



**Entergy
Operations**

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D. F. Packer
General Manager
Plant Operations
Waterford 3

W3F1-92-0438
A4.05
QA

November 2, 1992

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

Subject: Waterford 3 SES
Docket No. 50-382
License No. NPF-38
Reporting of Licensee Event Report

Gentlemen:

Attached is Licensee Event Report Number LER-92-012-00 for Waterford Steam Electric Station Unit 3. This Licensee Event Report is submitted pursuant to 10CFR50.73(a)(2)(iv).

Very truly yours,

D.F. Packer
General Manager - Plant Operations

DFP/TWG/ssf
Attachment

cc: J.L. Milhean, NRC Region IV
G.L. Fiorreich
J.T. Wheelock - INPO Records Center
R.B. McGehee
N.S. Reynolds
NRC Resident Inspectors Office
Administrator - LRPD

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JEZ

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digit characters for each block)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNB 7714) U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503

FACILITY NAME (1)

Waterford Steam Electric Station Unit 3

DOCKET NUMBER (2)

05000 382

PAGE (3)

1 OF 07

TITLE (4)

Jumper Error Results .A Partial Engineered Safety Features Component Actuation

EVENT DATE (5)			LER NUMBER (6)			REPORT NUMBER (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
10	02	92	92	012	00	11	02	92	N/A	05000
									N/A	05000

OPERATING MODE (9)	POWER LEVEL (10)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more) (11)				
6	000	20.402(b)		20.405(c)	X 50.73(a)(2)(iv)	73.71(b)
		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)(vi)	OTHER
		20.405(a)(1)(iii)		50.73(a)(2)(ii)	50.73(a)(2)(vii)(A)	Specify in Abstract below and in Text, NRC Form 366A
		20.405(a)(1)(iv)		50.73(a)(2)(iii)	50.73(a)(2)(vii)(B)	
		20.405(a)(1)(v)		50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (include Area Code)
R.D. Peters, Electrical Maintenance Superintendent	(504) 464-3386

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRRS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRRS

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 October 2, 1992, Waterford SES, Unit 3 was in Mode 6 (Refueling). During maintenance to replace a relay in the Engineered Safety Features Actuation System (ESFAS), an improperly placed electrical jumper caused a limited number of Engineered Safety Features (ESF) actuation relays to deenergize. The deenergized actuation relays caused the associated components to shift position as they would have in response to a Safety Injection Actuation Signal.

This event was caused by an undetectable error by the technician that was performing the jumper installation. The jumper was installed in the proper location but was inadvertently landed on the terminal lug insulation instead of the terminal lug.

Corrective action for this event will include a review of this event by Electrical and I&C Maintenance technicians. There have been no similar events.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 60.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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

REPORTABLE OCCURRENCE

On October 2, 1992, Waterford SES, Unit 3 was in Mode 6 (Refueling). During maintenance to replace a relay in the Engineered Safety Features Actuation System (ESFAS; EIS Identifier JE), an improperly placed electrical jumper caused a limited number of Engineered Safety Features (ESF) actuation relays to deenergize. The deenergized actuation relays caused the associated components to shift position as they would have in response to a Safety Injection Actuation Signal. This sequence constitutes an invalid ESF actuation because no plant condition or parameter satisfying the requirements for ESF initiation existed. Except for a limited number of cases, invalid ESF actuations are reportable in accordance with the requirements of 10CFR50.73(a)(2)(iv).

INITIAL CONDITIONS

Plant Power:	0
Mode:	6
Procedures Being Performed Specific to this Event:	None
Technical Specification LCO's in Effect Specific to this Event:	None
Major Equipment Out of Service Specific to this Event:	None

EVENT SEQUENCE

In response to Information Notice 92-04, "Potter and Brumfield Model MDR Rotary Relay Failures," as well as Combustion Engineering analyses of two MDR relay failures at Waterford 3, Entergy Operations opted to replace a number of affected MDR relays (including all of the MDR relays in the ESFAS cabinets) during Waterford 3's fifth refueling outage. The new Potter and Brumfield MDR relays are of an improved design which is expected to eliminate the problem of

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outgassing of the relay coils. The outgassing phenomenon had been found to liberate chlorine gas which caused corrosion damage to the relay internals.

On October 2, 1992, Waterford SES, Unit 3 was in Mode 6 (Refueling). Electrical Maintenance technicians were in the process of changing out the Letdown Stop Valve Actuation Relay (K308A) in accordance with Condition Identification/Work Authorization (CI/WA) 280719/99000416.

