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R. D. (Rick) Machon
Vice President, Browns Ferry Nuclear Plant

February 20, 1996

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

10 CFR 50.73

Dear Sir:

**BROWNS FERRY NUCLEAR PLANT (BFN) - UNITS 1, 2, AND 3 - DOCKET
NOS. 50-259, 260, and 296 - FACILITY OPERATING LICENSE
DPR-33, 52, AND 68 - LICENSEE EVENT REPORT 50-259/96001**

The enclosed report provides details concerning the auto start of a diesel generator. This event resulted from a component failure during local panel testing. This report is submitted in accordance with 10 CFR 50.73 (a)(2)(iv) as a condition that resulted in an automatic actuation of an engineered safety feature.

Sincerely,

R. D. Machon

cc: See page 2

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Enclosure

cc Enclosure):

Mr. Mark S. Lesser, Branch Chief
U.S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

NRC Resident Inspector
Browns Ferry Nuclear Plant
10833 Shaw Road
Athens, Alabama 35611

Mr. J. F. Williams, Project Manager
U.S. Nuclear Regulatory Commission
One White Flint, North
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Rockville, Maryland 20852

EXPIRES 04/30/98

LICENSEE EVENT REPORT (LER)

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

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH
THIS MANDATORY INFORMATION COLLECTION REQUEST:
50.0 HRS. REPORTED LESSONS LEARNED ARE
INCORPORATED INTO THE LICENSING PROCESS AND FED
BACK TO INDUSTRY. FORWARD COMMENTS REGARDING
BURDEN ESTIMATE TO THE INFORMATION AND RECORDS
MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR
REGULATORY COMMISSION, WASHINGTON, DC 20555-0001.

FACILITY NAME (1)

Browns Ferry Nuclear Plant (BFN) Unit 1

DOCKET NUMBER (2)

05000259

PAGE (3)

1 OF 5

TITLE (4)

A Unit 1/2 Diesel Generator Auto Started During Local Panel Testing As A Result Of A Component Failure.

| 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 |
| 1 | 21 | 96 | 96 | -- 001 | -- 00 | 02 | 20 | 96 | Browns Ferry Unit 2 | 05000260 |
| | | | | | | | | | FACILITY NAME | DOCKET NUMBER |
| | | | | | | | | | | |

| OPERATING MODE (9) | N | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11) | | | |
|--------------------|-----|---|-------------------|-------------------|---|
| POWER LEVEL (10) | 000 | 20.2201(b) | 20.2203(a)(2)(v) | 50.73(a)(2)(i) | 50.73(a)(2)(viii) |
| | | 20.2203(a)(1) | 20.2203(a)(3)(i) | 50.73(a)(2)(ii) | 50.73(a)(2)(x) |
| | | 20.2203(a)(2)(i) | 20.2203(a)(3)(ii) | 50.73(a)(2)(iii) | 73.71 |
| | | 20.2203(a)(2)(ii) | 20.2203(a)(4) | X 50.73(a)(2)(iv) | OTHER |
| | | 20.2203(a)(2)(iii) | 50.36(c)(1) | 50.73(a)(2)(v) | Specify in Abstract below or in NRC Form 366A |
| | | 20.2203(a)(2)(iv) | 50.36(c)(2) | 50.73(a)(2)(vii) | |

LICENSEE CONTACT FOR THIS LER (12)

NAME

Clare S. Hsieh, Compliance Engineer

TELEPHONE NUMBER (Include Area Code)

(205) 729-2635

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 |
|-------|--------|-----------|--------------|---------------------|-------|--------|-----------|--------------|---------------------|
| X | EK | SCR | E147 | Y | | | | | |
| | | | | | | | | | |

