

LICENSEE EVENT REPORT (LER)

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|---|--------------------------------------|----------------------|
| FACILITY NAME (1) Vermont Yankee Nuclear Power Corporation | DOCKET NUMBER (2) 0 5 0 0 0 2 7 1 | PAGE (3) 1 OF 0 3 |
|---|--------------------------------------|----------------------|

TITLE (4)
Diesel Generator Lockout Trip of Both Generators

| 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 NAMES | | DOCKET NUMBER(S) |
| 1 | 0 | 23 | 8 | 4 | 3 | 4 | 0 | 2 | 0 | 0 | 0 |
| 1 | 0 | 23 | 8 | 4 | 3 | 4 | 0 | 2 | 0 | 0 | 0 |

OPERATING MODE (9) N

POWER LEVEL (10) 1 0 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)

| | | | |
|-------------------|------------------|--|--|
| 20.402(b) | 20.406(e) | 50.73(a)(2)(iv) | 73.71(b) |
| 20.406(a)(1)(i) | 50.38(c)(1) | <input checked="" type="checkbox"/> 50.73(a)(2)(v) | 73.71(c) |
| 20.406(a)(1)(ii) | 50.38(c)(2) | 50.73(a)(2)(vi) | OTHER (Specify in Abstract below and in Text, NRC Form 366A) |
| 20.406(a)(1)(iii) | 50.73(a)(2)(i) | 50.73(a)(2)(vii)(A) | |
| 20.406(a)(1)(iv) | 50.73(a)(2)(ii) | 50.73(a)(2)(vii)(B) | |
| 20.406(a)(1)(v) | 50.73(a)(2)(iii) | 50.73(a)(2)(ix) | |

LICENSEE CONTACT FOR THIS LER (12)

| | |
|---|---|
| NAME James P. Pelletier, Plant Manager | TELEPHONE NUMBER 8 0 2 2 5 7 - 7 7 1 1 |
|---|---|

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 | E, K | 8 7 | W 1 2 0 | Y | | | | | |

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15)

| | | |
|-------|-----|------|
| MONTH | DAY | YEAR |
| | | |

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

On 10/22/84 at 1335 EST, diesel generator 1-1-A experienced a generator lockout trip caused by a differential relay trip. At 0140 EST on 10/23/84, Control Room personnel noted a loss of diesel generator 1-1-B, also resulting from generator lockout trip caused by differential relay trip.

The differential relay trips resulted from the failure of a Zener diode in each of the differential relays. The Zener diode is in parallel with a silicon-controlled rectifier in the Westinghouse type SA-1 differential relays.

On 10/23/84 at approximately 1730 EST and on 10/24/84 at approximately 2000 EST, the relays for diesel generators 1-1-B and 1-1-A respectively were repaired and the diesels were declared operable.

Corrective action will consist of installing the newer version of the Westinghouse SA-1 relay which is designated for Class 1E applications and no longer uses the Zener diode across the output SCR.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | | | |
| | | 8 4 | — 0 2 2 | — 0 0 | 0 2 | OF | 0 3 |

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

With the plant at normal full power on 10/22/84 at 1335 EST, Control Room personnel received diesel generator 1-1-A lockout and differential alarms. Local investigation revealed that the lockout relay had tripped due to differential relay trip and that it would not reset. This occurrence happened 11 days after completion of monthly technical specification surveillance on the diesel generator.

At 2105 EST on 10/22/84, alternate surveillance testing on diesel generator 1-1-B was successfully completed.

At 0140 EST on 10/23/84, Control Room personnel received diesel generator 1-1-B lockout and differential alarms. Local investigation again revealed that the lockout relay had tripped due to differential relay trip and that it would not reset.

Since both diesel generators were inoperable, a reactor shutdown was initiated in accordance with Tech. Spec. Section 3.5.H.1 and an Unusual Event was declared.

