

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

R.J. Adney  
Site Vice President  
Sequoyah Nuclear Plant

January 19, 1996

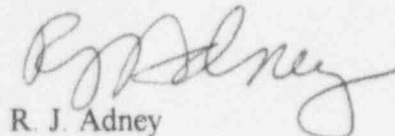
U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D.C. 20555

Gentlemen:

TENNESSEE VALLEY AUTHORITY - SEQUOYAH NUCLEAR PLANT (SQN)  
UNIT 1 - DOCKET NO. 50-327 - FACILITY OPERATING LICENSE DPR-77 -  
LICENSEE EVENT REPORT (LER) 50-327/95019

The enclosed LER provides details concerning a manual reactor trip that was initiated as a result of oscillating meter indications associated with the main generator excitation system. This event is being reported in accordance with 10 CFR50.73(a)(2)(iv) as an event that resulted in the actuation of engineered safety features, including the reactor protection system.

Sincerely,

  
R. J. Adney

Enclosure  
cc: See page 2

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U.S. Nuclear Regulatory Commission

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Enclosure

cc (Enclosure):

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LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)  
Sequoyah Nuclear Plant (SQN), Unit 1

DOCKET NUMBER (2)  
05000327

PAGE (3)  
1 of 4

TITLE (4) Manual Reactor Trip as a Result of Main Generator Exciter Problems

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 NAME	DOCKET NUMBER
12	25	95	95	019	00	01	19	96	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	POWER LEVEL (10)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)					
1	100	20.402(b)		20.405(c)	X	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
		20.405(a)(1)(iii)		50.73(a)(2)(i)		50.73(a)(2)(viii)(A)	(Specify in Abstract below and in Text, NRC Form 366A)
		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  
S. D. Gilley, Compliance Licensing Engineer

TELEPHONE NUMBER (Include Area Code)  
(423) 843-7427

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

CAUSE	SYS TEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS
X	TL	EXC	W120	No					

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE). X NO

EXPECTED SUBMISSION DATE (15)

MONTH DAY YEAR

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

On December 25, 1995, at 0713 Eastern standard time (EST), with Unit 1 at 100 percent power, a manual reactor trip was directed by the shift operations supervisor (SOS). The unit had received a Generator 1 Exciter Field Overcurrent alarm and was experiencing oscillating meter indications associated with the main generator excitation system, including meter indications that the electrical megawatt output on the main generator was fluctuating 100-150 megawatts. The manual reactor trip was directed when the SOS determined that control of the generator excitation system had been lost and could not be regained. The reactor protection systems responded to the trip as expected. Operators responded to the trip as prescribed by procedures and stabilized the reactor in the hot standby condition. The root cause of this event was a field pole failure in the main generator exciter. The corrective action was to replace the exciter. This action is complete.

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TEXT CONTINUATION

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

**I. PLANT CONDITIONS**

Unit 1 was in Mode 1 at 100 percent power.

**II. DESCRIPTION OF EVENT**

**A. Event**

On December 25, 1995, at 0713 Eastern standard time (EST), with Unit 1 at 100 percent power, a manual reactor trip was directed by the shift operations supervisor (SOS). The unit had received a Generator 1 Exciter Field Overcurrent alarm (EISS Code IB) and was experiencing oscillating meter indications associated with the main generator excitation system (EISS Code TL), including meter indications that the electrical megawatt output on the main generator (EISS Code TB) was fluctuating 100-150 megawatts. The manual reactor trip was directed when the SOS determined that control of the generator excitation system (EISS Code TL) had been lost and could not be regained.

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

None.

**C. Dates and Approximate Times of Major Occurrences**

December 25, 1995  
at 0710 EST

Unit 1 received a Generator 1 Exciter Field Overcurrent alarm, and the following instrumentation was observed to be swinging full scale: exciter volts, exciter amps, MVARs, main generator amps (Phases A, B, and C), voltage regulator/base adjust, generator field volts, generator field amps, and generator volts. The voltage indications for the 6.9-kilovolt (kV) unit boards and shutdown boards were oscillating as was the main generator megawatt output and the generator neutral transformer voltmeter.

