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Robert A. Fenech
Vice President, Sequoyah Nuclear Plant

July 14, 1993

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

Gentlemen:

TENNESSEE VALLEY AUTHORITY - SEQUOYAH NUCLEAR PLANT UNITS 1 AND 2 -
DOCKET NOS. 50-327 AND 50-328 - FACILITY OPERATING LICENSES DPR-77 AND
DPR-79 - LICENSEE EVENT REPORT (LER) 50-327/93015

The enclosed LER provides details concerning the start of all four
emergency diesel generators as the result of an incorrectly wired current
transformer.

This event is being reported in accordance with 10 CFR 50.73.b.2.iv as an
event that resulted in the automatic actuation of an engineered safety
feature.

Sincerely,

Robert A. Fenech

Enclosure
cc: See page 2

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U.S. Nuclear Regulatory Commission

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cc (Enclosure):

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Sequoyah Nuclear Plant, Unit 1 DOCKET NUMBER (2) | PAGE (3) | 050003 | 27 | 10 | 06

TITLE (4) Diesel Generator (D/G) Start as the Result of an Incorrectly Wired Current Transformer

EVENT DAY (5) | LER NUMBER (6) | REPORT DATE (7) | OTHER FACILITIES INVOLVED (8) | DOCKET NUMBER (5) |
MONTH | DAY | YEAR | SEQUENTIAL | REVISION | MONTH | DAY | YEAR | FACILITY NAMES | DOCKET NUMBER (5) |
06 | 14 | 93 | 015 | 000 | 07 | 14 | 93 | Sequoyah, Unit 2 | 05000328

OPERATING MODE (9) | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following)(11) |
N | 20.402(b) | 20.405(c) | XX | 50.73(a)(2)(iv) | 73.71(b) |
POWER LEVEL (10) | 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) | TELEPHONE NUMBER | AREA CODE |
K. E. Meade, Compliance Licensing | 615843-7766

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 |
|-------|--------|-----------|--------------|---------------------|-------|--------|-----------|--------------|---------------------|
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SUPPLEMENTAL REPORT EXPECTED (14) | EXPECTED SUBMISSION DATE (15) |
YES (If yes, complete EXPECTED SUBMISSION DATE) | X | NO

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)
On June 14, 1993, with Unit 1 defueled and Unit 2 in cold shutdown, Mode 5, the 1A start bus alternate feeder breaker tripped upon the start of the Unit 1 reactor coolant pump No. 1 motor. This resulted in the loss of voltage to the 1B-B 6.9 kilovolt shutdown board. The four emergency diesel generators (D/G) started and the 1B-B D/G supplied power to the 1B-B 6.9 kV shutdown board, as designed. The event has been determined to have been caused by an incorrectly wired current transformer in the alternate feeder breaker protection circuitry. Plant equipment response during this event was consistent with that specified in the Final Safety Analysis Report for a loss of offsite power event.

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| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | OF | TOTAL |
| Sequoyah Nuclear Plant, Unit 1 | 0500032793 | 0 | 1 | 5 | 0 | 0 |
| | | | | | 2 | 6 |

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

I. PLANT CONDITIONS

Unit 1 was defueled and Unit 2 was in cold shutdown, Mode 5.

II. DESCRIPTION OF EVENT

A. Event

On June 14, 1993, the 1A start bus alternate feeder breaker (EIIS Code EA) tripped upon the start of the Unit 1 reactor coolant pump (RCP) No. 1 motor (EIIS Code AB). This resulted in the loss of voltage to the 1B-B 6.9 kilovolt (kV) shutdown board (EIIS Code EB). The four emergency diesel generators (D/Gs) (EIIS Code EK) started and the 1B-B D/G supplied power to the 1B-B 6.9 kV shutdown board, as designed.

The 1A start bus had been transferred to the alternate feeder breaker earlier the previous day as the result of maintenance being performed on the normal feeder breaker. A very light load existed on the boards at that time as the result of the current dual unit outage. On June 14, the Unit 1 RCP No. 1 motor was started after having been recently reinstalled from maintenance activities. Upon start of the RCP motor, a neutral overcurrent relay actuated and, in turn, actuated the lock-out relay for the alternate feeder breaker to the 1A start bus. As a result, the 1A and 1C 6.9 kV unit boards, as well as the 1B-B shutdown board, experienced a loss of voltage and all four D/Gs started. The 1B-B D/G tied on to the 1B-B shutdown board to supply power. The boards were verified to have no grounds, the RCP motor was not shorted, and there were no signs of damage to the shutdown board, unit boards, or start bus enclosure.

This event is being reported in accordance with 10 CFR 50.73.b.2.iv as an event that resulted in the automatic actuation of an engineered safety feature.

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

None.

C. Dates and Approximate Times of Major Occurrences

October 15, 1992 Electrical Maintenance discovered a significant crack on the "B" phase load current transformer (CT) for the 1A start bus alternate feeder breaker.

November 3, 1992 The cracked CT was replaced with a new CT from the same manufacturer.

