NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

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 9

TITLE (4)
Containment Electric Penetration Backup Protection
Inoperable Due to Inadequate Construction Documentation

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
1 1	2 3	8 7	8 7	-	0 2 6	- 0 1	0 2	2 5	8 8	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 0 0		20.402(b)		20.405(c)		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)	X	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
	AREA CODE
D.E. Baker, Event Analysis & Reporting Department Head	5 0 4 — 4 6 4 - 3 1 3 3

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	

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 1500 hours on November 23, 1987, Waterford Steam Electric Station Unit 3 was operating at 100% power when Operations personnel discovered that Chemical and Volume Control (CVC) valves 218A and 218B had failed to meet the containment penetration backup overcurrent protection operability requirement of Technical Specification (TS) 3.8.4.1. At 1415 hours on January 26, 1988, while in hot standby, a followup to corrective actions initiated from the first event resulted in the discovery of a Control Element Drive Mechanism (CEDM) Cooling Valve Limit Switch cable penetration which did not have the required backup overcurrent protection. In both events, the plant operated in a condition prohibited by TS since initial plant startup.

The root cause of these events was cognitive personnel error by architect engineers. Discrepancies in design documentation resulted in the incorrect circuit configurations. CVC and CEDM cables were properly connected and declared operable within approximately 4 hours and 24 hours, respectively. A review of maintenance history records indicates there were no equipment problems which would have challenged the overcurrent protection of the breakers. Since the breakers were properly wired and operable and the equipment would have functioned as designed, there was no health or safety significance to this event.

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

On June 12, 1985, Letter W3A85-0026 was issued by Plant Management in response to Potentially Reportable Event 85-090, which reported a Pressurizer Heater (EIIS Identifier AB-PZR-EHTR) circuit breaker that was incorrectly labeled as a spare. The letter requested initiation of a program to ensure that all breakers had been properly identified on applicable lists and drawings.

In response to this letter, Condition Identification Work Authorization (CIWA) 22839 was initiated by Engineering and Nuclear Safety (ENS) personnel on September 25, 1985, to verify Power Distribution and Motor Data (PDMD) diagrams' conformance with their respective Power Distribution Panels (PDPs) (EIIS Identifier ED-PL). This CIWA was authorized by the Shift Supervisor on October 16, 1985, and sent to the Planning and Scheduling Work Center (PSWC). The Shift Supervisor's review of the CIWA includes checking the CIWA for reportability under 10CFR50.73 and the Technical Specifications. Since the CIWA had not yet identified any discrepancies, there was no evidence of a reportable condition at this point. On October 17, 1985, the PSWC dispositioned the CIWA as a maintenance item.

The CIWA was then evaluated by On-Site Licensing personnel who determined the condition was not reportable pursuant to 10CFR21. This evaluation, required by procedure NSP-105, "Compliance with 10CFR21 Reporting of Defects and Noncompliance", was performed prior to work commencement, so there were no documented discrepancies yet. Additionally, the CIWA was designated as a maintenance versus nonconformance item, so Licensing personnel were not required to perform an in-depth evaluation of the CIWA.

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On November 18, 1985, the walkdown of PDPs was completed by ENS and Plant Maintenance Electrical (PME) personnel. After comparing the discrepancy list to applicable diagrams, the ENS engineers documented a list of 70 discrepancies on addendum pages to CIWA 22839 on January 13, 1986. Items 69 and 70 on this list addressed the problem with the power supply cables for Chemical and Volume Control (CVC) valves (EIIS Identifier CB-ISV) 218A and 218B. The two discrepancies mention that cables 30381F-SA and 30382F-SB should have been connected to the fuses for circuits 27 and 29 in PDPs 390 SA and 391 SB, respectively, but instead were connected directly to the breakers. The text of each discrepancy describes cable and PDP circuit numbers, but does not mention the components being supplied. It was therefore not obvious to the ENS engineer or other personnel reviewing the CIWA that there might be a potential for violation of the Technical Specifications (TS). Nevertheless, these items should have been recognized as nonconformances and received a more in-depth review.

This list of 70 discrepancies was divided into three categories by ENS personnel for corrective actions. The first category dealt with typographic errors on Control Wiring Diagrams (CWDs) and was evaluated by ENS on Project Evaluation Information Request (PEIR) 10257 with correction by Station Modification (SM) 1416. The second category dealt with obvious physical discrepancies which were to be corrected by PME after review by Plant Engineering (PE). Items 69 and 70 were in this category. The third category dealt with physical discrepancies with an unknown cause. These discrepancies were evaluated on PEIR 10256 by Ebasco Engineering personnel and returned to ENS on March 5, 1986. The PEIR was reviewed by ENS on March 21, 1986, and then all categories of discrepancies were sent to PE for technical evaluation.

