

CATEGORY 1

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 9711180190 DOC.DATE: 97/11/14 NOTARIZED: NO DOCKET #
 FACIL: 50-315 Donald C. Cook Nuclear Power Plant, Unit 1, Indiana M 05000315
 AUTH.NAME AUTHOR AFFILIATION
 MANGAN, P. Indiana Michigan Power Co.
 BLIND, A.A. Indiana Michigan Power Co.
 RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 97-023-01: on 970916, design change introduces possibility
 of single failure which could result in loss of both trains
 of ESF ventilation, was determined. Caused by failure to
 identify adverse impact. Design change revised. W/971114 ltr.

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Indiana Michigan
Power Company
One Cooper Place
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November 14, 1997

United States Nuclear Regulatory Commission
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Operating Licenses 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:

97-023-01

Sincerely,

A handwritten signature in dark ink, appearing to read 'A. A. Blind'.

A. A. Blind
Site Vice President

/mbd

Attachment

c: A. B. Beach, Region III
E. E. Fitzpatrick
P. A. Barrett
S. J. Brewer
J. R. Padgett
D. Hahn
Records Center, INPO
NRC Resident Inspector

9711180190 971114
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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 INFORMATION AND RECORDS MANAGEMENT BRANCH (MNB87714), 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)
Donald C. Cook Nuclear Plant - Unit 1DOCKET NUMBER (2)
50-315

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TITLE (4)

Design Change Introduces Possibility of Single Failure Which Could Result in Loss of Both Trains of ESF Ventilation Due to Failure to Identify Adverse Impact During Design Review

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	16	97	97	-- 023 --	01	11	14	97	Cook - Unit 2	50-316
									FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 50.73(a)(2)(iii) (Check one or more) (11)			
POWER LEVEL (10)	0	20.2201(b)	20.2203(a)(3)(i)	50.73(a)(2)(iii)	73.71(b)
		20.2203(a)(1)	20.2203(a)(3)(ii)	50.73(a)(2)(iv)	73.71(c)
		20.2203(a)(2)(i)	20.2203(a)(4)	50.73(a)(2)(v)	OTHER
		20.2203(a)(2)(ii)	50.36(c)(1)	50.73(a)(2)(vii)	(Specify in Abstract below and in Text, NRC Form 366A)
		20.2203(a)(2)(iii)	50.36(c)(2)	50.73(a)(2)(viii)(A)	
		20.2203(a)(2)(iv)	50.73(a)(2)(i)	50.73(a)(2)(viii)(B)	
		20.2203(a)(2)(v)	X 50.73(a)(2)(ii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME
Mr. Pat Mangan, Mechanical Design Engineering SupervisorTELEPHONE NUMBER (Include Area Code)
616/697-5198

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRPDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRPDS

SUPPLEMENTAL REPORT EXPECTED (14)

YES	X	NO
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EXPECTED SUBMISSION DATE (15)

MONTH DAY YEAR

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

On September 16, 1997, with Units 1 and 2 in Mode 5, it was determined that a design change to the bypass dampers for the Engineered Safeguards Features (ESF) ventilation system installed between December 1996, and August, 1997 introduced the possibility of a single failure which could result in the loss of both trains of the ESF ventilation system. The loss of the 85 psig air header without concurrent loss of the 20 psig air header would result in the ESF ventilation trains being unable to meet their design function. On September 16, 1997, this event was reported via ENS under 10CFR50.72(b)(2)(i), as an event found while the reactor was shutdown that resulted in an unanalyzed condition. This LER is therefore submitted in accordance with 10CFR50.73(a)(2)(ii), as an event found while the reactor was shutdown that resulted in an unanalyzed condition, and a condition outside the design bases.

The root cause of the event is the failure of the design change process to identify the potential adverse impact on the ESF ventilation system created by the modification of the control air supply to the bypass dampers. Installation of a supply to the inlet damper actuators from the 85 psig header via a pressure reducing valve was completed on November 5, 1997. This modification placed both the inlet and bypass dampers on the same supply header. The Design Change Reference Guide will be revised to explicitly require the consideration of the effects of a proposed change of the air system on a "header by header" basis and the analysis of individual source failures.

Based on the low probability of the series of events necessary to prevent the ESF ventilation trains from performing their design functions, and the Probabilistic Risk Assessment results, it has been concluded that this condition had low safety significance, and did not endanger the health or safety of the public at any time.

LICENSEE EVENT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), 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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Cook Nuclear Plant - Unit 1		50-315	YEAR	SEQUENTIAL	REVISION	2 OF 4
			97	-- 023 --	01	

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

Condition Prior to Event

Unit 1 was in Mode 5, Cold Shutdown

Unit 2 was in Mode 5, Cold Shutdown

Description of Event

On September 16, 1997, it was determined that a design change to the bypass dampers for the ESF ventilation system installed between December 1996, and August, 1997 introduced the possibility of a single failure which could result in the loss of both trains of the ESF ventilation system. The condition was identified while reviewing questions raised by an NRC Architect Engineering Design Inspection team.

The control air system for Cook is provided from the compressors at 100 psig and reduced to provide air to three additional headers, the 85 psig, 50 psig and 20 psig. Each of these headers is independent of the others, provided with separate sets of regulators and isolation valves. Each of the headers provides air to a set of components, which require air delivered at a specific pressure to actuate.