December 25, 1995  
at 0713 EST

The SOS directed that a manual reactor trip be initiated on Unit 1 due to the generator megawatt output swinging 100-150 megawatts electric and the determination that control of the main generator excitation system had been lost and could not be regained.

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

None.

**E. Method of Discovery**

The operators in the main control room observed various annunciators in conjunction with electrical indications which were swinging outside their normal values.

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**F. Operator Actions**

The operators initiated a manual reactor trip. The necessary actions were taken to shutdown the unit and maintain it in a safe condition.

**G. Safety System Responses**

The plant responded to the manual reactor trip as designed.

**III. CAUSE OF EVENT**

**A. Immediate Cause**

The immediate cause of this event was the manual reactor trip directed by the SOS in response to the loss of control of the main generator excitation system.

**B. Root Cause**

The root cause of the event was determined to be the result of an extensive failure along the length of one side of the coil on the No. 7 exciter field pole and another ground which involved a short between a signal lead and the grounded shield on the cable to the main control room exciter field voltmeter. The ground currents circulating in the cable shield were adjacent to the meters that were swinging in the main control room. Based on the evaluation of other plant parameters, the erratic indications were induced by ground currents and did not represent actual changes in the plant. The SOS directed the manual reactor trip when he determined that control of the generator excitation system had been lost and that extensive damage to the main generator, exciter, or voltage regulation circuit could occur.

**C. Contributing Factors**

None.

**IV. ANALYSIS OF EVENT**

The excitation system establishes the electrical field necessary for the rotation of the main generator to produce electrical output. A ground loop in the excitation system caused erratic displays on electrical indications associated with this system. Based on these erratic displays a manual reactor trip was initiated. The plant response to the trip was consistent with that described in the FSAR. Therefore, it can be concluded that there were no adverse consequences to plant personnel or to the general public as a result of this event.



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TEXT CONTINUATION

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

**V. CORRECTIVE ACTIONS**

**A. Immediate Corrective Action**

When control of the main generator excitation system was lost, the SOS directed the operators to manually trip the reactor.

**B. Corrective Action to Prevent Recurrence**

The exciter was replaced.

**VI. ADDITIONAL INFORMATION**

**A. Failed Components**

A field pole on the main generator exciter manufactured by Westinghouse, Serial Number 77PO766-1, Frame BB No. A201C.

**B. Previous Similar Events**

A review of previous similar events identified two previous events on Unit 2 that involved a reactor trip as the result of overexcitation problems. LER 50-328/93001 involved a reactor trip as the result of a steam leak which flowed onto the nearby main generator voltage regulator cubicle. This caused an overvoltage condition to exist on the main generator. The second similar event identified, resulted in a turbine and subsequent reactor trip of Unit 2. LER 50-328/93006 involved missing insulation in the exciter which was determined to be the most probable cause of multiple grounds in the exciter. These grounds resulted in a rise in stator cooling temperature that actuated a temperature switch which initiated the turbine trip. This exciter on Unit 2 was replaced with the exciter from Unit 1 and the Unit 2 exciter was shipped offsite for refurbishment. Both of the events described above involved the exciter that was installed on Unit 1 and was involved in the event described by this LER. This exciter was sent offsite for complete refurbishment following the event described by LER 50-328/93006. Following refurbishment the exciter was installed in Unit 1 and was placed in service on April 20, 1994 and operated without incident until November 27, 1995 when the generator was removed from service due to a ground on the No. 9 field pole winding and a grounded jumper cable to the current winding resistors. The field pole winding and jumper cable were replaced and the unit returned to service November 30, 1995 and did not experience any other exciter problems until the event described by this LER.

**VII. COMMITMENTS**

None.