Because the K308A relay is arranged with a number of other ESF actuation relays in a parallel string circuit, a temporary jumper was required in order to maintain the relays downstream of K308A energized while the K308A relay itself was changed out. In this particular application, power is normally supplied to a number of actuation relays (including K308A) by permanent jumpers arranged in a "daisy chain." When installed, the temporary jumper was to replace one of the permanent jumpers in the daisy chain. Then, with power to the downstream relays maintained by the temporary jumper, the permanent jumper could be disconnected and the K308A relay could be changed out. In this case, a temporary jumper consisting of an insulated lead with alligator clips and insulating boots on either end was used.

The temporary jumper was installed in the proper location by the technician performing the work. However, instead of landing the temporary jumper cleanly on the terminal lug, the technician unknowingly caught part of the terminal lug insulator in the alligator clip. As a result, the temporary jumper made a poor electrical connection.

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ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 30.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNRB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20545-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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Believing that the temporary jumper was properly installed and electrically correct, the technician proceeded to remove the appropriate terminal board screw so that the K308A relay could be removed from the circuit. Besides deenergizing the K308A relay, removing this screw also had the effect of breaking the normal power supply daisy chain because the permanent power jumper was landed at the same terminal board point.

When the terminal board screw for the K308A relay was removed, the normal power supply daisy chain was broken. Without the power that should have been provided by the temporary jumper, not only was K308A deenergized (which was expected) but so were all of the actuation relays downstream of K308A in this particular chain. The following relays were deenergized:

- K302A High Pressure Safety Injection (HPSI) Flow Control Valve Safety Injection Actuation Signal (SIAS) Actuation Relay
- K308A Letdown Stop Valve SIAS Actuation Relay
- K311A Heating, Ventilation, and Air Conditioning SIAS Actuation Relay
- K401A Boric Acid Pumps A&B Valves SIAS Actuation Relay
- K403A HPSI Flow Control Valve SIAS Actuation Relay
- K408A Water Chiller Compressor A&C SIAS Actuation Relay
- K409A Safety Injection Flow Control Drain and Isolation Valves SIAS Actuation Relay
- K410A Component Cooling Water Valves SIAS Actuation Relay
- K412A Diesel Generator A Start #2 SIAS Actuation Relay
- K516A SIAS Trip Leg Lockout Relay

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Normally, when the ESF initiation logic is satisfied and an initiating signal is produced, these relays (among others) deenergize and actuate various plant components. As expected, deenergizing these relays caused a number of components to actuate as they would in response to a valid ESF Actuation Signal- in this case a Safety Injection Actuation Signal. Because only ten actuation relays were deenergized, the event had a limited impact on the plant. The systems that were primarily affected included the Component Cooling Water System (EISS Identifier CC), the Chilled Water System (EISS Identifier KM), and the Safety Injection System (EISS Identifiers BQ and BP) although, as expected, neither the High nor the Low Pressure Safety Injection Pumps started (no water was injected into the reactor coolant system). A number of ventilation fans were either secured or shifted operating modes. Other equipment that would normally have been expected to be affected by this event was either danger tagged out or already in the actuated state because of the refueling outage that was in progress.

A review of this event indicated that all plant equipment operated as designed.

CAUSAL FACTORS

This event was caused by an undetectable error by the technician that was performing the jumper installation. In this particular case, the jumper was in the correct physical location but part of the alligator clip was attached to the terminal lug insulator. Voltage checks made just after the event showed that some voltage did exist on the terminal board downstream of the

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break in the circuit but it was apparently not enough to prevent the affected relays from deenergizing. This would indicate that at least part of the temporary jumper had in fact been landed on the terminal lug. Given these indications and the dimensions of the alligator clip on the jumper, it would appear that alligator clip was installed no more than one eighth of an inch (1/8") out of position. This is a small working tolerance, especially considering that the insulating boots on the jumpers (necessary to prevent both electrical shock and short circuits) are about one half inch (1/2") in diameter.

CORRECTIVE MEASURES

Immediate corrective action for this event was to properly land the jumper and restore actuated components to their normal conditions.

In addition, a number of photographs were taken of the temporary jumper installation. These pictures, illustrating the fact that the alligator clip had just barely been mislanded, were reviewed with the personnel involved in the MDR relay replacement work. The K308A relay was the 43rd of a total of 97 MDR relays that were replaced during this outage. No related problems occurred before or after this event.

As action to prevent recurrence, this LER will be reviewed with Electrical and I&C maintenance personnel during an upcoming shop meeting.

Corrective actions associated with this event are expected to be complete by January 20, 1993.

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SAFETY SIGNIFICANCE

This event did not pose a threat to the health and safety of the public because of the limited number of components that were affected, none of which had any impact on the Reactor Coolant System. Equipment necessary to maintain the plant in a safe shutdown condition was provided by the 'B' train in accordance with the "protected train" concept described in Administrative Procedure PLG-009-005, "Outage Planning and Controls." No protected train equipment was impacted by this event.

SIMILAR EVENTS

None