PE completed a technical evaluation of discrepancies listed on CIWA 22839 and PEIRs 10256 and 10257 on April 15, 1986. This technical review made the determination that there were no unreviewed safety questions and no potentially reportable defects or noncompliances. This evaluation was in error since CIWA items 69 and 70 were, in fact, reportable.

CIWA 22839 remained open while PE and PME personnel coordinated efforts to correct the discrepancies. Since the technical evaluation had determined there were no reportable defects or noncompliances, no special effort was put forth to complete the corrective action for all discrepancies.

In February 1987, the M tenance Review Committee (MRC) was formed to review a backlog of open CIWAs. On April 7, 1987, the CIWA 22839 work package was sent to PME from PE when it became a maintenance review item. Since the CIWA was over a year and a half old, PME personnel performed a walkdown on items 1 through 70 and issued an updated response to each item on additional addendum pages to CIWA 22839. The response to items 69 and 70 directed relocating the cable as required. The work package was then delivered to PE on June 16, 1987 for evaluation.

On November 23, 1987, the work package was delivered to PME from PE to convert the CIWA to Condition Identifications (CIs) 252608 and 252607. Procedure UNT-5-002 was recently revised to reorganize CIWAs into CIs. Work Authorizations (WAs) are now written under a separate procedure, UNT-5-015, "Work Authorization Preparation and Implementation." When the work package was brought to the attention of a licensed operator, items 69 and 70 were recognized as reportable under 10CFR50.73(a)(2)(i)(B) per TS 3.8.4.1. In accordance with the action statement of the LCO, action was commenced to restore the fuses to operability and the affected valves were declared inoperable. Since a spring loaded bypass check valve is provided for these charging header isolation valves, and the valves remain open under accident conditions, there was no effect on CVC system operability. At least one of these valves was maintained open during repairs to avoid unnecessary opening of the spring check valve. CI 000004 was immediately generated to correct the deficiency, the cables were properly connected, and the valves declared operable at 1915 hours on November 23, 1987.

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

TS 3.8.4.1 Table 3.8-1 lists fuse pairs as backup overcurrent protection for these power supply circuits. The fuses should have been connected in series with the circuit breakers. Since the power supply cables bypassed the fuse pairs and were directly connected to the circuit breakers, the fuse pairs were inoperable, so the plant operated in a condition prohibited by Technical Specifications.

During plant construction, Cable Termination Worksheets (CTWs) were used by construction personnel to make electrical connections. The CTWs used to connect the CVC valves' power supplies were derived from CWDs. CWDs used to derive the termination sheets, LOU-1564-B-424 sheets 381S and 382S, only reference "PDP 390-SA CKT 27 (CVC-EBKR-90A-27)" and "PDP 391-SB CKT 29 (CVC-EBKR-91B-29)" as the power supplies. The CTWs direct connecting the cables to the "line" and "neutral" terminal points in each circuit. Since the CWDs imply that the power supply is connected directly to the circuit breakers, construction personnel bypassed the fuse pairs and connected the cables directly to the breakers. Since Quality Control personnel used the same documentation, they also did not notice the discrepancy.

PDMD Diagrams, LOU-1564-B-289 sheets 147 and 148, would have also been used to develop the CTWs since they show the load distribution at the PDPs. Review of construction records showed that the revision of the PDMD diagrams, LOU-1564-B-289 sheets 147 and 148, in effect at the time the termination sheets were developed did not show these circuits connected to PDP 390-SA and PDP 391-SB. These PDMDs were not updated at the time, therefore the unusual breaker-fuse combination was not noticed, and the field documentation used by construction and Quality Control personnel showed the cable connected only to the breaker. The panel was therefore originally connected in this configuration. The PDMDs have since been updated to correctly show the breaker-fuse combinations.

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The root cause of this event was cognitive personnel error by architect engineers. A contributing cause was the failure by various utility and architect engineers involved in the design and review of these systems to recognize the discrepancies. Termination sheets derived from wiring diagrams were used to connect the power supply circuits to CVC 218A and 218B, but inadvertently bypassed the fuse pairs. The technical evaluations of the CIWA and associated PEIRs failed to uncover the reportable discrepancies. Had the CIWA been dispositioned as a nonconformance item, it would have received more in-depth followup reviews which would have detecced the discrepancies at an earlier date. Since it was thought there were no reportable discrepancies or noncompliances, the CIWA was handled in a routine manner which delayed discovery of the error until conversion of the CIWA to a CI. Contributing to this delay were the backlog of open CIWAs awaiting work completion and required reviews.