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

- June 13, 1993 The 1A start bus is transferred to the alternate feeder breaker in order to perform maintenance on the normal feeder breaker.
- June 14, 1993 While attempting to start the Unit 1 RCP No. 1, the 1A start bus alternate feeder breaker tripped, causing a loss of voltage to the 1A and 1C unit boards and the 1B-B shutdown board and subsequent start of all four D/Gs.
- June 15, 1993 Investigation revealed that a CT on the "B" phase of the alternate feeder breaker was wired incorrectly. The CT had been replaced in November 1992. The replacement CT (same manufacturer) had the "X1" and "X2" positions in opposite locations from the original CT. The electricians when replacing the CT and laid the leads down with the X1 and X2 wires in the same position as the original CT, not knowing the replacement CT was opposite the original CT. The CT wiring error went undetected until sufficient load existed (RCP motor start) on the boards to create the phase imbalance that resulted in the breaker trip. No records could be found that indicated the alternate feeder breaker had ever been placed in service until the day before this event occurred.

D. Other Systems or Secondary Functions Affected

None.

E. Method of Discovery

The D/G start was the result of the loss of voltage to the 1B-B shutdown board and was, thus, discovered by Operations personnel

The incorrectly wired CT was discovered by Maintenance personnel investigating the cause of the 1A start bus alternate feeder breaker trip.

F. Operator Action

Operations personnel, upon ensuring that a stable offsite power source existed, secured the three D/Gs that were not loaded to the shutdown boards. Once offsite power was restored to the 1A start bus, the final D/G was also secured.

G. Safety System Response

The D/Gs started, as designed, upon the loss of voltage to the 1B-B shutdown board. The 1B-B D/G properly tied onto the 1B-B shutdown board and provided the power to the board until offsite power could be restored to the board.

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

III. CAUSE OF EVENT

A. Immediate Cause

The immediate cause of this event was an incorrectly wired CT on the "B" phase of the 1A start bus alternate feeder breaker. This caused the breaker to trip and resulted in the loss of voltage to the 1B-B shutdown board.

B. Root Cause

The root cause of this event was the failure to uniquely identify the CT secondary wiring in accordance with site procedures in order to ensure correct retermination of the wires. The individuals that removed the cracked CT indicated that the "B" phase CT control wiring was removed. Proper identification would have indicated that two uniquely identified wires were removed from the X2 position of the CT and one uniquely identified wire was removed from the X1 position.

C. Contributing Cause

A contributing cause was that the postmaintenance test (PMT) for the installation of the CT was ineffective in detecting the wiring error. This was the result of a lack of technical knowledge involving CTs and a lack of specific guidance in site procedures concerning the proper PMT for a CT.

IV. ANALYSIS OF EVENT

One of the signals upon which the D/Gs are designed to start is a loss of voltage to the shutdown boards. The shutdown board, through the protective relays, will strip the load from the board, allow the D/G to come up to speed, tie the D/G to the board, and then sequence the required loads back on the board. This is the sequence that occurred for this event. All safety-related equipment functioned as designed.

CTs are designed to monitor the current in a circuit. The CTs used in the 1A start bus alternate feeder breaker are 4000/5-amp, wye-wired CTs. The CTs sum the current in all three phases of the circuit and send the resultant value to the breaker protective relays. The current total for a three-phase system should be zero for a normal circuit. However, with the "B" phase CT wired incorrectly, a current imbalance was sensed and a signal was sent to the protective relays to trip the 1A start bus alternate feeder breaker. Thus, with the CT wired incorrectly, the equipment functioned as designed.

Plant equipment response during this event was consistent with that specified in the Final Safety Analysis Report for a loss of offsite power event. Therefore, the event did not adversely affect the health and safety of the public.

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

V. CORRECTIVE ACTION

A. Immediate Corrective Action

The immediate corrective action associated with this event included securing the three D/Gs that were not supplying power to the shutdown boards, restoring offsite power, and then securing the final D/G. An investigation was then initiated to determine why the 1A start bus alternate feeder breaker tripped. Upon discovery of the incorrectly wired CT, all 6.9-kV CTs that had been replaced were identified to ensure that proper installation had occurred. This investigation did not discover any further discrepancies. However, subsequent testing on a 6.9-kV common board CT revealed an incorrectly wired CT in the 2A start bus normal feeder breaker circuitry. Procedures were developed to perform phase testing on all 6.9-kV CTs that had not been tested upon replacement. The open work documents were also reviewed to ensure phase testing of any future replacement CTs. The incorrectly wired CTs were corrected.

B. Action to Prevent Recurrence

The site procedure that governs configuration control of maintenance activities has been revised to clearly require unique identification of each configuration change.

Site Standard Practice (SSP) 6.31, "Maintenance Management System Pre- or Post-Maintenance Testing," will be revised to specify the proper PMT for CT replacement.

VI. ADDITIONAL INFORMATION

A. Failed Components

None.

B. Previous Similar Events

A review of previous reportable events was conducted to identify any similar events. Several events were identified with similar causes, i.e., inadequate PMT, inattention to detail, and inadequate verification. Actions have been taken in response to previous events to ensure that management expectations were clearly conveyed, understood, and concurred with by site personnel. It should be noted that the work for the replacement of the CT was planned in March 1992. This was before the specified corrective actions were in place. Subsequent planning of work activities associated with CT replacement in February and again in April 1993 resulted in the proper PMT being specified.

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

VII. COMMITMENT

SSP-6.31 will be revised by August 27, 1993, to ensure that the proper PMT for CTs is specified.