

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

Richard T. Purcell  
Site Vice President  
Sequoyah Nuclear Plant

March 25, 2003

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

10 CFR 50.73

Gentlemen:

**TENNESSEE VALLEY AUTHORITY - SEQUOYAH NUCLEAR PLANT UNIT 2 -  
DOCKET NO. 50-328 - FACILITY OPERATING LICENSE DPR-79 - LICENSEE  
EVENT REPORT (LER) 50-328/2003-002-00**

The enclosed report provides details concerning an entry into Limiting Condition for Operation 3.0.3 when two refueling water storage tank level channels failed during cold weather conditions. This event is being reported, in accordance with 10 CFR 50.73(a)(2)(i)(B), as any operation or condition which was prohibited by Technical Specification and 10 CFR 50.73(a)(2)(vii), as an event where a single-cause resulted in at least two independent channels to become inoperable.

This letter is being sent in accordance with NRC RIS 2001-05.

Sincerely,



Richard T. Purcell

Enclosure

cc (Enclosure):

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

<b>NRC FORM 366</b> (7-2001)	<b>U.S. NUCLEAR REGULATORY COMMISSION</b>	<b>APPROVED BY OMB NO. 3150-0104 EXPIRES 7-31-2004</b> <small>Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOF-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC cannot conduct or sponsor, and a person is not required to respond to, the information collection.</small>
<b>LICENSEE EVENT REPORT (LER)</b> <small>(See reverse for required number of digits/characters for each block)</small>		

<b>1. FACILITY NAME</b> Sequoyah Nuclear Plant (SQN) UNIT 2	<b>2. DOCKET NUMBER</b> 05000328	<b>3. PAGE</b> 1 OF 5
--	-------------------------------------	--------------------------

**4. TITLE**  
Limiting Condition for Operation 3.0.3 was entered when two refueling water storage tank level transmitters failed during cold weather conditions.

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
01	24	2003	2003	002	00	03	25	2003	FACILITY NAME	DOCKET NUMBER
										05000
										05000

<b>9. OPERATING MODE</b>	1	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)</b>								
<b>10. POWER LEVEL</b>	100	20.2201(b)			20.2203(a)(3)(ii)			50.73(a)(2)(ii)(B)		50.73(a)(2)(ix)(A)
		20.2201(d)			20.2203(a)(4)			50.73(a)(2)(iii)		50.73(a)(2)(x)
		20.2203(a)(1)			50.36(c)(1)(i)(A)			50.73(a)(2)(iv)(A)		73.71(a)(4)
		20.2203(a)(2)(i)			50.36(c)(1)(ii)(A)			50.73(a)(2)(v)(A)		73.71(a)(5)
		20.2203(a)(2)(ii)			50.36(c)(2)			50.73(a)(2)(v)(B)		OTHER Specify in Abstract below or in NRC Form 366A
		20.2203(a)(2)(iii)			50.46(a)(3)(ii)			50.73(a)(2)(v)(C)		
		20.2203(a)(2)(iv)			50.73(a)(2)(i)(A)			50.73(a)(2)(v)(D)		
		20.2203(a)(2)(v)			X 50.73(a)(2)(i)(B)			X 50.73(a)(2)(vii)		
		20.2203(a)(2)(vi)			50.73(a)(2)(i)(C)			50.73(a)(2)(viii)(A)		
20.2203(a)(3)(i)			50.73(a)(2)(ii)(A)			50.73(a)(2)(viii)(B)				

**12. LICENSEE CONTACT FOR THIS LER**

NAME J. W. Proffitt	TELEPHONE NUMBER (Include Area Code) (423) 843-6651
------------------------	--

**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
B	FD	CBL	AIW	N					

<b>14. SUPPLEMENTAL REPORT EXPECTED</b>				<b>15. EXPECTED SUBMISSION DATE</b>		
YES (If yes, complete EXPECTED SUBMISSION DATE)	X	NO		MONTH	DAY	YEAR

