CATEGORY 1

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9712010357 DOC.DATE: 97/11/17 NOTARIZED: NO DOCKET #
FACIL:50-315 Donald C. Cook Nuclear Power Plant, Unit 1, Indiana M 05000315

AUTH.NAME	AUTHOR AFFILIATION
BENES,J.	Indiana Michigan Power Co.
BLIND,A.A.	Indiana Michigan Power Co.
RECIP.NAME	RECIPIENT AFFILIATION

SUBJECT: LER 97-026-01:on 970925,potential for overpressurization of Control Air Headers was determined to be unanalyzed condition by lack of overpressure protection.Redundant safety related relief valves were installed.W/971117 ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 6
TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

NOTES:

	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
	PD3-3 PD	1	1	HICKMAN,J	1	1
INTERNAL:	~~AEOD/SPD/~~RAB	2	2	AEOD/SPD/RRAB	1	1
	FILE CENTER	1	1	NRR/DE/ECGB	1	1
	NRR/DE/EELB	1	1	NRR/DE/EMEB	1	1
	NRR/DRCH/HHFB	1	1	NRR/DRCH/HICB	1	1
	NRR/DRCH/HOLB	1	1	NRR/DRCH/HQMB	1	1
	NRR/DRPM/PECB	1	1	NRR/DSSA/SPLB	1	1
	NRR/DSSA/SRXB	1	1	RES/DET/EIB	1	1
	RGN3 FILE 01	1	1			
EXTERNAL:	L ST LOBBY WARD	1	1	LITCO BRYCE,J H	1	1
	NOAC POORE,W.	1	1	NOAC QUEENER,DS	1	1
	NRC PDR	1	1	NUDOCS FULL TXT	1	1

C A T E G O R Y 1 D O C U M E N T

NOTE TO ALL "RIDS" RECIPIENTS:
PLEASE HELP US TO REDUCE WASTE. TO HAVE YOUR NAME OR ORGANIZATION REMOVED FROM DISTRIBUTION LISTS OR REDUCE THE NUMBER OF COPIES RECEIVED BY YOU OR YOUR ORGANIZATION, CONTACT THE DOCUMENT CONTROL DESK (DCD) ON EXTENSION 415-2083

FULL TEXT CONVERSION REQUIRED
TOTAL NUMBER OF COPIES REQUIRED: LTTR 24 ENCL 24

Indiana Michigan
Power Company
Cook Nuclear Plant
One Cook Place
Bridgman MI 49106

INDIANA
MICHIGAN
POWER

November 17, 1997

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

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:

97-026-01

Sincerely,

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

I E22

NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION
(5-92)

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

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.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	
Donald C. Cook Nuclear Plant - Unit 1	50-315	Page 1 of 5

TITLE (4)
Potential for Overpressurization of the Control Air Headers Determined to be Unanalyzed Condition

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
09	25	97	97	-- 026 --	01	11	17	97	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	5
POWER LEVEL (10)	0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

	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©
	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	TELEPHONE NUMBER (Include Area Code)
Mr. James Benes, Mechanical Systems Engineering Manager	616/465-5901, X2862

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	X	NO				

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

On September 25, 1997, with Units 1 and 2 in Mode 5, it was recognized that due to a lack of overpressure protection on the 85, 50, or 20 psig control air headers, if an air regulator failed open resulting in an overpressurization of a control air header, there was the potential for common mode failure of both trains of safety related equipment. The potential for this event was reported in accordance with 10 CFR 50.72(b)(2)(I) as a condition which was found while the reactor was shutdown, which if found while the reactor was operating, would have resulted in the nuclear plant being in an unanalyzed condition.

The lack of overpressure protection on the control air headers due to a regulator failing open was not identified as a mechanism that could overpressurize the low pressure headers. As a result, single failure of a non-safety related component affecting both trains of safety related equipment was not identified. Redundant safety related relief valves have been installed on the 20, 50, and 85 psig control air headers. In addition, the current design change process addresses the requirement to ensure that single failure criteria has been met.

An evaluation was performed to determine what the effect of an overpressurization of the control air headers would have been. This evaluation determined that there would have been no significant effects for the 85 and 50 psig headers. Overpressurization of the 20 psig header could have resulted in the degradation of the RHR system and the partial opening of the unit 2 Steam Generator (SG) Power Operated Relief Valves (PORVs) for the duration of the overpressure event. Due to a single failure being identified that could have potentially resulted in the degradation of both trains of RHR this event may have been significant.

