FORD 1

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9112020127 DOC.DATE: 91/11/15 NOTARIZED: NO DOCKET #
FACIL:50-315 Donald C. Cook Nuclear Power Plant, Unit 1, Indiana M 05000315
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BLIND,A.A. Indiana Michigan Power Co. (formerly Indiana & Michigan Ele
RECIP.NAME RECIPIENT AFFILIATION
Document Control Branch (Document Control Desk)

SUBJECT: Revised LER 91-007-01:on 910819,control bank A ordered into core by rod control sys but appeared not to move into core by observation of analog rod position indication.Caused by multiplexing relay MXR-1 in power cabinet 2AC.W/911115 ltr.

DISTRIBUTION CODE: IE22D COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 4
TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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AEP
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November 15, 1991

United States Nuclear Regulatory Commission
Document Control Desk
Rockville, Maryland 20852

Operating Licenses DPR-58
Docket No. 50-315

Document Control Manager:

In accordance with the criteria established by 10 CFR 50.59 entitled Licensee Event Report System, the following report is being submitted:

91-007-01

Sincerely,

for A. A. Blind
Plant Manager

AAB:sb

Attachment

c: D. H. Williams, Jr.
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NOV 2 1 1991

NRC FORM 366 (6-89) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92

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.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
D. C. Cook Nuclear Plant - Unit 1	0 5 0 0 0 3 1 5	1 OF 0 3

TITLE (4) Shutdown Rods Mispositioned During Attempt To Move Control Rods Due To Malfunction Of Multiplexing Relay In The Rod Control System

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)
0 8	1 9	9 1	9 1	— 0 0 7	— 0 1	1 1	1 5	9 1		0 5 0 0 0
										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
T. P. Beilman - Maintenance Superintendant	AREA CODE 6 1 6 4 6 5 - 5 9 0 1

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

CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS	
E	A A	R L Y	C 3 4 6	N							

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)

This revision provides information on the results of the root cause analysis and corrects the Failed Component Identification information.

On August 19, 1991, during routine surveillance testing of the full length rods, Control Bank A was ordered into the core by the Rod Control System but appeared not to move into the core by observation of the Analog Rod Position Indication. Further positioning of Control Bank A resulted in an Urgent Alarm being received. Initial troubleshooting of the Rod Control System found no reason for the Urgent Alarm and it was reset. The rods were moved per the test requirements and the surveillance completed.

At approximately 1200, a rod misalignment in Shutdown Bank A, Group 2 was suspected due to additional small amount of dilution required to keep thermal power at the pre-surveillance level and a decrease in the Analog Rod Position Indication for Shutdown Bank A, Group 2 in relation to pre-surveillance readings. At 1305 hours the flux mapping system was used to determine that the 4 rods of Shutdown Bank A, Group 2 were inserted approximately 6 steps into the core. Further troubleshooting of the Rod Control System discovered a failure of the 2AC Power Cabinet Multiplexing Relay, MXR-1. It was replaced and proper operation of the Rod Control System was verified. The misaligned rods of Shutdown Bank A were brought out to the top of the core and normal operation resumed at 1605 hours.

Conditions Prior to Occurrence

Unit One in Mode One at 100 Percent Rated Thermal Power.

Description of Event

On August 19, 1991, during routine surveillance testing of the full length control rods, Control Bank A was ordered 8 steps into the core by the Rod Control System (EIIS/AA) but appeared not to move into the core by observation of the Analog Rod Position Indication. Control Bank A was ordered another 2 steps into the core, leaving both group demand counters at 218 steps. The bank was ordered out of the core 4 steps and an Urgent Alarm was received. Further movement of the rods was discontinued pending investigation of the alarm. It was then noticed that Group 2 remained at 218 steps. The shutdown margin was then verified to known plant conditions at the time.

Initial troubleshooting of the Rod Control System found no reason for the Urgent Alarm but it was noted that Power Cabinet 2AC (EIIS/AA-JX) was selecting Shutdown Bank A instead of Control Bank A. As it was presumed to be selected by the control room, the alarm was reset and the rods were moved per the test requirements and the surveillance completed. Subsequent discussions with control room personnel indicated that no other rod bank had been selected. At approximately 1200, a rod misalignment in Shutdown Bank A, Group 2 was suspected due to additional small amount of dilution required to keep thermal power at the pre-surveillance level and a decrease in the Analog Rod Position Indication for Shutdown Bank A, Group 2 in relation to pre-surveillance readings.

At 1305 hours the flux mapping system was used to determine that the 4 rods of Shutdown Bank A, Group 2 were inserted approximately 6 steps into the core and entry into Technical Specification 3.0.3 began at this time. The flux mapping system was also used to verify that any other banks involved with Power Cabinet 2AC were not misaligned. The banks checked were Control Bank A, Control Bank C and also Shutdown Bank A, Group 1. At 1403 hours reactor power reduction began and an Unusual Event was declared.

Further troubleshooting of the Rod Control System discovered a failure of the 2AC Power Cabinet Multiplexing Relay, MXR-1 (EIIS/AA-RLY). It was replaced and proper operation of the Rod Control System was verified. When tested later on the bench, the relay exhibited fluctuating coil circuit readings out of the circuit.

Notification of the event was made on the ENS at 1500 hours. Each of the misaligned rods of Shutdown Bank A was brought out to the top of the core, one at a time, while verifying that reactivity changes remained within limits. The Unusual Event was terminated at 1605 hours.

Further research was conducted as to the possibility of the root cause being due to the Stationary B Firing card and/or the Signal Process card. Based on the available information and the satisfactory operating results since the event, the intermittent failure of MXR-1 is believed to be the cause of failure.

Cause of Event

The rod misalignment was due to failure of the Multiplexing Relay, MXR-1, in Power Cabinet 2AC which allowed Shutdown Bank A, Group 2 to move while Control Bank A was selected.

Analysis of Event

Technical Specification 3.1.3.4 addresses the situation of only one shutdown rod below the insertion limit of 228 steps (fully withdrawn). As four shutdown rods were below this limit and required entry into Technical Specification 3.0.3, this event is considered to be reportable pursuant to 10CFR50.73(a)(2)(i)(B) as an operation prohibited by the Plant's Technical Specifications.

Safety consequences of the event were evaluated and determined to be insignificant. Flux mapping measurements taken prior to the event (August 6, 1991) shows the following:

1)	Margin in Heat flux hot channel factor	20.6%
2)	Margin in Nuclear enthalpy hot channel factor	7.6%
3)	Margin in Allowable power level	9.7%

These margins can easily accommodate possible increase in peaking factors due to insertion of shutdown bank A by six steps. Also, a review of the Reload Safety Evaluation indicates an excess shutdown margin of 1817 pcm. This excess offsets any reduction in the shutdown margin due to insertion of Shutdown Bank A by six steps.

Corrective Action

Multiplexing Relay MXR-1 of Power Cabinet 2AC was replaced and proper operation of the Rod Control System was verified. The misaligned rods of Shutdown Bank A were then brought out to the proper position at the top of the core, one at a time. Subsequent use of the control rods to complete planned shutdown activities and routine surveillance testing has been satisfactory with no similar problems occurring.

Failed Component Identification

Unit One Rod Control System, Power Cabinet 2AC, Multiplexing Relay MXR-1
Plant Designation: 2-RCS-2AC, 2A1MXR1
Manufacturer: C.P. Clare and Company
Model: HG3A-1004
EIIS Code: AA-RLY

Previous Similar Events

None