To improve system performance, a design change had installed new bypass dampers on the ESF ventilation system trains that were more leak tight than the ones previously installed. The new dampers required higher air pressure to actuate, and the air supply to the actuators was moved from the 20 psig header to the 85 psig header. The actuators for the inlet dampers on those same ventilation trains were left on the 20 psig header. This created the potential for a single failure, the loss of the 85 psig header without concurrent loss of the 20 psig header, which could result in loss of both trains of ESF ventilation. This would happen when the normally open bypass dampers would fail closed on loss of the 85 psig air, while the normally closed inlet dampers would remain closed since their air supply had not been affected.

Cause of Event

The root cause of the event is the failure of the design change process to identify the potential adverse impact on the ESF ventilation system created by the modification of the control air supply to damper actuators. It was determined that the only failures generally considered were loss of electrical power, and total loss of air. Failure of the system, on a "header by header" basis, was not considered, nor was it required to be considered by the governing procedure.

Analysis of Event

This event was initially reported via the ENS under 10CFR50.72(b)(2)(i), as an event found while the reactor was shutdown that resulted in an unanalyzed condition, on September 16, 1997 at 1620 hours EDT. This written report is there submitted in accordance with 10CFR50.73(a)(2)(ii), as an event found while the reactor was shutdown that resulted in an unanalyzed condition, and was outside the design bases.

The Updated Final Safety Analysis Report (UFSAR), Chapter 9, Section 9.9.3.1, states: "Normally one fan/filter unit operates continuously, directing the exhaust air through the roughing filter and high efficiency particulate air filter, bypassing the charcoal filter, and discharging it to the unit vent. This operation aids in the air distribution within the auxiliary building, isolates the atmosphere in the enclosures by inducing a draft through the entering portals and

LICENSEE EVENT CONTINUATION

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

Analysis of Event (cont'd)

removes any heat generated within the enclosures." UFSAR Section 9.9.3.1 also states: "In the event of a Phase B Isolation signal the standby fan/filter unit is energized and the charcoal filter bypasses are automatically closed and the air is directed through the charcoal filters in addition to the roughing and high efficiency particular air filters.

Technical Specification (T/S) 3.7.6.1 requires that two independent ESF ventilation system exhaust air filter trains be operable in Modes 1, 2, 3, and 4. T/S Bases for 3.7.6.1 states that the ESF ventilation system ensures that adequate cooling is provided for ECCS equipment and that radioactive materials leaking from the ECCS equipment within the pump rooms following a LOCA are filtered prior to reaching the environment.

In accordance with UFSAR Section 9.9.3.1, to fulfill the radiological filtration requirements, the ESF ventilation system is designed to start on a Phase B containment isolation signal. This ability to fulfill this function was not lost due to the design change, as both the inlet and bypass dampers would have been aligned correctly, as a result of the Phase B signal opening the inlet damper to the ventilation trains. The failed closed position of the bypass damper would not have affected this function, as this is the required position for the filtration mode.

The normal function of the ESF ventilation system, aiding in the air distribution within the auxiliary building, isolation of the atmosphere in the enclosures, and providing cooling for the ECCS equipment rooms by exhausting heated air from the area, would not be fulfilled if the postulated loss of the 85 psig header were to occur. The inlet dampers are normally closed and would not have received a signal to open; the bypass dampers would fail closed, effectively robbing the fans of a suction path.

For a single failure (the loss of the 85 psig header without concurrent loss of the 20 psig header) to prevent the design function of the ESF ventilation system, the following events would have to occur:

- ▶ One ventilation train is already in service per operating procedure
- ▶ The second train fan starts automatically on an ECCS pump start
- ▶ Depressurization of the 85 psig header
- ▶ No concurrent depressurization of the 20 psig header
- ▶ Phase B signal not generated

Although this scenario is considered possible, it is not considered probable. It is considered highly likely that the flow through the ESF ventilation system trains would be restored in a very short time if such an series of events were to occur, to allow the ventilation system to function as designed.

The Probabilistic Risk Assessment notebook for ECCS High Head Cooling notes that pump failure due to loss of cooling was not included in the fault trees since there would be no negative effects on the ECCS equipment, as these motors can operate for at least 24 hours without cooling. Evaluations were also performed which indicated that the ECCS pump motors would have over 118 days of qualified life at the elevated temperatures which would occur if the ESF ventilation system were unavailable and a LOCA were to occur.

Based on the low probability of the series of events necessary to prevent the design function of the ESF ventilation trains, and the Probabilistic Risk Assessment results, it has been concluded that this condition had low safety significance, and did not endanger the health or safety of the public at any time.

LICENSEE EVENT CONTINUATION

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

Corrective Action

A design change package, already in existence to make other modifications to the control air system, was revised to include installation of an 85 psig air supply to the inlet damper actuators via a pressure reducing valve. Physical installation of the new air supply to the inlet damper actuators was completed on November 5, 1997.

Procedure 227400-STG-5400-07, Design Change Reference Guide, will be revised to explicitly require the consideration of the effects of a proposed change to the air system on a "header by header" basis and the analysis of individual source failures. This will be completed by December 31, 1997.

As discussed in the NRC's Confirmation Action Letter (CAL) to the Cook Nuclear Plant, dated September 19, 1997, we are assessing the problems identified during the recent AE Design Inspection to determine whether these types of engineering problems exist in other safety related systems and whether they affect system operation in the longer term. We will evaluate our programs for improvements to assure these kinds of engineering problems are promptly identified, thoroughly evaluated and resolved. The results of our reviews and assessments, as well as necessary preventive actions will be communicated separately to the NRC.

Failed Component Identification

None

Previous Similar Events

None