NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
D. C. COOK UNIT TWO	0 5 0 0 0 3 1 6	1 OF 0 2

TITLE (4)

LOSS OF RESIDUAL HEAT REMOVAL PUMPS

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 5 0 0 0
0 5	2 1	8 4	8 4	— 0 1 4	— 0 0	0 6	2 1	8 4		0 5 0 0 0

OPERATING MODE (9)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
5	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10) 0 1 0 0	20.405(a)(1)(i)	50.36(c)(1)	X 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)	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
	AREA CODE
K. R. BAKER OPERATIONS SUPERINTENDENT	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	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 fifteen single-space typewritten lines) (16)

WITH THE UNIT IN COLD SHUTDOWN (MODE 5) AND THE REACTOR COOLANT SYSTEM AT HALF-LOOP, THE CONTROL ROOM OPERATORS STARTED A SECOND RESIDUAL HEAT REMOVAL (RHR) PUMP IN PREPARATION FOR REMOVING THE OPERATING RHR PUMP FROM SERVICE. WITH BOTH PUMPS RUNNING, FLOW BECAME EXCESSIVE FOR THE HALF-LOOP CONDITION CAUSING CAVITATION AND AIR BINDING OF BOTH PUMPS. BOTH PUMPS WERE OUT OF SERVICE FOR APPROXIMATELY 25 MINUTES WHILE THEY WERE BEING VENTED WHICH IS WITHIN THE ONE HOUR ACTION STATEMENT TIME LIMIT OF T.S. 3.4.1.3.

TO PREVENT RECURRENCE THE PROCEDURE WHICH CONTROLS THE OPERATION OF THE RHR PUMPS HAS BEEN CHANGED TO INCLUDE SPECIFIC INSTRUCTIONS TO STOP THE OPERATING PUMP PRIOR TO STARTING THE SECOND PUMP WHILE AT HALF LOOP.

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
D. C. COOK UNIT TWO	0 5 0 0 0 3 1 6	8 4	— 0 1 4	— 0 0	0 2 OF 0 2

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

PLANT OPERATING CONDITIONS: MODE 5 (COLD SHUTDOWN), REFUELING COMPLETED, REACTOR COOLANT SYSTEM (RCS) AT HALF LOOP, WEST RHR PUMP OPERATING EAST RHR PUMP OUT OF SERVICE. TIME: 0155, DATE: 5/21/84.

WITH THE RCS AT HALF LOOP, THE LICENSED CONTROL ROOM OPERATORS STARTED THE EAST RHR PUMP IN PREPARATION FOR REMOVING THE WEST RHR PUMP FROM SERVICE. IT HAS BEEN A PRACTICE TO START THE STANDBY PUMP PRIOR TO REMOVING THE RUNNING PUMP FROM SERVICE. SINCE THE RHR PUMPS TAKE THEIR SUCTION FROM THE SAME PIPE, THE RESULTING HIGH FLOW AT HALF LOOP CONDITIONS CAN CAUSE VORTEXING AT THE LOOP SUCTION AND THE SUBSEQUENT AIR BINDING OF BOTH RHR PUMPS. BOTH PUMPS WERE REMOVED FROM SERVICE AND THE VENTING PROCESS STARTED. APPROXIMATELY 25 MINUTES LATER, THE WEST RHR PUMP WAS RETURNED TO SERVICE, WITH THE EAST PUMP BEING RETURNED TO OPERABLE STATUS ABOUT AN HOUR LATER.

ALTHOUGH THERE WAS A CAUTION IN THE PROCEDURE STATING NOT TO RUN BOTH PUMPS AT HALF LOOP, THERE WERE NO INSTRUCTIONS FOR SHIFTING RHR PUMPS AT HALF LOOP. THE PROCEDURE HAS BEEN CHANGED TO ADDRESS THE HALF LOOP OPERATION.

A SAFETY EVALUATION (COPY ATTACHED) WAS PERFORMED WHICH EXPLORED TWO SCENARIOS. THE FIRST ANALYSIS WAS FOR THE LOW DECAY HEAT LEVELS THAT EXISTED AND THE SECOND WAS FOR HIGH DECAY HEAT LEVELS. BOTH EVALUATIONS WERE PERFORMED USING CONSERVATIVE ASSUMPTION COMPARED TO WHAT WOULD REALISTICALLY BE EXPECTED. BOTH ANALYSES REVEALED THERE WAS ADEQUATE TIME AVAILABLE TO RESTORE RHR PUMPS BEFORE THE ALTERNATE MEANS OF DECAY HEAT REMOVAL WERE EXHAUSTED. ON THE BASIS OF THE EVALUATION, IT IS OUR BELIEF THAT THE EVENT CITED IN THIS REPORT DID NOT AND WOULD NOT HAVE ADVERSELY AFFECTED PUBLIC HEALTH AND SAFETY.