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

On January 24, 2003, at 0835 Eastern Standard Time, Operations personnel observed that one of the Unit 2 refueling water storage tank (RWST) level transmitters had failed high and another transmitter was observed to be reading higher than normal. Inspections revealed that the transmitters were malfunctioning because of freezing at the sense lines to the transmitters inside the junction boxes. The failures occurred during cold weather. The two RWST level transmitters malfunctioned because the heater circuits designed to prevent freezing in the boxes in which they are located did not operate properly. The malfunctions of the heater circuits were the result of damaged cables supplying power to the heater strips. After adding temporary heat, the two transmitters returned to scale. One transmitter was calibrated and returned to operable status. The other transmitter was replaced, calibrated, and returned to operable status. Evaluation of the cables determined that the root cause of the damage to both cables was excessive pull tension, during installation in December 1982. The evidence suggests that the excess tension resulted from an attempt to pull in kinked cables. The damaged cables were replaced.

**LICENSEE EVENT REPORT (LER)**

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION	
Sequoyah Nuclear Plant (SQN) Unit 2	05000328	2003	002	00	2 OF 5
		--	--	--	

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

I. PLANT CONDITION(S)

Unit 2 was in power operation at approximately 100 percent power.

II. DESCRIPTION OF EVENT

A. Event:

On January 24, 2003, at 0835 Eastern Standard Time, Operations personnel observed that one of the Unit 2 refueling water storage tank (RWST) (EIS Code BQ) level transmitters had failed high and another transmitter was observed to be reading higher than normal. Inspections by instrument maintenance personnel revealed that the transmitters were malfunctioning because of freezing at the sense lines to the transmitters inside the junction boxes. The failures occurred during cold weather, approximately 6 degrees Fahrenheit. Temporary heat was placed around the area of the junction boxes. After adding temporary heat, the two transmitters returned to scale. One transmitter was calibrated and returned to operable status that same day. The other transmitter had to be replaced because it could not be calibrated. The new transmitter was installed, calibrated, and returned to operable status the following day.

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

None.

C. Dates and Approximate Times of Major Occurrences:

January 24, 2003, at 0835 EST      During performance of a surveillance instruction it was found that a Unit 2 RWST level transmitter had failed high and another was reading higher than normal.

January 24, 2003, at 0845 EST      Operations entered Limiting Condition for Operation (LCO) 3.0.3 based on two inoperable RWST channels required for RWST/Containment Sump swapover.

January 24, 2003, at 1252 EST      TVA Applied for and received enforcement discretion from NRC for the failure of the two RWST level channels.

January 24, 2003, at 1345 EST      One of the two RWST level channels was calibrated and declared operable. Operations exited LCO 3.0.3.

**LICENSEE EVENT REPORT (LER)**

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
Sequoyah Nuclear Plant (SQN) Unit 2	05000328	YEAR	SEQUENTIAL NUMBER	REVISION	3 OF 5
		2003 --	002 --	00	

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

**D. Other Systems or Secondary Functions Affected:**

Although other sense lines were affected by the cold weather, none were determined to be associated with a loss of freeze protection because of damaged cables.

**E. Method of Discovery:**

The failed RWST level instruments were discovered during routine performance of a shiftily channel check surveillance.

**F. Operator Actions:**

Control room operators evaluated the condition and took action to maintain the plant in a safe condition. The appropriate TS LCO was entered, plant management was notified, and work documents were initiated to troubleshoot and restore the failed transmitters.

**G. Safety System Responses:**

No safety system responses were required.

**III. CAUSE OF THE EVENT**

**A. Immediate Cause:**

The immediate cause of the event was the failures of the RWST level transmitters because of the cold weather.

**B. Root Cause:**

The two RWST level transmitters malfunctioned because the heater circuits designed to prevent freezing in the junction boxes in which they are located did not operate properly. The malfunctions of the heater circuits were the result of damaged cables supplying power to the heater strips. Evaluation of the cables determined that the root cause of the damage to both cables was excessive pull tension, during installation in December 1982. This was verified by a microscopic examination of the ends of the conductor strands at the damaged spots. The evidence suggests that the excess tension resulted from an attempt to pull in kinked cables.

**C. Contributing Factor:**

There were no contributing factors to the event.

