

# CATEGORY 1

## REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 9711200179      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  
 SCHOEPF, P.      Indiana Michigan Power Co.  
 BLIND, A.A      Indiana Michigan Power Co.  
 RECIP.NAME      RECIPIENT AFFILIATION

SUBJECT: LER 97-018-01: on 970905, failure to maintain 1/4 inch  
 particulate retention requirement for containment  
 recirculation was noted. Caused by incomplete design change  
 RFC-12-2361. Modifications made. W/971114 ltr.

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November 14, 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:

97-018-01

Sincerely,

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

9711200179 971114  
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S PDR



## 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 (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)  
Donald C. Cook Nuclear Plant - Unit 1DOCKET NUMBER (2)  
50-315

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## TITLE (4)

Failure to Maintain ¼ Inch Particulate Retention Requirement for the Containment Recirculation Sump Results in a Condition Outside the Design Bases

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	05	97	97	-- 018 --	01	11	14	97	Cook Unit 2	50-316
									FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
POWER LEVEL (10)	100	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  
Mr. Paul Schoepf, Safety Related Mechanical Engineering SuperintendentTELEPHONE NUMBER (Include Area Code)  
616/465-5901, x2408

## 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)

YES

X NO

EXPECTED SUBMISSION DATE (15)

MONTH

DAY

YEAR

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

While reviewing findings relative to containment recirculation sump modifications and requirements, the containment system engineer identified a historical problem on Unit 1 and Unit 2 recirculation sumps from 1978 until 1996 in Unit 2 and 1997 in Unit 1. In 1978 five ¼ inch diameter holes were installed in the upper roof of the recirculation sump under design change 12-RFC-2361. Under the same design change, the ¼ inch particle retention boundary was moved from the lower chamber of the recirculation sump back to the recirculation sump inlet area. When this ¼ inch retention element was moved several sump inlet locations, including the five holes, were left unprotected for ¼ inch particle retention. The NRC was notified of this event on September 5, 1997 at 0921 hours. The NRC notification was made under 10 CFR 50.72(b)(1)(ii)(B) as a condition outside the design basis of the plant. This event is being reported under 10 CFR 50.73(a)(2)(ii) as a condition that resulted in the nuclear power plant being in a condition that was outside the design basis of the plant.

The cause for this event was that the design change that moved the ¼ inch particle retention boundary was not technically complete in that it did not address the ¼ inch particle retention requirement during design and/or installation.

Based on the low probability of material entering the sump and an analysis of material which had the highest probability of entering the sump, it was concluded that the containment recirculation sump could have performed its intended function with the identified deficiencies. Therefore, this event did not present a risk to the health and safety of the public.

## 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)	SERIAL NUMBER (6)			PAGE (3)
Cook Nuclear Plant - Unit 1	50-315	YEAR	SEQUENTIAL	REVISION	2 OF 4
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TEXT (if more space is required, use additional NRC Form 366A's) (17)

### Condition Prior to Event

Unit 1 Mode 1, 100 percent Rated Thermal Power

Unit 2 Mode 1, 100 percent Rated Thermal Power

### Description of Event

While reviewing findings relative to containment recirculation sump modifications and requirements, the containment system engineer identified a historical problem on Unit 1 and Unit 2 recirculation sumps from 1978 until 1996 in Unit 2 and 1997 in Unit 1. In 1978 five ¾ inch diameter holes were installed in the upper roof of the recirculation sump under design change 12-RFC-2361. Under the same design change, the ¾ inch particle retention boundary was moved from the lower chamber of the recirculation sump back to the recirculation sump inlet area. When this ¾ inch retention element was moved several sump inlet locations, including the five holes, were left unprotected for ¾ inch particle retention.

Other items found during the 1997 review included:

- ▶ An 8 inch cross-over pipe between the lower containment sump and the recirculation sump that had existed without a ¾ inch particle retention barrier to ensure items in the lower containment sump greater than ¾ inch would not be transferred to the containment recirculation sump;
- ▶ Gaps greater than ¾ inch between the curb openings around the recirculation sump entrance; and
- ▶ Lower containment sump cover gaps greater than ¾ inch that would have allowed particles larger than ¾ inch to enter the lower containment sump which potentially could be transferred to the lower containment recirculation sump.