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

Condition Prior to Event
Unit one was in Mode Five, Cold Shutdown
Unit two was in Mode Five, Cold Shutdown

Description of Event
At Cook plant a non-safety related, centrally regulated compressed air system is employed. The 100 psig header supplies lower pressure service headers (i.e.,, 85, 50, and 20 psig headers). The design does not provide for individual pressure regulators for each component served by the compressed air system, rather, a regulator is provided for each header. The system is designed such that, upon loss of air in a header, components on the header fail to their safe position. For example, containment isolation valves will close upon loss of air.

During the recent Architect Engineer Design Inspection, the design of the system was questioned regarding failure of a pressure regulator in a manner such that an overpressurization could occur. For example, a failure of a 20 psig regulator could result in the 20 psig header being exposed to 100 psig air. This could adversely impact safety related equipment on the header in a manner which rendered equipment inoperable. Additionally, there are cases where redundant trains of safety related equipment are supplied from the same header, meaning that a single failure of a pressure regulator could render redundant trains of safety related equipment inoperable.

Cause of Event
The cause of the lack of overpressure protection on the Control Air System was the fact that a regulator failing open was not identified as a mechanism that could overpressurize the low pressure headers. As a result, single failure of a non-safety related component affecting both trains of a safety related system was not identified.

Analysis of Event
This event was reported on September 25, 1997 via ENS at 1011 hours EDT under 10CFR50.72(b)(2)(I) as a condition which was found while the reactor was shutdown, which if found while the reactor was operating, would have resulted in the nuclear plant being in an unanalyzed condition. On October 22, 1997 at 1648 hours a phone call update was made to update the safety significance. An interim LER was submitted on October 27, 1997. This LER is therefore being submitted in accordance with 10CFR50.73(a)(2)(A) as an unanalyzed condition that could have significantly compromised plant safety.

An evaluation was performed to determine if overpressurization of a control air header would prevent devices required to safely shut down the reactor or mitigate the consequences of an accident from performing their safety function. The results of this evaluation are provided below.

LICENSEE EVENT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL	REVISION	
Cook Nuclear Plant - Unit 1	50-315	97	-- 026 --	01	3 OF 5

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

Analysis of Event (cont'd)

85 psig header

Overpressurization of an 85 psig header would result in no safety significant effect to either unit. The evaluation determined that the equipment would either:

- Function as designed,
- Not be effected since the valve is normally in the vented position and would not be expected to be exposed to the excessive air pressure,
- Experience a valve diaphragm rupture resulting in the valve going to its fail-safe position,
- Not be effected because the valves rated for 85 psig were determined by the vendor to be allowed a one-time excursion to 125 psig,
- Experience deformation of the torque-producing mechanism:
- If CIVs VCR-101, 102, or 107 were to be stroked during a standing overpressurization. Although this is considered unacceptable, the safety significance is low since the other train of the penetration's CIV is located outside of containment and is supplied by a different 85 psig regulator, or conversely,
- If CIVs VCR-201, 202, or 207 were to be stroked during a standing overpressurization. Although this is considered unacceptable, the safety significance is low since the other train of the penetration's CIV is located inside containment and is supplied by a different 85 psig regulator,

50 psig header

Overpressurization of a 50 psig header would result in no safety significant effect to either unit. The evaluation determined that the equipment would either:

- Function as designed,
- Not be effected because the valves are normally in the vented position and not expected to be exposed to the excessive air pressure
- Experience a valve diaphragm rupture on some valves inside containment resulting in the valves going to their fail-safe position,
- Experience a valve diaphragm rupture on some valves outside containment resulting in the valves going to their fail safe position and a unit trip. This would be similar to a loss of control air except that many pneumatic devices would still be available.

20 psig header

Overpressurization of the 20 psig header in either unit could have resulted in significant effects. The evaluation determined that the equipment would either:

- Function as designed,
- Experience valve diaphragm rupture resulting in the valve going to its fail-safe position,
- Experience a transient, resulting in a unit trip,
- Be partially mispositioned (both trains of the RHR heat exchanger outlet valves, Unit 2 Steam Generator (SG) Power Operated Relief Valves (PORV))

The partial mispositioning of the RHR heat exchanger outlet valves and the SG PORVs would be due to the overpressurization of electro-pneumatic transmitters (EPTs) that send a pneumatic input to the valve positioners. Partial opening of the SG PORVs would result in an uncontrolled cooldown for the duration of the overpressure event. The core response to this event would be bounded by a main steam line break.

