting revealed that the Unit 1 Solatron output voltage had an approximate plus/minus 2.3 volt variation as compared to a very stable voltage (plus/minus 0.01 volt) on the Unit 2 Solatron. Since the actual regulation is primarily controlled by the Solatron's circuit board assembly (EIIS Code ECBD), Maintenance concluded that the circuit board may have been defective.

To replace the circuit board, it was necessary to deenergize the Solatron which rendered the RPI system inoperable. On March 7, 1991, at 1805 EST, power was removed from the voltage regulator and the plant again entered LCO 3.0.3, to perform the maintenance. At approximately 1830 EST, the board replacement was completed, and the system was reenergized and placed in service for post maintenance testing. The Solatron output voltage was stable and the RPIS were functioning properly. At 1855 EST, the system was declared operable and LCO 3.0.3 was exited.

CAUSE OF EVENT

This event was caused by a failure of the circuit board assembly in the Solatron voltage regulator. Based on a visual inspection of the board, it appeared that at least one electrolytic capacitor had deteriorated to a point that may have contributed to the failure. Another possible contributing cause could have been the accumulation of excessive dirt on the circuit board which may have resulted in overheating of the components. Although this is unlikely based on the relative orientation of the circuit board (i.e., located at the bottom of the vented regulator casing), it probably warrants preventive maintenance checks for cleanliness.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		Sequoyah Nuclear Plant Unit 1	0500132791	004	0	0

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

CAUSE OF EVENT

A detailed analysis of the failed circuit board will be performed by the manufacturer to determine the actual failed components and exact failure.

ANALYSIS OF EVENT

This event is being reported in accordance with 10 CFR 50.73 (a)(2)(1)(B) as a condition prohibited by TSs.

The Rod Control System group demand step counters were not affected by the RPI failure and continued to indicate the demanded rod position throughout the event. Upon discovery of the failure, operators placed the rods in manual control and verified that reactivity parameters had not changed to ensure rods had not moved. Subsequent entry into LCO 3.0.3 for the circuit board replacement was carefully preplanned and coordinated including development of contingency actions to ensure the out of service time was minimized. The operators were aware of rod position throughout both events. Therefore, the health and safety of the public were not threatened.

CORRECTIVE ACTIONS

Upon receipt of the computer alarm, the operators verified that the condition existed, placed the rod control system in manual, and entered LCO 3.0.3. Subsequent troubleshooting revealed that the output of the Solatron voltage regulator was 115 VAC. It was adjusted to 125 VAC and the RPIs returned to an acceptable range. However, the Solatron's output voltage was not as stable as normal, causing the RPIs to vary. Therefore, on March 7, 1991, the Solatron's voltage regulating circuit board was replaced, resulting in a stable output voltage and proper functioning of the RPIs.

The failed circuit board will be sent to the manufacturer, Sola Electric, to further determine the failure mechanism. If results of this evaluation lead to different conclusions, this LER will be revised to reflect the cause of the failure and required corrective actions.

Unit 2 contains the same device in the RPI System; therefore, the Unit 2 Solatron voltage regulating circuit board was inspected to determine if immediate replacement was warranted. No accumulation of dirt was discovered on the board that could contribute to a failure and the output voltage was and is remaining stable. Unless the failure analysis warrants immediate replacement, the circuit board will be replaced during the Unit 2, Cycle 5 refueling outage to ensure its continued reliability. As additional precautions, a preventative maintenance (PM) instruction will be instituted by December 6, 1991, to periodically replace the circuit boards for both units and the RPI calibration procedures for both units will be revised before the respective Cycle 5 refueling outages to include periodic cleanliness inspections.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
Sequoyah Nuclear Plant Unit 1	015101013 12 17 19 11	--	0 0	--	0 6	01 05

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

COMMITMENTS

1. The failed circuit board will be sent to the manufacturer (Sola Electric) to further determine the failure mechanism. Results of this analysis will be evaluated and any additional corrective actions defined by June 3, 1991.
2. If results of this evaluation lead to different conclusions this LER will be revised to reflect the cause of the failure and required corrective actions by July 1, 1991.
3. The Unit 2 Solatron voltage regulating circuit board will be replaced during the Unit 2 Cycle 5 refueling outage.
4. A PM instruction will be instituted to periodically replace the circuit boards for both units by December 6, 1991.
5. The RPI calibration procedure for Unit 1 will be revised before the Unit 1 Cycle 5 refueling outage to include periodic cleanliness inspections.
6. The RPI calibration procedure for Unit 2 will be revised before the Unit 2 Cycle 5 refueling outage to include periodic cleanliness inspections.