Tennessee Valley Authority
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Timothy P. Cleary
Site Vice President
Sequoyah Nuclear Plant

July 20, 2009

10 CFR 50.73

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

Docket No. 50-328

TENNESSEE VALLEY AUTHORITY - SEQUOYAH NUCLEAR PLANT (SQN) UNIT 2 - FACILITY OPERATING LICENSE DPR-79 - LICENSEE EVENT REPORT (LER) 50-328/2009-001-00

The enclosed LER provides details concerning an automatic reactor trip and automatic engineered safety feature actuation of the auxiliary feedwater system. The reactor trip was the result of a power range negative rate trip. This report is being submitted in accordance with 10 CFR 50.73 (a)(2)(iv)(A), a condition that resulted in an automatic actuation of the reactor protection system.

Sincerely,

Timothy P. Cleary

Enclosure
cc: See page 2

Enclosure
cc (Enclosure):

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NRC FORM 366 (9-2007) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 08/31/2010

LICENSEE EVENT REPORT (LER)

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

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
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4. TITLE: Unit 2 Automatic Reactor Trip Following a Power Range Negative Rate Trip

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
05	27	2009	2009	- 001 -	00	07	20	2009	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE: 1

10. POWER LEVEL: 100

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check all that apply)*

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☒ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER
☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER *(Include Area Code)*
Donald Sutton	423-843-6539

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
C	AA	JX		N					

14. SUPPLEMENTAL REPORT EXPECTED	15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO				

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

On May 27, 2009, at 1904 Eastern daylight time, SQN Unit 2 reactor automatically tripped following a power range negative rate trip. An investigation revealed that one out of five rod control power cabinets had lost power as a result of lightning strikes onsite that induced a voltage on the electrical cables between the power cabinets and the reactor head. The Unit 2 power supplies in the rod control system contain a circuit that will sense a high voltage condition and will trip the power supply. When the high voltage condition occurred, the control rods (10) supplied from the affected cabinet inserted into the core causing the negative rate trip. The plant safety systems responded as designed. The root cause of this event has been determined to be the power supplies are susceptible to lightning induced overvoltage conditions because of a lack of a filter in the overvoltage protection circuit for the control rod drive system. The corrective actions include replacement of the existing overvoltage circuits with those less susceptible to voltage induced occurrences. An evaluation of lightning protection issues for the site is being conducted.

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

I. PLANT CONDITION(S)

Unit 2 was operating in Mode 1 at approximately 100 percent power when the automatic reactor trip occurred.

II. DESCRIPTION OF EVENT

A. Event:

On May 27, 2009, at 1904 Eastern daylight time (EDT), with Unit 2 operating at approximately 100 percent reactor power, the reactor automatically tripped during a thunderstorm having multiple onsite lightning strikes because of a loss of power to one of the five rod control power cabinets [EIIS Code AA]. The loss of power to the cabinet allowed the associated control rods (10) to insert into the reactor core. This generated a decreasing negative power rate that exceeded the power range excore nuclear instrumentation system [EIIS Code IG]. The unit was stabilized in Mode 3.

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

None.

C. Dates and Approximate Times of Major Occurrences:

Date May 27, 2009 Time	Description
1904 EDT	With Unit 2 at approximately 100 percent power, the reactor automatically tripped. Lightning strikes were reported in the area because of a thunderstorm.
1904 EDT	Operations personnel entered emergency operating procedures.
1932 EDT	Operations personnel stabilized the unit in a safe condition in Mode 3.

D. Other Systems or Secondary Functions Affected:

No other systems or secondary functions were affected by this event.

E. Method of Discovery:

The reactor trip was annunciated in the main control room.

F. Operator Actions:

The operators promptly diagnosed the plant conditions and took actions as prescribed by plant procedures to stabilize the unit in the hot standby condition (Mode 3).

G. Safety System Responses:

The safety systems performed as designed for the reactor trip. The auxiliary feedwater system started and maintained steam generator (SG) level as expected.

III. CAUSE OF THE EVENT

A. Immediate Cause:

The immediate cause of the event was attributed to four simultaneous lightning strikes occurring onsite during a thunderstorm. The control rod drive (CRD) system was determined to be at an elevated static voltage level because of the environmental conditions. When the lightning strikes occurred, the induced charge on the CRD system went to ground. This current flow on the CRD cables caused a voltage spike on the sense circuits. The overvoltage protection device circuit activated causing the loss of the CRD hold-in current that allowed the control rods to insert into the core.

B. Root Cause:

The root cause of this event has been determined to be the power supplies are susceptible to lightning induced overvoltage conditions because of a lack of a filter in the overvoltage protection circuit for the CRD system.

C. Contributing Factor:

A contributing factor was unshielded cables that make the CRD system more susceptible to lightning strike discharges creating overvoltage conditions. The site actions did not identify the CRD system vulnerabilities to harden the plant against lightning strikes.

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

IV. ANALYSIS OF THE EVENT

Unit 2 was operating at approximately 100 percent power. Prior to the event, the reactor coolant system (RCS) [EIIS Code AB] pressure was approximately 2235 pounds per square inch gauge (psig). Following the reactor trip, RCS pressure decreased to a minimum pressure of approximately 2021 psig, which is well above the pressure that would have initiated a safety injection signal (1870 psig). Prior to the reactor trip, the RCS temperature was at its program value of approximately 578 degrees Fahrenheit; following the trip, it decreased to an average temperature of approximately 542 degrees Fahrenheit and remained within technical specifications (TS) limits. The minimum pressurizer (PZR) level following the reactor trip was about 28 percent. No TS safety limits were exceeded and the Updated Final Safety Analysis Report analysis of this event remained bounding. The plant responded as expected to the conditions of the trip.

V. ASSESSMENT OF SAFETY CONSEQUENCES

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

VI. CORRECTIVE ACTIONS

A. Immediate Corrective Actions:

After an initial investigation determined the cause to be the power supply to the CRD cabinet, the power supply was reset, tested, and returned to service. The Unit 1 CRD system was determined to have the improved overvoltage protection devices.

B. Corrective Actions to Prevent Recurrence:

The preventive maintenance procedures are being revised to require replacing the current overvoltage protection devices with improved overvoltage protection devices. Work orders were initiated to install improved overvoltage devices in the CRD system power supplies during the next Unit 2 refueling outage scheduled in the fall 2009. An analysis of lightning vulnerabilities at the site is being conducted.

VII. ADDITIONAL INFORMATION

A. Failed Components:

None.

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

B. Previous LERs on Similar Events:

A review of previous reportable events did not identify any previous similar events within the last three years.

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).

E. Unplanned Scram with Complications:

This condition did not result in an unplanned scram with complications.

VIII. COMMITMENTS

None.