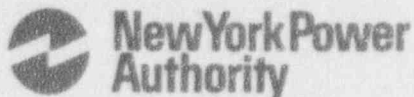


James A. FitzPatrick
Nuclear Power Plant
P.O. Box 41
Lycoming, New York 13093
315 342-3840



Harry P. Salmon, Jr.
Resident Manager

February 19, 1993
JAFF-93-0094

United States Nuclear Regulatory Commission
Document Control Desk
Mail Station P1-137
Washington, D.C. 20555

SUBJECT: DOCKET NO. 50-333
LICENSEE EVENT REPORT: 93-001-00 -
Identification of
Inadequate Breaker
Coordination Affecting
Appendix R Compliance

Dear Sir:

This report is submitted in accordance with 10 CFR
50.73(a)(2)(ii)(B).

Questions concerning this report may be addressed to
Mr. David Holliday at (315) 349-6359.

Very truly yours,

A handwritten signature in cursive script, appearing to read "H. P. Salmon, Jr.", written in dark ink.

for HARRY P. SALMON, JR.

HPS:DAH:tld
Enclosure

cc: USNRC, Region 1
USNRC Resident Manager
INPO Records Center

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LICENSEE EVENT REPORT (LER)

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.

FACILITY NAME (1)

James A. FitzPatrick Nuclear Power Plant

DOCKET NUMBER (2)

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PAGE (3)

TITLE (4) Identification of Inadequate Breaker Coordination Affecting Appendix R Compliance

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)			
YEAR	MONTH	DAY	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES		DOCKET NUMBER(S)	
0 1	2 0	9 3	9 3	0 0 1	0 0	0 2	1 9	9 3			0 5 0 0 0	
OPERATING MODE (9) N			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)									
POWER LEVEL (10) 0 2 1			20.402(b)			20.405(c)			50.73(a)(2)(iv)			73.71(b)
			20.405(a)(1)(ii)			50.36(c)(1)			50.73(a)(2)(v)			73.71(c)
			20.405(a)(1)(iii)			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)(ix)			

LICENSEE CONTACT FOR THIS LER (12)

NAME

TELEPHONE NUMBER

Mr. David Holliday, Senior Licensing Engineer

AREA CODE

3 1 5 3 4 9 - 6 3 5 9

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC

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)

INTERIM REPORT

EIIIS CODES ARE IN []

The plant was operating at 21.1 percent power while performing startup testing after an extended outage. During a study of the electrical distribution system for Appendix R concerns in 12/92, Engineering determined that the assumptions used by the architect engineer in the preparation of the original breaker coordination drawings were erroneous and that inadequate breaker coordination on a feeder breaker existed on a safety-related Motor Control Center (MCC) [ED]. The discrepancy was due to the fact that the architect engineer assumed that if coordination existed between the largest feeder breaker and the supply breaker, then all smaller feeder breakers would also be coordinated; however, that assumption was not correct in that a smaller feeder breaker of a different type (with a different time-current characteristic) may not coordinate with the supply breaker. After review and independent verification by Engineering in 1/93, it was determined that adequate breaker coordination did not exist within two fire areas, the Cable Spreading Room and the Battery Room Corridor [NA]. The NRC was notified of the Appendix R non-compliance on 1/20/93. On 1/21/93, a procedure change was made to open the feeder breaker and close the MCC supply breaker if it tripped. The feeder breaker was replaced and coordination was achieved on 1/24/93.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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.

FACILITY NAME (1) James A. FitzPatrick Nuclear Power Plant	DOCKET NUMBER (2) 0 5 0 0 0 3 3 3 9 3	LER NUMBER (6)			PAGE (3)	
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		0 0 1	0 0	0 2	OF	0 5

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

INTERIM REPORT
EIIIS CODES ARE IN []

Description

The plant was operating at 21.1 percent power while performing startup testing after an extended outage. During the performance of a base-line study of the electrical distribution system by a contracted engineering firm, New York Power Authority (NYPA) Engineering determined that the assumptions used by the original architect engineer (AE) in the preparation of the original breaker coordination drawings were erroneous and that inadequate breaker coordination on an Appendix R feeder breaker existed on a safety-related Motor Control Center (MCC) [ED]. A sequence of events follows.