The remaining discrepancies were evaluated as not being safety related on CI 252607 by PE. Corrective actions will be performed per CI 252608 by Maintenance personnel and will be completed by the end of the second Refueling Outage. Other open CIWAs have been reviewed, and no similar problems were found. Applicable CWDs are being revised to reference the TS required fuses in the power supply circuit of Table 3.8-1 of the Technical Specifications and will be completed by April 1, 1988. PE personnel have received training on the identification and dispositioning of nonconformance items. In addition to these corrective actions, NOE personnel conducted a review of applicable drawings to verify that each backup protection device was correctly shown.

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

At 1415 hours on January 26, 1988, with the plant in hot standby (mode 3), Nuclear Operations Engineering (NOE) personnel discovered that the Control Element Drive Mechanism (CEDM) Cooling Coil Water Shutoff Valve (CCWSV) CC-646 Limit Switch (EIIS Identifier CD-CCL-SHV-33) power supply did not have the backup overcurrent protection required by TS 3.8.4.1. Item 68 of TS Table 3.8-1 specifies that CEDM Cooling Valves and Dampers will have backup overcurrent protection from fuse F2 referenced on CWD 1145. This CWD shows a 120 VAC cable connection on the line side of fuse F2 to terminal 191 in Auxiliary Panel 4 Section DA. This cable provides power for the open and shut indication lights for the CEDM CCWSV on Control Panel (CP) (EIIS Identifier MCBD) 18 in the Control Room. The cable penetrates containment to connect to the open and shut limit switches for the valve. Since this cable requires backup overcurrent protection, the plant operated in a condition prohibited by Technical Specifications since initial plant startup.

The root cause of this event was cognitive personnel error by the Architect Engineer. The Architect Engineer did not ensure this circuit conformed to the Final Safety Analysis Report (FSAR) paragraph 8.3.1.1.4(d) when the CWD was revised in 1983. The FSAR specifies that 120 VAC circuits supplied by PDPs that penetrate containment must have a backup means of overcurrent protection.

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This discrepancy was discovered in a followup to corrective actions taken as a result of the bypassed CVC valves' fuses. NOE personnel were comparing the Penetration List, LOU-1564-B-316, with the CWDs and TS Table 3.8-1. The Penetration List shows all cables that enter containment through electrical penetrations. The check produced no other penetrations that lack primary and backup overcurrent protection. In order to correct the above wiring error, CI 253857 and Interim Modification DC-3014 were implemented. The cable was moved from the line side of fuse F2 to the load side by connection to Terminal 49 in Auxiliary Panel 4, Section DA and declared operable at 1433 hours on January 27, 1988. This provided the required backup overcurrent protection for the above penetration. Document Revision Notices (DRNs) I-88-000-75 and I-88-000-76 have been issued to incorporate this change into the CWDs. These revisions should be completed by April 1, 1988. Since the Penetration List review checked that design documents correctly reflect backup protection where required and CIWA 22839 checked the conformance of PDPs to the design documents, there is now a high level of confidence that all penetrations requiring backup protection are properly wired.

In order to have threatened the integrity of these containment electrical penetrations, a fault would have to occur on CVC 218A, CVC 218B, the CEDM CCWSV switches, or their associated wiring inside containment, and the associated breaker would have to fail to open. A review of maintenance history records indicates there were no equipment problems which would have challenged the overcurrent protection of the breakers. Since the circuit breakers have always been properly wired and operable, there was no health hazard or safety significance to this event.

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

SIMILAR EVENTS

NONE

PLANT CONTACT

D.E. Baker, Event Analysis & Reporting Department Head, 504/464-3133

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

LOUISIANA POWER & LIGHT / WATERFORD 3 SES • P.O. BOX B • KILLONA, LA 70066

MIDDLE SOUTH UTILITIES SYSTEM

February 25, 1988

W3A88-0014
A4.05
QA

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
Reporting of Licensee Event Report

Attached is Licensee Event Report Number LER-87-026-01 for Waterford Steam Electric Station Unit 3. This report is submitted pursuant to 10CFR50.73(a)(2)(i).

Very truly yours,

N.S. Carns
Plant Manager - Nuclear

NSC/WEM:rk

Attachment

cc: R.D. Martin, NRC Resident Inspectors Office, Records Center
(J.T. Wheelock), E.L. Blake, W.M. Stevenson, Wigginton

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