On 10/23/84 at approximately 1730 EST, the relay for diesel generator 1-1-B was repaired and, after satisfactory testing, the diesel was declared operable. The reactor shutdown was terminated and ascension to full power began. On 10/24/84 at approximately 2000 EST, the relay for diesel 1-1-A was repaired and, after testing, the diesel was declared operable.

The cause of the Westinghouse SA-1 differential relay malfunction was determined to be due to failure of a Zener diode in each of the relays. The Zener diode is installed across the anode and cathode of the SCR on the output of the differential relay. The diode short-circuited, which resulted in actuation of the lockout relay.

During investigation of the cause of the differential relay trip it was noted that surge protection across the lockout relay coils of both diesel generators lockout relays were installed backwards. The surge protection consists of a 47 ohm resistor and a 180 volt Zener diode. It was determined that the surge protection circuit did provide some protection as it was installed since the diode was a Zener diode, and any time the voltage exceeded the 180 volt breakdown voltage, the Zener diode would conduct. The diode was, however, reversed so that the anode was connected to the positive side of the DC supply.

Due to the unusual circumstances of the same diode failure occurring in redundant systems, an investigation to attempt to determine the cause of the diode failures was conducted. Vermont Yankee personnel met with Westinghouse Relay-Instrument Division and it was mutually concluded that the specific cause of the Zener diode failures could not be positively determined. The Zener diode failures probably resulted from component end of life or from the cumulative damage from normally experienced switching transients within the DC system. The polarity of the suppression circuit of the lockout relay may have contributed to increased stress and shortened life.

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| | | 8 4 | — 0 2 2 | — 0 0 | 0 3 | OF | 0 3 |

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

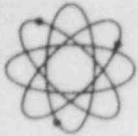
The corrective action will consist of installing the newer version of the Westinghouse SA-1 relay which is designated for Class 1E applications. The relay no longer uses the Zener diode across the output SCR but has a resistor capacitor network across the SCR. The circuit also uses two additional capacitors for surge protection.

It was also determined during the meeting with Westinghouse that use of the repaired relays did not place the system in immediate jeopardy of another Zener failure.

In order to have the best possible system reliability, the latest Westinghouse design commercial grade relays, which have been evaluated to be a one-for-one replacement for the existing relays, are being installed on an interim basis until receipt of relays designated for Class 1E service. These relays are electrically and functionally the same as those designated for Class 1E use.

Another significant item was discovered during troubleshooting of one of the failed differential relays. It was determined that replacement of the relay trip indicating lamp with an incorrect voltage bulb can prevent the relay from tripping. When the relay simulated a trip upon Zener diode failure, illumination of the indicating lamp was expected. Since the bulb did not light as expected, it was replaced. Inadvertent replacement of the bulb with one with a lower voltage rating resulted in the relay not tripping when tested. Due to the higher amperage through the bulb, insufficient current was available for firing the output SCR. It should also be noted that the part number for the bulb is not contained in the parts list for either the relay in service at Vermont Yankee or for the present Westinghouse design relay. The correct part number of the bulb was obtained and the installed bulbs were verified correct.

No similar occurrences of this type have been reported to the Commission.



VERMONT YANKEE NUCLEAR POWER CORPORATION

P. O. BOX 157
GOVERNOR HUNT ROAD
VERNON, VERMONT 05354

November 20, 1984

VYV84-587

U.S. Nuclear Regulatory Commission
Document No. 50-271
Washington, D.C. 20555

REFERENCE: Operating License DPR-28
Docket No. 50-271
Reportable Occurrence No. LER 84-22

Dear Sirs:

As defined by 10CFR50.73, we are reporting the attached Reportable Occurrence as LER 84-22.

Very truly yours,

VERMONT YANKEE NUCLEAR POWER CORPORATION

James P. Pelletier
Plant Manager

RDP/jbb

cc: Regional Administrator
USNRC Office of Inspection and Enforcement
Region I
631 Park Avenue
King of Prussia, Pennsylvania 19406

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