

CATEGORY 1

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 9810020421 DOC. DATE: 98/09/30 NOTARIZED: NO DOCKET #
 FACIL: 50-315 Donald C. Cook Nuclear Power Plant, Unit 1, Indiana M 05000315
 AUTH. NAME AUTHOR AFFILIATION
 FINISSI, M. Indiana Michigan Power Co.
 SAMPSON, J. R. Indiana Michigan Power Co.
 RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 98-040-00: on 980831, ESF actuation & start of EDGs 1 CD
 & 2 CD, occurred. Caused by equipment failure. Cable fault was
 located & failed section cut out & cable spliced. With 980930
 ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 5
 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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Indiana Michigan
Power Company
Cook Nuclear Plant
One Cook Plant
Bridgman, MI 49106
616 465 5501



September 30, 1998

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

Operating License DPR-58
Docket No. 50-315

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:

98-040-00

Sincerely,

J. R. Sampson
Site Vice President

/mbd"

Attachment

c: J. L. Caldwell (Acting), Region III
R. P. Powers
P. A. Barrett
J. B. Kingseed
R. Whale
D. Hahn
Records Center, INPO
NRC Resident Inspector

9810020421 980930
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LICENSEE EVENT REPORT (LER)

(See reverse for required number of
digits/characters for each block)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-8 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

FACILITY NAME (1) Cook Nuclear Plant Unit 1										DOCKET NUMBER (2) 50-315		PAGE (3) 1 of 4			
TITLE (4) ESF Actuation and Start of Emergency Diesel Generators 1 CD and 2CD Due to Faulted Underground Cable															
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 Cook - Unit 2		DOCKET NUMBER 50-316				
08	31	98	98	-- 040	-- 00	09	30	98	FACILITY NAME		DOCKET NUMBER				
OPERATING MODE (9)		5		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)				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)				X 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 in NRC Form 366A	
				20.2203(a)(2)(iv)				50.36(c)(2)				50.73(a)(2)(vii)			
LICENSEE CONTACT FOR THIS LER (12)															
NAME Mr. Mike Finissi, Electrical System Engineering Manager										TELEPHONE NUMBER (Include Area Code) 616/465-5901, x2830					
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 15 single-spaced typewritten lines) (16)

On August 31, 1998, at 1520 hours EDT with Units 1 and 2 in Cold Shutdown, one bus of reserve power was lost to both units due to the failure of a station service transformer. The Unit 1 CD Emergency Diesel Generator (EDG) and the Unit 2 CD EDG both started and picked up load. At 1830 hours EDT this event was reported in accordance with 10CFR50.72(b)(2)(ii), as an actuation of an Engineered Safety Feature. This LER is therefore reported in accordance with 10CFR50.73(a)(2)(iv), any event that resulted in an automatic actuation of any Engineered Safety Feature.

The root cause of this event was equipment failure. The failure of a 12kV underground cable due to age degradation caused the failure of the station service transformer. The failed cable section was replaced, as was the failed transformer. The 12kV cable will be replaced and a setting change to improve the coordination of the fuse/differential relay has been proposed.

The safety significance of this event was evaluated and found to be minimal. All actions expected to occur upon a loss of power to a bus occurred as expected, including load shed and start of the CD EDGs on both units. The health and safety of the public were never jeopardized.

LICENSEE EVENT REPORT (LER)
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		98	--	040	--	00

Cook Nuclear Plant Unit 1

50-315

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

Conditions Prior to Event

Unit 1 was in Mode 5, Cold Shutdown

Unit 2 was in Mode 5, Cold Shutdown

Description of Event

On August 31, 1998, at 1520 hours, the Phase 1-to-2 preferred source station service transformer faulted internally, placing a phase-to-phase fault on the 34.5kV feed to the CD reserve auxiliary transformers. The 34.5kV lead bus differential relays, 87-TCDLD (phase 1 & phase 2), located in the Unit 1 control room, detected this fault. Phases 1 and 2 of these relays operated to trip the 87X-T101CD and 87X-T201CD HEA lockout relays, which tripped breaker 12CD, de-energizing Reserve Auxiliary Transformers 101CD and 201CD, and tripped the reserve feed 4kV breakers on buses 1C, 1D, 2C, and 2D. Because of the loss of voltage on the safety busses supplied from these busses, the CD Emergency Diesel Generators (EDGs) in both units started and loaded.

