Entergy Operations

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Ref: 10CFR50.73(a)(2)(iv)

W3B5-91-0188
A4.05
QA

June 25, 1991

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

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

Gentlemen:

Attached is Licensee Event Report Number LER-90-004-01 for Waterford Steam Electric Station Unit 3. This Licensee Event Report supplement is submitted to provide additional causal information resulting from diagnostic testing of the failed component. This Licensee Event Report is submitted pursuant to 10CFR50.73 (a)(2)(iv).

Very truly yours,

D.F. Packer
General Manager - Plant Operations

DFP/LDC/rk
Attachment

cc: Messrs. R.D. Martin
G.L. Florreich
J.T. Wheelock - INPO Records Center
E.L. Blake
D.L. Wigginton
N.S. Reynolds
NRC Resident Inspectors Office

IE22
1/1

NRC FORM 366 (6-89) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92
ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Waterford Steam Electric Station Unit 3	0 5 0 0 0 3 8 2	1 OF 0 4

TITLE (4)
Inadvertent Emergency Feedwater System Actuation Due to Test Circuit Malfunction

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)
											N/A	0 5 0 0 0
0 4	0 8	9 0	9 0	–	0 0 4	–	0 1	0 6	2 5	9 1	N/A	0 5 0 0 0

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	1 1 0	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)(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)

NAME	TELEPHONE NUMBER
W.R. Brian, Plant Engineering Superintendent	AREA CODE 5 0 1 4 4 6 4 – 3 1 1 2 1 7

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	
B	J C	C N T R	C 7 7 0	N							

SUPPLEMENTAL REPORT EXPECTED (14)

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

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

At 0444 hours on April 8, 1990, Waterford Steam Electric Station Unit 3 was operating at 100% power when a partial actuation of the Emergency Feedwater (EFW) system occurred during a scheduled functional test of the Plant Protection System (PPS). This event is reportable as an unplanned Engineered Safety Feature (ESF) actuation. The actuation was not of sufficient duration to allow EFW flow to the Steam Generators (SG).

The root cause of this event is test circuit malfunction. The matrix test module relay hold pushbutton assembly was replaced and the PPS functional test was completed satisfactorily. Further diagnostic testing and evaluation of the relay hold pushbutton isolated the cause of the circuit malfunction to be the incorrect assembly of the early closing contact block. Because the circuit malfunction was associated only with the test circuitry and the EFW System was capable of responding in the safe direction, this event did not threaten the health and safety of the general public or plant personnel.

At 0444 hours on April 8, 1990, Waterford Steam Electric Station Unit 3 was operating at 100% power when a partial actuation of the Emergency Feedwater (EFW) (EIIS Identifier - BA) occurred during a scheduled functional test of the Plant Protection System (PPS) (EIIS Identifier - JC). This event is reportable as an unplanned engineered safety feature (ESF) actuation.

While performing step 85 of operating procedure (OP) 903-107, "Plant Protection System Channel Functional Test," which involves pressing and holding the PPS matrix relay hold pushbutton and verifying system response, all three EFW pumps (EIIS Identifier BA-P) and Steam Generator (SG) (EIIS Identifier-SG) blowdown System Isolation Valves (EIIS Identifier WI-ISV) actuated. The EFW to SG isolation valves did not open due to the short duration of the actuation signal. The functional test was terminated and EFW system components were returned to their normal configuration. The inadvertent actuation could not be reproduced and the functional test was later reperformed with satisfactory results.

The matrix relay hold pushbutton performs three functions. 1) It interrupts test power to the matrix test modules (EIIS Identifier - IMOD) not being tested. 2) It provides test power to the matrix bistable relay aiding coils (EIIS Identifier - RLY/CL) through the use of early closure contacts (EIIS Identifier - CNTR) on the pushbutton. 3) It provides test power to the matrix bistable relay opposing coils.

During the circuit test sequence, the relay hold pushbutton is depressed and through use of the early closure contacts, applies test power to the aiding coils of the matrix trip path relays before the bistable relays are deenergized. If the bistable relays deenergize the matrix trip path relay primary coils before the matrix relay aiding coils energize, an Emergency Feedwater Actuation Signal (EFAS) (EIIS Identifier BA-JE) will result.

During troubleshooting performed on May 3, 1990, the relay hold pushbutton and contact blocks for the A-C matrix test module were examined and revealed a higher than normal resistance across the early opening contacts. The resistance measured in the range of 1.9 to 28 ohms, compared to a normal resistance of 0.2 ohms. Bench testing of the relay hold pushbutton indicated that the contact resistance varied with the degree of pressure applied to the pushbutton and that the contact resistance did not delay energizing the matrix bistable relay aiding coil.

Diagnostic testing of the removed pushbutton was completed. Neither carbon or corrosion buildup on the contacts was found. Evaluation by a vendor (Combustion Engineering, Inc.) determined that the root cause of the test circuit malfunction was the incorrect assembly of the Cutler-Hammer early closing contact block (model number 2 N.O. 10250T57), which resulted in poor electrical contact.

The relay hold pushbutton and contacts were replaced and the A-C matrix was tested satisfactorily on May 3, 1990. The five other relay hold pushbutton switches were replaced prior to April 19, 1991. All five contact blocks were x-rayed and found to be assembled correctly. One of the early closing contact blocks was found to be incorrectly labeled. The early closing symbol was stamped on the wrong side of the contact block.

Corrective action to prevent recurrence of this event is to verify that the function of the contact block is stamped correctly on the block and to x-ray all Cutler-Hammer contact blocks before installation in safety equipment in order to verify proper assembly. These actions will continue until the quality control of the manufacturer is upgraded. A part 10CFR21 evaluation is being performed. All plant safety related equipment that use the Cutler-Hammer contact block (model number 2 N.O. 10250T57) will be identified and verified for proper assembly.

The circuit malfunction was limited to the PPS test circuitry and would not have impaired the ability of the EFW system or any other related safety systems to respond to an actual demand on the PPS if required. The functional test in progress at the time of the EFAS was later completed satisfactorily. For these reasons, the health and safety of the general public was not jeopardized during this event.

Similar Events

None

Plant Contact

W.R. Brian, Plant Engineering Superintendent, 504/464-3127.