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 January 21, 1996, at 1942 hours, Unit 1/2 B diesel generator (DG) inadvertently auto started during local panel testing. The auto start occurred while the Unit 1 assistant unit operator was conducting a trouble alarm check on the Unit 1/2 B DG local control panel annunciation circuit. When the operator depressed the alarm test pushbutton for the Unit 1/2 B DG local control panel, Unit 1/2 B DG auto started. The DG did not tie onto its 4kV shutdown board since the normal supply voltage for the board was available. The associated residual heat removal service water pump started as expected to provide cooling water to the DG. Unit 1/2 B DG was declared inoperable, and a seven-day technical specification limiting condition for operation was entered. The root cause of this event was an unexpected and random failure of a blocking diode in the Unit 1/2 B DG start failure circuitry. When the alarm test pushbutton was depressed, the short in the failed diode allowed the DG start failure auxiliary relay to energize, which in turn started Unit 1/2 B DG. After replacing the diode, the DG was declared operable. Since the cause was determined to be random in nature, no other corrective actions were required.

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| Browns Ferry Unit 1 | 05000259 | 96 | -- 001 -- | 00 | 2 OF 5 |

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

I. PLANT CONDITIONS

At the time of this event, Unit 2 and Unit 3 were operating at approximately 100 percent power. Unit 1 was shutdown and defueled.

II. DESCRIPTION OF EVENT

A. Event:

On January 21, 1996, at 1942 hours Central Standard Time (CST), Unit 1/2 B diesel generator (DG) [EK] inadvertently auto started during local panel testing. This auto start occurred while the Unit 1 Assistant Unit Operator (AUO) [utility, nonlicensed] was conducting a trouble alarm check on the Unit 1/2 B DG local control panel annunciation circuit.

The trouble alarms for all four Unit 1/2 DG local control panels are routinely checked every evening shift. After satisfactorily completing the alarm check on the Unit 1/2 A DG local control panel, the AUO proceeded to check the alarm on the Unit 1/2 B DG panel. However, when the operator depressed the alarm test pushbutton for the Unit 1/2 B DG local control panel, Unit 1/2 B DG auto started. The DG did not tie onto its 4kV Shutdown Board (SD) [EB] since the normal supply voltage for the board was available. The associated residual heat removal service water (RHRSW) [BI] pump started as expected to provide cooling water to the DG. Unit 1/2 B DG was declared inoperable, and a Technical Specification (TS) seven-day Limiting Condition for Operation (LCO) was entered.

The operator allowed the DG to run while a preliminary investigation was initiated to determine the exact cause of the event. The initial investigation did not identify a reason for the auto start. At 2007 hours, the DG and RHRSW pump were secured. At approximately 2020 hours, a Problem Evaluation Report (PER) was initiated for this event.

On January 22, 1996, at approximately 0100 hours, troubleshooting of the inadvertent auto start revealed a shorted blocking diode [SCR] in the Unit 1/2 B DG start failure circuitry. The short caused the DG start failure auxiliary relay to energize when the Unit 1/2 B DG local panel alarm test pushbutton was depressed. The energized relay started Unit 1/2 B DG. At 0634 hours, Post Maintenance Testing (PMT) was successfully completed following the diode replacement. At 0642 hours, after declaring the Unit 1/2 B DG operable, the TS LCO was exited.

This event is reportable in accordance with 10 CFR 50.73(a)(2)(iv), as an event or condition that resulted in an automatic actuation of Engineered Safety Feature (ESF).

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

None.

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

C. Dates and Approximate Times of Major Occurrences:

January 21, 1996

at 1942 hours CST

Unit 1/2 B DG inadvertently auto started when the DG local panel alarm test pushbutton was depressed. The DG was declared inoperable and a seven-day LCO was entered.

at 2020 hours CST

A PER was initiated for this event.

at 2209 hours CST

TVA made a four-hour nonemergency notification to NRC in accordance with 10 CFR 50.72(b)(2)(ii).

January 22, 1996

at 0100 hours CST

Troubleshooting revealed a shorted diode in the Unit 1/2 B DG start failure circuitry.

at 0634 hours CST

Diode replaced and PMT completed successfully.

at 0642 hours CST

Unit 1/2 B DG declared operable. TS LCO exited.