The loss of power to the CD busses resulted in a very brief loss of the operating Residual Heat Removal (RHR) pump in each unit. Upon auto start of the EDGs, the operators manually started the pumps and placed RHR back in service.

Cause of Event

The cause of this event was equipment failure. The failure of a 12kV underground cable due to age degradation was identified as the initiating action of this event, causing the transformer failure.

The 500KVA 34.5/12kV transformer that faulted had its top blown off from the pressure generated by the internal fault. The two 34.5kV fuses feeding it were blown, as was the 12kV fuse protecting the phase 1 cable supplying Station Service Center #2. Because of the blown fuse, the cable was tested and found faulty. The fault was located and identified as a dielectric failure due to age degradation.

Analysis of Event

This event was reported via the ENS on August 31, 1998 at 1830 hours EDT in accordance with 10CFR50.72(b)(2)(ii), as an actuation of an Engineered Safety Feature. This LER is therefore reported in accordance with 10CFR50.73(a)(2)(iv), any event that resulted in an automatic actuation of any Engineered Safety Feature.

The automatic responses to this event were correct and in accordance with plant design. Upon operation of the undervoltage relays on the Train A safety busses on each unit, load shed and start of the Unit 1 and Unit 2 CD EDG occurred. The EDGs picked up load as designed, re-supplying power to the CD busses on each unit. A summary of operations that outlines the expected and actual sequence of events is provided on the next page.

The trip of the operating Residual Heat Removal (RHR) pump for both units did not result in an increase in reactor coolant system temperature in either unit. The pumps were restarted by the operators and RHR restored.

When this event occurred, one of the Unit 2 AB battery chargers exhibited lower than normal output voltage. The redundant battery charger was put in service and battery voltages were returned to normal. The investigation of the problem is being carried out separately.

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

ANALYSIS OF EVENT (cont'd)

When this event was reported via the ENS, it was mentioned that a Unit 1 Non-Essential Service Water pump load shed signal would not reset. It could not be determined why the signal would not reset at that particular time, as the signal was later reset by the next Operations shift.

Summary of Operations

Expected

Actual

Fault detected by Lead Differential Relays
Operation of T101CD and T201CD Lockout relays
Tripping of 34kV CB 12CD
Tripping of 4kV CBs 1C4, 1D3, 2C4 & 2D3
Operation of Undervoltage relays on Train A
Safety busses on both units
Load shed and Emergency Diesel Generators CD start on both units.
Auto loading of Train A safety busses-Unit 1

As expected
As expected
As expected
As expected
As expected
As expected
As expected: Auto start of East Component Cooling Water pump, East Essential Service Water pump, North Non-Essential Service Water pump
As expected: Auto start of the East Component Cooling pump, East Essential Service Water pump, North Non-Essential Service Water pump

Auto loading of Train A safety busses-Unit 2

The responses of the equipment and plant were evaluated for safety significance. All actions expected to occur upon a loss of power to a single bus occurred as expected, including load shed and start of the CD EDGs on both units. The safety significance of this event is minimal and the health and safety of the public were never jeopardized.

Corrective Actions

The cable fault was located and the failed section was cut out, and the cable spliced. An adjacent cable had damage to its covering due to the failure and was also repaired. The failed transformer was removed, and replaced with an on site spare.

The 12kV cables used for power distribution in the switchyards will be replaced with cable having a higher voltage rating and better insulation material. The existing cable is rated 15kV; the replacement cable will be at least 19.9kV. The existing cable's insulation was made of polyethylene, with a life expectancy of 30 years. Experience has found that the polyethylene cable typically has lasted about 25 years. The expected life of the new cable is 40 years. This cable is made of tree-retardant crosslinked polyethylene insulation and has a jacket to keep moisture out.

Other applications using the old style cable were considered for possible replacement. However, it was determined that the only other application of this cable is for roadway lighting outside the protected area. This cable will not be replaced.

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

CORRECTIVE ACTIONS (cont'd)

A setting change to improve the coordination of the fuse/differential relay has been proposed. This would increase the pick-up point and operating time of the relay to allow the 34.5kV fuses to blow and clear the fault before the relay will pick up. This will require revision of the appropriate calculation and initiation of a relay set-point change. Once the calculation is completed and reviewed, the possibility of a set-point change will be evaluated. If appropriate, a new relay setting sheet will be issued.

An engineering review of the benefit of removing the station service from the CD reserve feed, and of the 34kV station design will be performed.

Failed Component Identification

Not Applicable

Previous Similar Events

None