May 13, 2004

U.S. Nuclear Regulatory Commission 10 CFR 50.73
ATTN: Document Control Desk
Washington, D.C. 20555

Gentlemen:

TENNESSEE VALLEY AUTHORITY - SEQUOYAH NUCLEAR PLANT UNIT 1 - DOCKET NO. 50-327 - FACILITY OPERATING LICENSE DPR-77 - LICENSEE EVENT REPORT (LER) 50-327/2004-001-00

The enclosed LER provides details concerning an automatic reactor trip and engineered safety feature (ESF) actuation (auxiliary feedwater start and main feedwater isolation). The automatic reactor trip occurred as a result of a main generator trip from inadvertent protective relay operation on a main transformer. This event is being reported, in accordance with 10 CFR 50.73(a)(2)(iv)(A), as an event that resulted in a automatic actuation of the reactor protection system and ESF actuation.

Sincerely,

Original signed by:

Pedro Salas
Licensing and Industry Affairs Manager

Enclosure
cc: See page 2

cc (Enclosure):
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NRC FORM 366 (7-2001) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 7-31-2004

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LICENSEE EVENT REPORT (LER)

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

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Sequoyah Nuclear Plant (SQN) UNIT 1	05000327	1 OF 6

4. TITLE

Automatic Reactor Trip with main feedwater isolation and auxiliary feedwater start as a result of a main generator trip from inadvertent protective relay operation on a main transformer.

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
										05000
03	15	2004	2004	– 001 –	00	05	13	2004	FACILITY NAME	DOCKET NUMBER 05000

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)(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)	X 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)	50.73(a)(2)(i)(B)	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	TELEPHONE NUMBER (Include Area Code)
Jan Bajraszewski	(423) 843-7749

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

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

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

On March 15, 2004, at approximately 1517 Eastern standard time, automatic turbine and reactor trips occurred. The trips were the result of a main generator trip. The generator trip occurred because of inadvertent protection relay actuation. Relay actuation occurred as a result of a ground loop (a positive side and negative side ground) on the non-safety related 250 Volt direct current (Vdc) Battery Board 2 system. Following the reactor trip, reactor coolant system (RCS) temperature decreased below 550 degrees Fahrenheit (F). Based on this RCS temperature coincident with a reactor trip, a main feedwater isolation occurred as expected. As designed, auxiliary feedwater was automatically initiated on steam generator low-low level following the reactor trip. The immediate cause of the event was inadvertent actuation of the Unit 1 generator main bank transformer protective relay. The root cause of the event was that a negative ground was created by an improperly abandoned cable. Contrary to the design change, only one end of the cable was lifted and insulated during design change implementation in 1999 by TVA's Transmission Group. Since completion of the design change in 1999, TVA has taken steps to improve work standards in its Transmission Group by documenting management observations of work activities and implementation of the Substation and Switchyard Construction Standards Manual.

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Sequoyah Nuclear Plant (SQN) Unit 1	05000327	2004 --	001 --	00	2 OF 6

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

I. PLANT CONDITION(S)

Unit 1 was in power operation at approximately 100 percent reactor power.

II. DESCRIPTION OF EVENT

A. Event:

On March 15, 2004, at approximately 1517 Eastern standard time, automatic turbine and reactor trips occurred. The trips were the result of a main generator trip. The generator trip occurred because of inadvertent protection relay actuation. Relay actuation occurred as a result of a ground loop (a positive-side and negative-side ground) on the non-safety related 250 Volt direct current (Vdc) Battery Board 2 system [EIIS Code EI]. Following the reactor trip, reactor coolant system (RCS) temperature decreased below 550 degrees Fahrenheit (F). Based on this RCS temperature coincident with a reactor trip, a main feedwater isolation occurred as expected. As designed, auxiliary feedwater was automatically initiated on steam generator low-low level following the reactor trip.

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

None.

C. Dates and Approximate Times of Major Occurrences:

June 29, 1999	TVA's Transmission Group personnel begin implementation of a design change on site transformer sudden pressure circuits. The change affected 17 site transformers. The modification included trip logic changes and relocation of sudden pressure relays.
October 29, 1999	TVA's Transmission Group personnel complete site transformer sudden pressure circuit modifications.
March 15, 2004 at 1518 EST	An automatic main generator and turbine trip occurs followed by a reactor trip.
March 15, 2004 at 1736 EST	Unit 1 stable in hot standby, Mode 3.

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

D. Other Systems or Secondary Functions Affected:

Following the reactor trip, Main Control Room (MCR) operators observed that a rod position indicator (RPI) showed one rod in the full out position; however, the operators also observed that the rod bottom light was illuminated. The plant computer and step counter were checked and found to be consistent with the rod bottom light (rod fully inserted). Subsequently, the indicating needle fell to mid-scale. The RPI was determined to be faulty, and it was replaced.

E. Method of Discovery:

The turbine and reactor trips were observed by operators monitoring the MCR panels.

F. Operator Actions:

MCR operators responded to the event in accordance with plant procedures. They promptly diagnosed the plant condition and took actions to stabilize and maintain the unit in hot standby, Mode 3.