D. Other Systems or Secondary Functions Affected:

None.

E. Method of Discovery:

The DG start was immediately observed not only by the AUO conducting the test in the DG building but also by the Unit Operator (UO) [utility, licensed] in the control room when alarms indicating the start were received.

F. Operator Actions:

Operations personnel initiated a preliminary investigation of the event. Upon completion of the preliminary investigation, the UO in the control room secured the DG and the RHRSW pump.

G. Safety System Responses:

None.

III. CAUSE OF THE EVENT

A. Immediate Cause:

The immediate cause was the inadvertent energizing of the auxiliary relay in the DG start failure circuitry. The energized relay resulted in the start of Unit 1/2 B DG.

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

B. Root Cause:

The root cause of this event was an unexpected and random failure of a blocking diode in the Unit 1/2 B DG start failure circuitry. The blocking diode was connected between the alarm test bus of the DG local control panel and the operating coil of the DG start failure auxiliary relay. When the alarm test pushbutton was depressed to energize the alarm test bus for local panel alarm testing, the short in the failed diode allowed the bus to energize the Unit 1/2 B DG start failure auxiliary relay. This in turn started the Unit 1/2 B DG.

IV. ANALYSIS OF THE EVENT

As expected, the auto start of the DG was the successful completion of a designed function. In this event, operations personnel immediately secured the DG and the associated RHRSW pump. The cause of the ESF actuation was identified, and the failed component was replaced to restore the DG to standby readiness.

The diesel generator start circuitry is safety-related and located in a mild environment. Since the circuitry is located in a mild environment, the determination of a qualified lifetime is not required. As with the vast majority of components, both safety related and non-safety related, random failures of these components are expected to occur, be detected, and corrected during the life of the plant. Site Standard Practice 6.4, Equipment History and Failure Trending, establishes the requirements and processes for collecting equipment maintenance history, trending equipment reliability, as well as identifying repetitive and generic failure trends from the maintenance history data bases. Repetitive failures of this type of diode in the diesel generator start failure circuitry or elsewhere in the plant would either be identified as part of the root cause investigation of an individual failure or through the identification of a trend within the corrective action program of increasingly frequent failures in the same type of diode. Incipient age related failures of these diodes would be detected by this prior to the occurrence of concurrent failures that could defeat redundancy by incapacitating multiple paths or trains available for providing essential safety functions. Therefore, the safety of the plant, its personnel, and the public was not compromised.

V. CORRECTION ACTIONS**A. Immediate Corrective Actions:**

A preliminary investigation to determine the cause of the auto start event was initiated. Operations personnel declared Unit 1/2 B DG inoperable and secured the DG and RHRSW pump.

B. Corrective Actions to Prevent Recurrence:

TVA replaced the failed diode. Following the successful performance of the PMT, Unit 1/2 B DG was declared operable. The panel alarm pushbutton annunciation circuitry was again checked to ensure it was functioning properly. Since the event is considered random in nature, no further corrective actions are required.

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

VI. ADDITIONAL INFORMATION

A. Failed Components:

This event was caused by a failed diode [SCR] manufactured by International Rectifier (1000 volts, 1.5 amp, Model 10D10) .

B. Previous LERs on Similar Events:

There were two previous similar events (LER 259/80088 and LER 259/81058) resulting from failed International Rectifier Model 10D10 diodes. In both events, the failure was considered random in nature.

1. LER 259/80088 discussed a faulty diode in overspeed trip annunciator relay circuitry. The faulty diode allowed a spurious signal to operate the overspeed trip relay resulting in the Unit 1/2 C DG tie breaker on 4kV SD C to trip.
2. LER 259/81058 discussed a failed diode in the Unit 3 D DG engine control panel allowing the DG to start when the annunciation alarm reset button was pushed.

VII. COMMITMENTS

None.