Tennessee Valley Authority, Post Office Box 2000, Soddy-Daisy, Tennessee 37379

February 2, 1995

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

Gentlemen:

TENNESSEE VALLEY AUTHORITY - SEQUOYAH NUCLEAR PLANT UNIT 2 - DOCKET NO. 50-328 - FACILITY OPERATING LICENSE DPR-79 - LICENSEE EVENT REPORT (LER) 50-328/95001

The enclosed LER provides details concerning an automatic turbine and reactor trip resulting from a loss of the C-phase main transformer. This report is being submitted in accordance with 10 CFR 50.73(a)(2)(iv) as an event that resulted in the automatic actuation of engineered safety features, including the reactor protection system.

Sincerely,

R. J. Adney
Site Vice President

Enclosure
cc: See page 2

IE22
1/1

cc (Enclosure):

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NRC Form 366 (5-92)

U.S. NUCLEAR REGULATORY COMMISSION

Approved OMB No. 3150-0104
Expires 5/31/95

LICENSEE EVENT REPORT (LER)

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TITLE (4)
Turbine and Reactor Trips Caused from an Electrical Short Tripping the Main Transformer

EVENT DAY (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)
0 1	0 5	9 5	9 5	0 0 1	0 0	0 2	0 2	9 5		0 5 0 0 0

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following)(11)			
POWER LEVEL (10)	1 0 0	20.402(b)	20.405(c)	XX 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)(vii)	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)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (AREA CODE)
J. W. Proffitt, Compliance Licensing	6 1 5 8 4 3 - 6 6 5 1

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

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 January 5, 1995, at 0015 Eastern standard time, with Unit 2 operating at 100 percent power, the turbine tripped followed by a reactor trip as a result of operation of the gas-operated relay on the main bank transformer. Immediately before the trip, the "Transformer 2 Cooling System Abnormal" alarm annunciated. During the response to the alarm by the control room operator (CRO), it was noted that one of the lights for the cooler groups on the C-phase main bank transformer was not lit, indicating that a cooler group was out of service. When the CRO attempted to remove the lens cover of the light, the lamp socket rotated and the control power for the main bank transformer cooler group shorted. This resulted in the cycling of the pumps in both cooler groups, causing pressure surges of the transformer cooling oil which actuated the gas-operated relay. The gas relay tripped the main transformer, resulting in subsequent turbine and reactor trips. The cause of this event was a failure to design the light socket with an adequate barrier to prevent the electrical short from occurring. The Unit 2 and common control room panel lamp sockets were inspected. Eight deficiencies were identified and corrected. A preventive maintenance instruction will be developed to periodically check the tightness of control room light sockets. The Unit 1 control room light sockets will be checked during the next refueling outage.

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

I. PLANT CONDITIONS

Unit 2 was in power operation, Mode 1, at approximately 100 percent power.

II. DESCRIPTION OF EVENT

A. Event

On January 5, 1995, at 0015 Eastern standard time (EST), the turbine tripped followed by a reactor trip as a result of the operation of the gas-operated relay (EIIS Code RLY) on one of the main bank transformers (EIIS Code EA). Immediately before the trip, the "Transformer 2 Cooling System Abnormal" alarm (EIIS Code ALM) annunciated. During the response to the alarm by the control room operator (CRO), it was noted that one of the lights for the cooler groups on the C-phase main bank transformer was not lit, indicating that a cooler group was out of service. During shift turnover, it had been noted by the CRO that both cooler groups were operating. When the CRO was attempting to remove the lens cover of the cooling group indication light that was not lit, the lamp socket rotated. Rotation of the lamp socket allowed the terminals on the light socket to come in contact with the terminals of the adjacent light socket, the other cooler group. This resulted in a momentary fault on the transformer cooler control bus. This momentary fault resulted in the cooler groups being momentarily deenergized. As lens cap removal continued, the indication light that was not lit returned to normal illumination indicating that the cooler groups had reenergized. This resulted in a restart of both cooler groups, causing pressure surges of the transformer cooling oil which actuated the gas-operated relay. The gas-operated relay is designed to initiate a turbine trip on a large build-up of gas in the transformer tank. The gas-operated relay has a flapper that operates a trip contact on a sudden rush or expansion of oil. It is this contact that operated when the oil surge occurred. The gas relay tripped the main transformer, resulting in subsequent turbine and reactor trips.

