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AEP
INDIANA
MICHIGAN
POWER

September 29, 2000

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

Operating Licenses DPR-74
Docket Nos. 50-316

Document Control Manager:

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

LER 316/99-003-01, "Fuses Not Installed for Cable Passing Through Containment Penetration."

No commitments were identified in this submittal.

Should you have any questions regarding this correspondence, please contact Mr. Wayne J. Kropp, Director Regulatory Affairs, at 616/697-5056.

Sincerely,

Joseph E. Pollock

Joseph E. Pollock
Plant Manager

/inj
Attachment

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IE22

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	--	01	09	29	2000	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)
Ronald Gaston, Regulatory Compliance Manager	616/465-5901, x1366

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
	YES (If Yes, complete EXPECTED SUBMISSION DATE).	X NO				

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 its design basis. This LER supplement is being submitted to include the results of the evaluation of the safety significance.

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. Fuses for the protection of penetration 2-CEP-3P3 were installed prior to the unit's return to service in June, 2000.

Assuming the worst case location of a fault and failure of the upstream breaker to trip, some damage to the penetration could be postulated. The likely failure mode would be for the seals on the penetration feed-through assembly to fail. This potential loss of containment integrity would likely be limited to the feed-through assembly itself. The combination of events required to present a challenge to containment integrity through this penetration have a low probability of occurrence. It was estimated that, in the unlikely event that a release did occur, the dose consequences would remain within regulatory limits. Therefore, the safety significance of this condition is considered low.

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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 supplies 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. In addition to the lack of documentation pertaining to installation, no post installation testing, such as a continuity check across the fuses, was required by the modification package.

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.

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 coolant

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 containment 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. In addition, based on data provided in NUREG/CR 4550, the probability of a circuit breaker failing to trip is 3E-3 per demand. 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.

In the event that 2-21D3 did fail to open and the fault occured between the transformer secondary windings and the lighting loads, some damage to the penetration could be postulated. The likely failure mode would be for the seals on the penetration feed-through assembly to fail. This potential loss of containment integrity would likely be limited to the feed-through assembly itself. The combination of events required to present a challenge to containment integrity through this penetration have a low probability of occurrence. It was estimated that, in the unlikely event that a release did occur, the dose consequences would remain within regulatory limits. The safety significance of this condition is considered low.

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.

Fuses for the protection of penetration 2-CEP-3P3 were installed prior to the unit's return to service in June, 2000.

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.

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

The corrective actions to prevent recurrence for the root cause of the generic inadequacies of the design control process are being addressed through the CNP Corrective Action Program. The root cause evaluation identified numerous corrective actions to address management, organizational, and programmatic issues in the Engineering organization. Actions specific to restart of the CNP units have been tracked and completed as part of the CNP Restart Plan.

Previous Similar Events

As the cause of the event could not be determined, previous similar events based on failure to implement effective corrective action could also not be determined.