A verification of breaker coordination was performed for the 4.16kV [EB] and 600VAC [ED] electrical distribution system in conjunction with the James A. FitzPatrick Nuclear Power Plant (JAF) Appendix R Safe Shutdown Capability Assessment in December, 1992. Design documents which showed the various plots of breaker time-current characteristic curves (CALC-E drawings) were utilized to verify the coordination. The CALC-E drawings depict the time-current characteristic curves for both the feeder (outgoing) breakers and the supply (incoming) breaker of a given power distribution center. This process was consistent with the methodology used during original plant design.

A review of the CALC-E drawings plots on December 21 and 22, 1992, concluded that, except for four safety-related MCCs, the safe shutdown power supplies at the 4.16kV and 600V levels have proper coordination in the event of an Appendix R fire. The four MCCs lacking adequate coordination were 71MCC-153, MCC-155, MCC-163 and MCC-165. Further reviews were conducted on these four MCCs and it was determined that the Appendix R safe shutdown capabilities were unaffected. This information was utilized as input to NYPA letter JPN-92-074 to the NRC (dated December 22, 1992) regarding the Safe Shutdown Power Supply AC-DC Coordination Analysis.

A contracted engineering firm was in the process of performing a base-line study of the JAF Electrical Distribution System. On December 22, 1992, they were requested to review the MCC one-line diagrams and front-view (layout) drawings to determine if the feeder breakers with the most limiting time current characteristic curves were shown on the CALC-E drawing plots. The engineering firm found a number of discrepancies. They performed revised plots of the applicable CALC-E drawings and submitted twelve revised plots to NYPA on December 24, 1992.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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.

FACILITY NAME (1) James A. FitzPatrick Nuclear Power Plant	DOCKET NUMBER (2) 0 5 0 0 0 3 3 3	LER NUMBER (6)			PAGE (3)		
		YEAR 9 3	SEQUENTIAL NUMBER - 0 0 1	REVISION NUMBER - 0 0			

TEXT (If more space is required, use additional NRC Form 386A's) (17)

The revised plots were received by NYPA on December 28, 1992. NYPA Engineering performed a review of the newly revised CALC-E drawings. Five of the CALC-E drawings were associated with Appendix R safe shutdown power supplies. The information was checked for accuracy (breaker types and sizes) and a coordination analysis using alternative methods was performed. On January 6, 1993, it was determined that inadequate coordination existed in all five cases.

The discrepancy between the existing CALC-E drawings and the newly revised plots was due to the fact that the Architect Engineer, Stone and Webster Engineering Corporation (SWEC), developed the original CALC-E drawings by assuming that coordination existed between the largest feeder breaker and the supply breaker, then all smaller feeder breakers would also be coordinated. This, however, proved to be an erroneous assumption since, as in the present situation, a smaller feeder breaker of a different type (with different time-current characteristic curve) may not coordinate with the supply breaker.

Through discussions with a fire protection consulting firm, it was determined that four out of the five cases would not adversely affect Appendix R compliance based on the fire areas in which the equipment and the cables were located. For the fifth case, it was determined on January 13, 1993 that a potential for non-compliance with Appendix R existed. A field walkdown was performed to verify the breaker type and size. A cable length calculation was prepared to determine if the cable impedance would sufficiently limit the fault current to achieve coordination in the fire area of concern.

The calculation was submitted for review and independent verification to NYPA Engineering on January 20, 1993. Upon completion of the review the same day, it was determined that the fault current was not limited and that adequate breaker coordination did not exist within two fire areas, the Cable Spreading Room and the Battery Room Corridor [NA]. This resulted in non-compliance with Appendix R. JAF Operations and the NRC Resident Inspector were notified on January 20, 1993.