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

None.

C. Dates and Approximate Times of Major Occurrences

January 5, 1995 at 0015 EST	A turbine trip and subsequent reactor trip were initiated because of the loss of the main transformer.
January 5, 1995 at 0225 EST	Operations personnel stabilized the plant in a safe condition in Mode 3.

D. Other Systems or Secondary Functions Affected

None.

E. Method of Discovery

The turbine and reactor trips were annunciated on the main control room panels.

F. Operator Actions

Control room personnel responded as prescribed by emergency procedures. They promptly diagnosed the plant condition and took the actions necessary to stabilize the unit in a safe condition and maintained the unit in hot standby, Mode 3.

G. Safety System Response

The plant responded to the turbine and reactor trips as designed.

III. CAUSE OF EVENT

A. Immediate Cause

The immediate cause of the event resulted from pressure surges in the transformer cooling oil, actuating the gas-operated relay and tripping the main transformer. Subsequent turbine and reactor trips followed.

B. Root Cause

The root cause of this event was a failure to design the light socket with an adequate barrier (e.g., anti-rotation mechanism, physical separation, nonconductive divider, etc.) to prevent the electrical short from occurring.

C. Contributing Factors

There were no contributing factors to this event.

IV. ANALYSIS OF EVENT

Plant responses during and after the unit trip were consistent with responses described in the final safety analysis report, and accordingly the event did not adversely affect the health and safety of plant personnel or the general public.

V. CORRECTIVE ACTION

A. Immediate Corrective Action

Control room personnel responded as prescribed by emergency procedures. They promptly diagnosed the plant condition and took the action necessary to stabilize the unit in a safe condition.

A standing order was issued to inform Operations personnel of the reactor trip and linking the reactor trip to shorting of the terminal connections on the cooler group indicating lights. The standing order cautioned the operators regarding changing out light bulbs.

B. Corrective Action to Prevent Recurrence

The Unit 2 and common control room panel lamp sockets were inspected to ensure that they were properly installed. Eight deficiencies were identified and corrected.

A preventive maintenance (PM) instruction will be developed that will require a periodic check of the tightness of control room light sockets, which could result in a short if allowed to rotate.

An evaluation will be performed to determine if a barrier to prevent an electric short from occurring should be installed.

The Unit 1 control room light sockets will be checked during the next refueling outage to ensure the tightness of the light sockets.

VI. ADDITIONAL INFORMATION

A. Failed Components

None.

B. Previous Similar Events

A review of previous reportable events identified no similar events that resulted in a reactor trip that resulted from loose light sockets. However, the search did identify two reports that were associated with relay sockets on radiation monitors being loose. The corrective actions included replacing the relay sockets.

C. Other Related Information

The main transformers are protected for internal faults by two separate pressure-sensing devices, the sudden pressure device and the gas-operated relay. The gas-operated relay trip circuit has permissives that are controlled by auxiliary relays. These auxiliary relays were designed to delay the gas-operated relay trip circuit by 10 seconds anytime the cooler group is deenergized. There is no delay in the trip circuit upon energization of a cooler group. Operating experience indicates that a wave action can occur in the piping system which houses the gas-operated relay when a cooler group is

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stopped. This wave action requires approximately four seconds to subside. There has been no indication of a problem as the result of a wave action when a cooler group is started. The wave action caused by the run-stop-immediate restart of the cooler groups as previously described had insufficient time to subside before the gas-operated relay trip circuit was re-armed. This resulted in the actuation of the relay which provided the trips to the generator and turbine. Therefore, TVA is evaluating the function of the gas-operated relay. If the gas-operated relay is determined to be required, then the design may need to be changed to include a time delay relay which opens the entire gas-operated relay trip circuit for an appropriate timeframe to prevent spurious trips during oil flow transients.

VII. COMMITMENTS

1. A PM instruction will be developed by September 8, 1995, that will require a periodic check of the tightness of control room light sockets, which are subject to resulting in a short if allowed to rotate.

2. The Unit 1 control room light sockets will be checked during the next refueling outage to ensure the tightness of the light sockets.

3. An evaluation will be performed by April 14, 1995, to determine if a barrier to prevent an electric short from occurring should be installed.