RETYPED FROM TELECOPY

INDIANA & MICHIGAN ELECTRIC COMPANY

AMERICAN ELECTRIC AEP POWER SYSTEM

DATE: June 20, 1984

SUBJECT: DONALD C. COOK NUCLEAR PLANT UNIT NO. 2
SAFETY EVALUATION OF CONDITION REPORT NO. 02-05-84-846; LOSS OF BOTH RHR COOLANT LOOPS WHILE OPERATING IN MODE 5 AT HALF LOOP

FROM: J. G. Feinstein

TO: W. G. Smith, Jr. - Bridgman

The subject Condition Report describes an incident which resulted in air binding of both RHR pumps on Unit 2 during the transfer of RHR from the West train to the East train. This incident occurred on May 21, 1984, when the East RHR pump was started with the West pump operating, thereby drawing air into both pumps' suction and resulting in loss of all RHR flow. At the time the incident occurred, the plant was operating in MODE 5 at half loop conditions. The plant had been shut down for approximately 72 days and the Cycle 5 refueling operations had been completed.

The system was airbound for approximately 25 minutes during which time a number of attempts were made to vent the pumps. The first pump to be vented and made operational was the West pump. Since that time, both pumps have operated satisfactorily in normal cooldown service, and the East pump operated satisfactorily during a surveillance test on June 4, 1984.

On the basis of this continued satistactory operation, we have concluded that the pumps were not damaged by this incident and are suitable for normal service. To confirm this, however, the surveillance tests performed with the RHR pumps in the recirculation mode will be closely monitored. These tests demonstrate the ability of the pumps to perform under the most severe configuration. Should the vibration levels observed during these tests exceed the appropriate limits specified as part of the Inservice Testing program, then appropriate engineering review and actions will be taken.

Additionally, an evaluation of two scenarios was performed. The first explored the consequences if we had been unable to restore one RHR coolant loop within one hour after the actual time of failure, and the second explored the consequences if we had been unable to restore one RHR coolant loop within one hour after the worst possible time of failure in Cycle 4.

The results of our evaluation of the first scenario showed that, due to low decay heat levels, the operator would have at least 14 hours 37 minutes to restore an RHR coolant loop. If he were unsuccessful during that time, he would only have to start a Centrifugal Charging pump or Safety Injection pump to make up water that was being boiled off at a rate of about 8.7 gpm. Water available in the Refueling Water Storage Tank would have allowed the operator approximately another 27 days to correct the situation.

The second scenario considered loss of RHR near the end of the previous cycle, where irradiation time is maximized. If the earliest time we could reach halt loop conditions was 16 hours after shutdown, then the boil off rate could be as high as 126 gpm. Under these conditions, the operator would have at least one hour before uncovering the active core region. If an operator started a Centrifugal Charging or Safety Injection pump during this time, he would have approximately another 2 days to recover an RHR coolant loop or find an alternate means of removing decay heat.

It is to be noted that, for the above calculations, the time to uncover the active core region was computed. Irradiation time was calculated from average burnups for previously irradiated fuel and fuel inserted at the beginning of Cycle 4. The decay heat fraction was obtained from the proposed ANS Standard 5.1, Decay Energy Release Rates Following Shutdown of Uranium-Fueled Thermal Reactors, October 1971. The calculation was intended to describe the actual event as accurately as possible.

On the basis of the above information it is believed that the events cited in Condition Report No. 02-05-84-846 did not adversely affect public health and safety.

Original Signed By:

James G. Feinstein, Manager
Nuclear Safety and Licensing Section

cc: M. P. Alexich/B. H. Bennett
D. A. Medek/AEP:NRC:0526A
J. M. Cleveland/V. D. Vanderburg/E. I. Neymotin
S. Steinhart/J. A. Kobyra
C. S. Swanson/J. J. Ripak
DC-N-6941.3.2

American Electric Power System
INDIANA & MICHIGAN ELECTRIC COMPANY
DONALD C. COOK NUCLEAR PLANT
P.O. Box 458, Bridgman, Michigan 49106
(616) 465-5901

June 21, 1984

United States Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Operating License DPR-74
Docket No. 50-316

Document Control Manager:

In accordance with the criteria established by 10CFR50.73 entitled Licensee Event Reporting System, the following report/s are being submitted:

RO 84-014-0

This report is being mailed one day late. The report preparation and review was completed in time, however, the final version of the safety evaluation was telecopied to the Plant and required retyping to make legible copies.

Sincerely,

W.G. Smith, Jr.
Plant Manager

/cbm

Attachment

cc: John E. Dolan
J.G. Keppler, RO:III
M.P. Alexich
R.F. Kroeger
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