A temporary change to Abnormal Operating Procedure AOP-43, "Plant Shutdown from Outside the Control Room", was initiated on January 21, 1993, to open the feeder breaker and reset that the MCC supply breaker if it had tripped. This temporary change was needed until the breaker was replaced.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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.

FACILITY NAME (1)

DOCKET NUMBER (2)

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James A. FitzPatrick
Nuclear Power Plant

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TEXT (If more space is required, use additional NRC Form 365A's) (17)

In parallel, the Site Engineering Group was contacted and a Design Equivalent Modification was initiated to replace the type THED-70 breaker with a smaller THED-50 in order to achieve adequate coordination. Technical Deviation Request (TDR) and Design Document Open Item were completed by January 24, 1993, to support preparation of the modification. Upon completion of the review and approval of the modification on January 21, 1991, the non-complying feeder breaker was replaced and coordination was achieved on January 24, 1993.

Cause

Normal practice during original plant design required that the largest feeder breaker of each type be plotted against the supply breaker to check for proper coordination. However, the original CALC-E drawings developed: AE only plotted the supply breaker and the largest feeder breaker regardless of the breaker type. This proved to be an erroneous practice (Cause Code B) because a smaller feeder breaker of a different type could have a more limiting time-current coordination characteristic and may not coordinate with the supply breaker.

Analysis

This event is reportable under the provisions of 10CFR 50.73(a)(2)(ii)(B) since breaker coordination did not meet the approved design bases, potentially affecting Appendix R compliance in the Cable Spreading Room and the Battery Room corridor.

The plant had been shutdown for about 400 days and was in the startup testing phase at about 21 percent power.

Although the inadequate breaker coordination resulted in non-compliance with Appendix R, Section III G, "Fire Protection of Safe Shutdown Capability", the effect of the occurrence on the margin of safety was minimal. The inadequate coordination existed in a narrow band only where fault currents 2300 to 3000 amps existed for a short period between 0.2 to 3 seconds. Because the impedance of the cable helps to limit the fault current, the fault would have to occur in the cable (not at the load). If the feeder breaker didn't trip immediately (before 0.2 seconds), there would be a race between the supply and the feeder breaker such that either breaker (or both) would trip. If the MCC supply breaker tripped, the loss of the MCC loads would be no more severe than a random failure of the MCC supply breaker. Only one safety related train was affected. Once the inadequate coordination was discovered, a temporary change to the shutdown procedure to take mitigating steps and a permanent breaker replacement modification was quickly implemented.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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-330), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) James A. FitzPatrick Nuclear Power Plant	DOCKET NUMBER (2) 0 5 0 0 0 3 3 3 9 3 - 0 0 1 - 0 0 0 5 OF 0 5	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		

TEXT (If more space is required, use additional NRC Form 306A's) (17)

Corrective Actions

1. A temporary change was initiated to the Procedure AOP-43 to open the non-complying feeder breaker and close the MCC supply breaker if it tripped. Completed - January 21, 1993.
2. Design Equivalent Modification DEM-93-005 was implemented to replace the feeder breaker and achieve proper coordination on 71MCC-262. Completed - January 24, 1993.
3. Electrical Coordination Adequacy Forms (ECAFs) have been prepared to review all the newly replotted CALC-E drawings including those associated with non-safety related power supplies. Completed - February 9, 1993.
4. Complete the review of the Electrical Distribution System base-line study and prepare ECAFs for the remaining CALC-E drawings. Completion date - December 31, 1994.

Additional Information

Failed Components: None

Previous Similar Events: LER-92-042 - Postulated Unavailability of Emergency Service Water and Standby Gas Treatment Due to Electrical Miscoordination

Related Industry Experience: NRC Generic Letter - 88-15, Inadequate Control Over Design Processes (Part 5 - inadequate breaker coordination found during a fire protection program audit)