G. Safety System Responses:

The plant safety systems responded to the transient as designed.

III. CAUSE OF THE EVENT

A. Immediate Cause:

The immediate cause of the event was inadvertent actuation of the Unit 1 generator main bank transformer protective relay. Protection relay actuation was the result of a ground loop (a positive-side and negative-side ground) on the non-safety related 250 Vdc Battery Board 2 system. The negative-side ground occurred on an improperly abandoned cable. The positive-side ground was not located before it cleared three hours following the unit trip. The protective relay is designed to trip the main generator and spray down the associated transformer if a sudden pressure is sensed in the transformer oil system. In this event, the sudden pressure relays did not actuate and testing after the trip verified that the transformer was unaffected.

B. Root Cause:

The root cause of the event was that a negative ground was created by an improperly abandoned cable. The cable was improperly abandoned during implementation of a modification prescribing that both ends of the cable be lifted and insulated. Only one end of the cable was lifted and insulated.

In 1999, TVA's Transmission Group personnel implemented a design change to site transformer sudden pressure circuits. The modification included removing the sudden pressure relay from the transformer tank on each transformer and replacing it with three sudden pressure relays mounted on a pedestal. Also, the trip logic was changed to a two out of three logic to eliminate a single-point failure concern. As part of the modification, both ends of the cables that was associated with each of the original sudden-pressure relays were to be lifted and insulated. A review performed following the event determined that only the sudden-pressure relay end of the cables were lifted and insulated. The wiring at the non-safety related 250 Vdc battery board system, which contains the main generator protection relays, remained terminated.

The cause of the improper cable abandonment was the failure to follow work processes and work package instructions for implementation of the design change resulting in steps being marked as completed and verified that were not performed as written. The involved individuals (performer and the foreman providing verification) incorrectly believed that lifting the cables at one end satisfied the intent of abandoning the cables. These individuals failed to realize that their action did not comply with the literal requirements of the modification.

C. Contributing Factor:

Contributing to the event were latent organization weaknesses such as maintenance processes did not have a method to locate small or intermittent grounds and no strong sense of urgency to clear ground conditions. A review of the annunciator system for grounds on the Number 2, 250 Vdc Battery Board System, identified 35 occurrences over a period of approximately three months. The type of grounds that were found were intermittent, short duration, low voltage, high impedance. Many of these grounds occurred during periods of rain, making ground identification and resolution difficult. Additionally, it was found that the ground detection equipment being used was not able to identify high impedance grounds.

IV. ANALYSIS OF THE EVENT

The plant systems responded to the main generator trip, turbine trip, and reactor trip as designed. The RCS average temperature was near its program value 578 degrees F before the reactor trip. Following the reactor trip, the loss of nuclear heat generation and the introduction of cold auxiliary feedwater resulted in a decrease in RCS average temperature to 538 degrees F. RCS temperature was restored to its no-load value of 547 degrees F after the reactor trip. Emergency boration was not required based on the shutdown margin requirements. Therefore, RCS temperature remained within technical specification and safety analysis report requirements during the event.

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

The plant safety system responses during and after the unit trip were bounded by the responses described in the SQN Final Safety Analysis Report.

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:

Immediate actions taken were to lift and properly abandon wiring on the Units 1 and 2 main bank transformers. Review was performed of other transformer modifications that may have cable abandonment problems that could impact operation of the 250Vdc system.

B. Corrective Actions to Prevent Recurrence:

Since completion of the design change in 1999, TVA has taken steps to improve work standards in its Transmission Group by documenting management observations of work activities and implementation of the Substation and Switchyard Construction Standards Manual. The management observation process reinforces application of appropriate work practices, procedure adherence, and provides management oversight of the work activity. The Substation and Switchyard Construction Standards Manual ensures work standard consistency. Management continuously reinforces the expectation to follow procedure through mid-shift briefings, periodic stand downs with site personnel, and management observation of various work activities.

VII. ADDITIONAL INFORMATION

A. Failed Components:

None

B. Previous LERs on Similar Events:

A review of previous reportable events for the past three years identified one event (LER 50-327/2003-001-00) associated with improper configuration control. In that event, configuration control of a pressure switch isolation valve was not properly

accomplished during performance of outage work activities. The corrective actions taken for that event, counseling of involved individuals and providing lessons learned to site personnel, would not have prevented the event described in this LER since the error described in this LER occurred in 1999 by non-station personnel.

C. Additional Information:

The corrective action documents associated with this event contains actions to:

- Perform a visual inspection of remaining site transformers for improperly abandoned cables.
- Perform a visual inspection of selected breakers for improperly abandoned cables that could impact the 250Vdc system.
- Develop new guidance for responding to and initiating work documents to locate grounds.
- Perform an industry review to determine if ground locating equipment is available which will locate high impedance grounds.

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. Loss of Normal Heat Removal Consideration

This event did not result in a loss of normal heat sink because main steam isolation and steam dump valves were available.

VIII. COMMITMENTS

None.