In 1996 the five ¾ inch diameter holes were identified on the Unit 2 recirculation sump. At the time they were discovered these holes were considered to be abandoned bolt holes remaining from recirculation sump level instruments removed under design change 12-RFC-2451. Thinking the holes had no current design function, they were simply plugged to meet foreign material exclusion zone requirements. An inspection of the Unit 1 recirculation sump during the following Unit 1 outage identified similar holes in the same location of the recirculation sump. The Unit 1 holes were also plugged.

### Cause of Event

Design change RFC-12-2361, the design change that moved the ¾ inch particle retention boundary from the lower chamber of the recirculation sump back to the recirculation sump inlet area, was not technically complete in that it did not address the ¾ inch particle retention requirement during design and/or installation.

### Analysis of Event

The NRC was notified of this event on September 5, 1997 at 0921 hours. The NRC notification was made under 10 CFR 50.72(b)(1)(ii)(B) as a condition outside the design basis of the plant. This event is being reported under 10 CFR 50.73(a)(2)(ii) as a condition that resulted in the nuclear power plant being in a condition that was outside the design basis of the plant. The containment recirculation sump functions to collect water deposited in the containment following a design basis accident, and return it to the emergency core cooling system (ECCS) and containment spray system (CTS) for long term cooling of the reactor and the containment. The design of the recirculation sump ensures that water is delivered to the suction of the ECCS and CTS pumps without detrimental air entrainment or vortexing, and it also includes provisions for exclusion of foreign material in excess of its ¾ inch screen mesh size. The ¾ inch screen mesh size ensure that particles sufficiently large to block the ¾ inch CTS nozzles will not enter the sump. The screen also provides protection for the ECCS and CTS components against foreign material.

## 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)

Assessment of the possible impact of these deficiencies considered the likelihood that material will actually enter the sump via these opening and the vulnerability of components in the ECCS and CTS if material does in fact enter the sump. Actual entry of material into the recirculation sump was considered a low probability event. Components with vulnerability to larger material included the safety injection (SI) and centrifugal charging (CC) pumps, which both have tight clearances, the safety injection needle valves, check valves throughout the ECCS and CTS and the CTS spray nozzles. Material which is considered the greatest threat for sump entry is presumably limited to buoyant material, which would be characteristically light and delicate. Such material, if swept into the RHR and CTS pump suctions, would be easily handled and broken down into smaller size by these pumps. Downstream pumps such as the SI and CC pumps would then be able to pass the material, based on both its reduced size and its light and delicate nature. Similarly, valves and the CTS nozzles would also be expected to pass these materials for the same reasons. Check valves would be expected to close against light and delicate material.

In summary, based on the low probability of material entering the sump and an analysis of material which had the highest probability of entering the sump, it was concluded that the containment recirculation sump could have performed its intended function with the identified deficiencies. However, the deficiencies were not within the design basis of the containment recirculation sump.

### Corrective Actions

#### Deficiency Corrections:

- ▶ For the 8 inch drain line from the recirculation sump to the containment sump  
In 1990 minor modification (MM) MM-175 put ¼ inch screens over the 8 inch cross-over pipe between the lower containment sump and recirculation sumps.
- ▶ For the small gaps left at the containment sump pumps  
In 1994 MM-546 made improvements to the lower containment sump covers. These improvements reduced gap size between the sump cover and the lower containment sump pumps and level instrumentation to within the design requirements.
- ▶ For the small edge gaps left around the recirculation sump entrance  
In 1990 MM-175 added screens to curb openings around the recirculation sump.
- ▶ For the five ¾ inch vents installed in the 1 foot thick concrete top cover of the recirculation sump  
The Unit 2 holes were plugged under a job order JOA #C35223-03 in 1996. The Unit 1 holes were plugged under JOA #C40073-01 in 1997. The five ¾ inch vents were subsequently reinstalled as a conservative measure to avoid air pockets from forming underneath the top cover of the sump. To maintain the ¼ inch particle retention requirement a design change, 12-DCP-852, was installed to place screens over the vent openings.

In addition, a walkdown of the containments was conducted to identify any other similar issues where design features were potentially overlooked. No further items were identified.

## LICENSEE EVENT CONTINUATION

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

**Corrective Actions (cont'd)**

As discussed in the NRC's Confirmatory Action Letter (CAL) to the Cook Nuclear Plant, date 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**

315/97-023-01