**LICENSEE EVENT REPORT (LER)**

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
Sequoyah Nuclear Plant (SQN) Unit 2	05000328	YEAR	SEQUENTIAL NUMBER	REVISION	4 OF 5
		2003 --	002 --	00	

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

IV. ANALYSIS OF THE EVENT

The RWST provides a source of borated water to the emergency core cooling system (ECCS) for a loss of reactor coolant accident event. The supply of water is used during the injection mode of the event. The injection mode continues until manual actuation is taken or the defining logic automatically switches the RWST water supply to the containment sump at which time the recirculation mode is entered. The RWST level transmitters provide level indication and automatic transfer of ECCS suction from the RWST to the Containment sump upon low RWST water level and sufficiently high containment sump water level. The RWST level system is comprised of four level channels with a logic combination of two out of four channels and a safety injection signal to perform the safety function.

At the time of the condition, two of the four RWST level transmitters were operable and able to meet the required safety function. The reduction in the minimum number of operable channels did not cause a malfunction of the operable channels. Operators are trained to perform procedurally required manual switchover; the procedure requires the operators to perform a manual switchover to the containment sump should the automatic switchover fail. Additionally, compensatory actions were established during the time when only two RWST level transmitters were operable. As part of the compensatory actions taken; a dedicated operator was used to monitor RWST level and perform the switchover to the sump should the automatic function fail. Also, monitoring of the RWST water level was increased from every 12 hours to every two hours.

V. ASSESSMENT OF SAFETY CONSEQUENCES

Based on the above Analysis of The Event and the compensatory actions taken, this event did not adversely affect the health and safety of plant personnel or the general public.

VI. CORRECTIVE ACTIONS

A. Immediate Corrective Actions:

Temporary heat was placed around the area of the junction boxes. After adding temporary heat, the two transmitters returned to scale. One transmitter was calibrated and returned to operable status that same day. The other transmitter had to be replaced because it could not be calibrated. The new transmitter was installed, calibrated, and determined operable the following day. The damaged cables were replaced.

B. Corrective Actions to Prevent Recurrence:

The other RWST junction box heater cables are being replaced, to ensure that a similar problem does not exist.

VII. ADDITIONAL INFORMATION

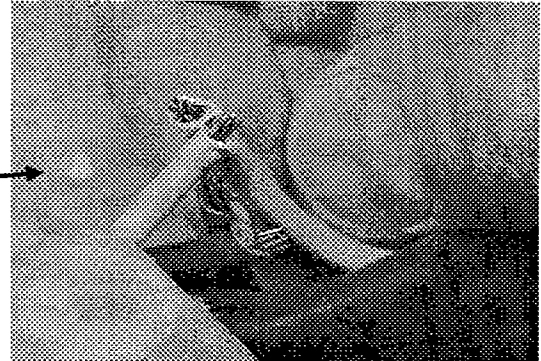
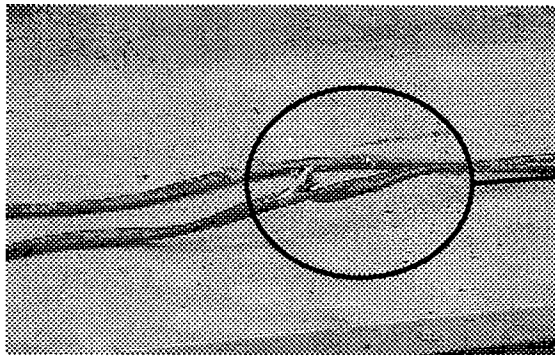
LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
Sequoyah Nuclear Plant (SQN) Unit 2	05000328	YEAR	SEQUENTIAL NUMBER	REVISION	5 OF 5
		2003 --	002 --	00	

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

A. Failed Components:

The malfunctions of the heater circuits were the result of cables damaged during installation, supplying power to the heater strips. The cables are: 2/c, 12 AWG, seven strands, manufactured by American Insulated Wire (AIW), TVA type PXMJ, mark letter WGB, no separator tape over the conductor, paper separator tape over the non-twisted conductors (the cable was assembled in a "twin-flat" arrangement).



B. Previous LERs on Similar Events:

A review of previous reportable events for the past three years did not identify any similar events.

C. Additional Information:

None

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).

VIII. COMMITMENTS

None.