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October 26, 1999

United States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Operating License DPR-74
Docket No. 50-316

Document Control Manager:

In accordance with the criteria established by 10 CFR 50.73 entitled Licensee Event Report System (LER), the following report is being submitted:

LER 316/99-003-00, "Fuses Not Installed for Cable Passing through Containment Penetration".

The following commitment was identified in this submittal:

- A permanent design change is being developed that will install fuses to provide redundant overcurrent protection for containment penetration 2-CEP-3P3. The design change will be implemented prior to restart of Unit 2.

Sincerely,

for M W Rencheck.

M. W. Rencheck
Vice President – Nuclear Engineering

/mbd
Attachment

IE22

PDR ADOCK

c: J. E. Dyer, Region III
R. P. Powers
J. E. Pollock
R. C. Godley
R. Whale
D. Hahn
Records Center, INPO
NRC Resident Inspector

NRC Form 366 (6-1998) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), 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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TITLE (4)

Fuses Not Installed for Cable Passing through Containment Penetration

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 NAME	DOCKET NUMBER
09	26	1999	1999	--	003	--	00	10	26	1999	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	-	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
POWER LEVEL (10)	00	20.2201 (b)	20.2203(a)(2)(v)	50.73(a)(2)(i)	50.73(a)(2)(viii)
		20.2203(a)(1)	20.2203(a)(3)(i)	X 50.73(a)(2)(ii)	50.73(a)(2)(x)
		20.2203(a)(2)(i)	20.2203(a)(3)(ii)	50.73(a)(2)(iii)	73.71
		20.2203(a)(2)(ii)	20.2203(a)(4)	50.73(a)(2)(iv)	OTHER
		20.2203(a)(2)(iii)	50.36(c)(1)	50.73(a)(2)(v)	Specify in Abstract below or n NRC Form 366A
		20.2203(a)(2)(iv)	50.36(c)(2)	50.73(a)(2)(vii)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Mr. D. C. Kosloff, Compliance Engineer	616/465-5901, x2129

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
X	YES (If Yes, complete EXPECTED SUBMISSION DATE).		NO		02	04	2000

Abstract (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On September 26, 1999, during an inspection of a Unit 2 electrical cabinet, maintenance personnel were unable to find fuses for the lighting transformer power cable that passes through containment penetration 2-CEP-3P3. The fuses and the associated fuse holder were within the scope of a plant modification that was installed in 1979. The modification provided redundant fault protection for containment electrical penetrations. Without the fuses, penetration 2-CEP-3P3 was vulnerable to damage by fault currents if a single circuit breaker failed during certain electrical faults. This LER is therefore submitted in accordance with 10 CFR 50.73(a)(2)(ii)(B), to report a condition found while the reactor is shut down, that, had it been found while the reactor was in operation, would have resulted in the nuclear power plant being outside the design basis of the plant.

The cause of the failure to install the fuses could not be determined. The modification package, which should have installed the fuses to provide redundant fault protection for containment electrical penetrations, was reviewed, and there was no apparent requirement to verify installation of the fuses. This may have contributed to the failure to install the fuses. A permanent design change is being developed to install the fuse holder and fuses.

The evaluation of the safety signficance is not yet complete. The result of the evaluation will be submitted in a supplement to this LER.

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

Conditions Prior to Event
Unit 2 was Shutdown and Defueled

Description of Event
On September 26, 1999, maintenance personnel were preparing to install a temporary modification to provide the Unit 2 containment area lighting transformer with temporary power. The temporary modification required temporary power cables to be terminated outside containment at a fuse holder for fuses shown on plant drawings OP-2-12002-22 and PS2-93201-6.

Maintenance personnel were unable to locate the fuse holder and fuses for the 600 VAC power cable that enters the Unit 2 containment through containment penetration 2-CEP-3P3, and powers a containment area lighting transformer inside containment. The cable and the transformer it supplies are not safety related components; however, the cable must have redundant, safety related overcurrent protection to protect the safety related containment electrical penetration in case the cable is subjected to certain fault currents.

The fuses and the associated fuse holder were included in the scope of a plant modification, Request for Change (RFC) 2-2202, that was installed in December 1979. RFC 2-2202 provided instructions for installing redundant circuit protection, circuit breakers or fuses, for approximately 60 circuits. As a result of the missing fuses, the Unit 2 lighting circuit did not meet the requirement to have redundant electrical circuit protection for containment penetration 2-CEP-3P3. The fuses should have been installed by January 12, 1980, when Unit 2 entered Mode 4 during startup from its first refueling outage.

Plant walkdowns in September 1999 after discovery of the condition confirmed that the other sets of fuses had been installed by RFC 2-2202 in Unit 2, and that Unit 1 also has the protective fusing installed.