Analysis of Event (cont'd)

Analysis indicates that if, during the injection phase of a large break LOCA in which one RHR train is unavailable for another reason, the 20 psig header had been overpressurized resulting in the RHR valves being partially mispositioned, the minimum RHR flow may not have been available until the RHR valves were correctly positioned. Therefore, we conclude that for the duration of the overpressure event, both trains of the RHR system would have been degraded.

Expected Operator Response

In the event of the overpressurization of the 20 psig header there would have been many indications for the operators to use in determining the appropriate response. The control rooms have many pneumatic indicators that would give the operators information that something was wrong with the air system. The operators would have been alerted to the open SG PORVs by control room alarms and valve position indicators.

One of the procedures the operators would have referred to is the Appendix R procedure, OHP 4025.001.001 "Emergency Remote Shutdown". The symptoms or entry conditions for emergency remote shutdown include the loss of significant control capability from Control Room and Hot Shutdown Panel of systems and equipment required for normal operation and safe shutdown, the failure or spurious actuation of equipment where the cause is not known, and multiple or erroneous instrument indications where the cause is not known.

The Appendix R procedure provides direction for manually isolating the SG PORVs from the control room. In addition, the procedure provides detailed directions for locally disconnecting air-operated valves from their normal signal air supply, and connecting manually operated signal air loaders to the valve positioners. The implementation of this procedure would correct the mispositioning of the RHR heat exchanger valves and the SG PORVs.

If a unit trip and cooldown resulted in Safety Injection, Emergency Operating Procedure (EOP) OHP 4023.E-0, "Reactor Trip or Safety Injection", Step 11, directs the operator to verify system alignments. If the required ECCS valves are not in their fully open positions, associated status lights in the control room would be flashing. The EOP directs the operator to manually align the valves as necessary and if proper valve alignment cannot be obtained from the control room, then locally align valves. Local alignment is performed as in the Appendix R procedure, by disconnecting the normal air supply and connecting an airset to provide a signal pressure to the valve positioners. This action is taken locally at the site of the EPTs. The EPTs for the steam generator PORVs and the RHR heat exchanger outlet valves are located in areas that are accessible in the event of a LOCA.

Probability of the event

The probability of an overpressurization of a control air header due to a regulator failure is considered to be low. This is based on the long operating experience of the pressure regulator in use at the plant. This centrally regulated air system is a common design used at many American Electric Power plants. The operating history for the pressure regulators has shown the equipment to be very reliable. In addition, the probability of the event having safety significance is considered very low because the overpressurization of the 20 psig header must be coincident with a large break LOCA and the unavailability of one train of RHR for some other reason.

NRC FORM 366A	U.S. NUCLEAR REGULATORY COMMISSION	APPROVED BY OMB NO. 3150-0104 EXPIRES 5/31/95
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.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL	REVISION	
Cook Nuclear Plant - Unit 1	50-315	97	-- 026 --	01	5 OF 5

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

Analysis of Event (cont'd)

Significance of the event
An overpressurization of a 50 or 85 psig header would not have prevented any safety function from being performed. Therefore, this would have had no safety significance.

An overpressurization of a 20 psig header could have resulted in the partial mispositioning of both trains of the RHR heat exchanger outlet valves for the duration of the overpressure event. If this event had occurred during normal cooldown, the procedures discussed above provide direction for the valves to be correctly positioned. However, if the overpressurization had occurred coincident with a large break LOCA and the unavailability of one train of RHR for another reason, the RHR system may not have been capable of providing the minimum flow assumed by the LOCA analysis until the valves had been correctly positioned.

Due to a single failure being identified that could partially misposition both trains of RHR heat exchanger outlet valves this event may have been significant.

Corrective Actions
Redundant safety related, relief valves were installed on the 20, 50, and 85 psi headers downstream of the pressure reducing valves. In addition, the current design change process addresses the requirement to ensure that single failure criteria has been met.

As discussed in the NRC's Confirmatory Action Letter (CAL) to Cook 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
Not Applicable

Previous Similar Events
315/97-023-00