Cause of Event
The cause of the failure to install the fuses could not be determined. There was no indication of verification of fuse installation included in the modification package. Although the applicable plant drawings had been revised and personnel had certified that the entire modification had been completed, there was no specific documentation that the fuses had been installed. No job orders or similar documentation associated with the modification could be found. In addition to the lack of documentation pertaining to installation, no post installation testing, such as a continuity check across the fuses, was specified by the modification

Analysis of Event
This LER is submitted in accordance with 10 CFR 50.73(a)(2)(ii)(B), to report a condition found while the reactor is shut down, that, had it been found while the reactor was in operation, would have resulted in the nuclear power plant being outside the design basis of the plant.

The primary containment system is a safety related system that is one of the three physical barriers that provide a fission product release barrier during normal and accident conditions. Electrical containment penetrations allow electrical cables and wires to penetrate containment while maintaining containment integrity under normal and accident conditions.

A postulated random single failure of the 2-21D3 600 VAC circuit breaker without redundant circuit protection could have allowed consequential electrical faults to threaten the integrity of containment penetration 2-CEP-3P3. This penetration has 24 conductor feed throughs, of which 12 are used. All conductors which use the penetration are for nonsafety related loads.

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

Electric circuits that penetrate containment carry augmented design criteria as described in Regulatory Guide 1.63, Revision 2, and IEEE 317-1972. The portion of the electric circuit inside containment is considered susceptible to a "consequential" fault failure arising due to postulated single credible malfunctions or events, such as a loss of cooling accident. Therefore, redundant circuit protection is required to account for a postulated random single failure of a circuit breaker or set of fuses.

During the DC Cook licensing process, an AEP to NRC letter dated September 29, 1975, stated that DC Cook did not employ redundant protective devices for 600 VAC electric circuits penetrating containment, as recommended by Paragraph C.1 to Revision 0 of Regulatory Guide 1.63. Regulatory Guide 1.63 provided additional recommendations to supplement the design guidance in Section 4 of IEEE 317-1972. Subsequently, the NRC conditioned the DC Cook Unit 2 license on the installation of redundant electrical protection for 600 VAC circuits penetrating containment. This was the subject of Unit 2 License Condition 2.C.(3)(m), which was deleted on May 13, 1980. A similar modification for Unit 1 was completed later.

The impact of a postulated consequential electrical fault would have depended on the fault location in relation to the lighting transformer. If the postulated fault had occurred between the transformer primary windings and the containment penetration, redundant circuit breaker protection would have been available because such a fault would have been large enough to trip the switchgear feeder breaker if the postulated lighting circuit breaker failure had occurred. Therefore, no penetration damage could have occurred.

If a fault would have occurred between the transformer secondary windings and the lighting loads, the containment penetration could have been damaged. This is because transformer impedance would probably have reduced the fault current through the penetration, such that the current would not have been high enough to trip the switchgear feeder breaker, but could still have been large enough to damage the penetration.

Even the smaller fault would have been unlikely to cause damage to the containment penetration. This is because of the reliability of circuit breaker 2-21D3. IEEE Standard 500, "Reliability Data", states that the expected failure rate for similar breakers is 2.0 failures per 1,000,000 hours. The maintenance history of circuit breaker 2-21D3 did not reveal any incidents when the breaker failed to operate when required, and the only maintenance performed on the breaker has been preventive maintenance. Additionally, the test report for penetration 2-CEP-3P3 was reviewed, as well as the solid state trip (SST) device setting for breaker 2-21D3. This review confirmed that the setpoint for the 21D3 SST would protect the penetration.

However, if 2-21D3 failed to open and the fault occurs between the transformer secondary windings and the lighting loads, some damage to the penetration could be postulated. The extent of the postulated damage is still being evaluated, and thus the overall safety signficance of the condition cannot be determined at this time. Once this information is available, a supplement to this LER will be submitted.

Corrective Actions

No immediate corrective actions were necessary as this condition was discovered with fuel offloaded from both units.

Walkdowns were completed in both units to confirm that all penetrations which required redundant electrical protection had such protection installed.

A permanent design change is being developed that will install fuses. The design change will be implemented prior to restart of Unit 2.

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

The potential for general improvements in work control indicated by this event had been previously recognized. Significant improvements have been implemented since the time frame of this event in job order instructions and worker practices that help assure that work is completed as planned and documented.

AEP:NRC:1260GH, "Enforcement Actions 98-150, 98-151, 98-152 and 98-186, Reply to Notice of Violation Dated October 13, 1998", dated March 19, 1999, responded to identified programmatic weaknesses in control of plant design. The Engineering Leadership Plan establishes a configuration management program to control plant design and a new design control process, which includes design document control and testing of design changes. Restart Action Plan Item No. 3A, "Uncontrolled/Unintended Plant Design Changes," will address installation of plant changes and post modification testing.

The root cause investigation of this condition has not been completed. If that investigation should reveal significant information different from that which has been submitted, that information will be included in the supplement that addresses safety significance.

Previous Similar Events

315/99-019-00
315/99-017-00
315/98-013-01
315/98-012-01
315/97-005-01
316/97-010-01
316/97-009-01
315/77-006