



April 6, 2001

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

Operating Licenses DPR-58 and DPR-74  
Docket Nos. 50-315 and 50-316

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:

LER 315/2001-001-00: "Reactor Trip Due to Loss of Main Feedwater Pump"

There were no commitments identified in this submittal.

Should you have any questions regarding this correspondence, please contact Mr. Ronald W. Gaston, Manager, Regulatory Affairs, at 616/465-5901, extension 1366.

Sincerely,

A handwritten signature in cursive script that reads 'J Pollock for'.

Joseph E. Pollock  
Plant Manager

/jlm  
Attachment

c: J. E. Dyer, Region III  
A. C. Bakken  
L. Brandon  
T. P. Noonan  
R. P. Powers  
M. W. Rencheck  
R. Whale  
NRC Resident Inspector  
Records Center, INPO

IE22

# LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), 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

<b>FACILITY NAME (1)</b> Donald C. Cook Nuclear Plant Unit 1	<b>DOCKET NUMBER (2)</b> 05000-315	<b>PAGE (3)</b> 1 of 3
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**TITLE (4)**  
Reactor Trip Due to Loss of Main Feedwater Pump

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	
02	15	2001	2001	-- 001 --	00	04	6	2001			

<b>OPERATING MODE (9)</b> 1	<b>THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)</b>									
<b>POWER LEVEL (10)</b> 100	20.2201 (b)	20.2203(a)(1)	20.2203(a)(2)(i)	20.2203(a)(2)(ii)	20.2203(a)(2)(iii)	20.2203(a)(2)(iv)	20.2203(a)(2)(v)	20.2203(a)(2)(vi)	20.2203(a)(2)(vii)	20.2203(a)(2)(viii)

<b>LICENSEE CONTACT FOR THIS LER (12)</b>										
<b>NAME</b> J. L. Mathis, Compliance Engineer								<b>TELEPHONE NUMBER (Include Area Code)</b> (616) 465-5901, x1578		

<b>COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)</b>										
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	

<b>SUPPLEMENTAL REPORT EXPECTED (14)</b>					<b>EXPECTED SUBMISSION DATE (15)</b>			MONTH	DAY	YEAR
YES (If Yes, complete EXPECTED SUBMISSION DATE).	X	NO								

**Abstract (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)**  
 On February 15, 2001 at 1417 hours, while at approximately 100 percent power, a low vacuum trip on the Unit 1 east main feedwater pump turbine occurred. The operator manually tripped the reactor in accordance with plant procedures. The post trip investigation indicated that all safety related systems performed as designed.  
 Prior to the event, the main feedpump water box differential pressure and backpressure was being monitored on an increased frequency due to a rising trend on both parameters. The previous shift had attempted to improve this condition by flushing the circulating water side of the main condenser waterboxes. A downpower had been previously scheduled to allow cleaning of the main feedwater condenser. However, the fouling occurred more rapidly than anticipated. In accordance with 10 CFR 50.72 (b)(3)(iv)(B)(1), a four-hour ENS notification was made to the NRC at 1545 hours on February 15, 2001, as an event or condition that resulted in an actuation of the reactor protection system when the reactor is critical.  
 The cause of the feedwater pump trip was loss of condenser vacuum as the result of corrosion scales obstructing flow at the condenser's inlet-side tubesheet. This condition lead to an elevated condenser backpressure and a subsequent low vacuum trip of the east main feedwater pump.  
 The feedwater pump turbines are non-safety related, non-safety interface, balance of plant equipment. The function of providing feedwater flow to support power operation is not a safety related or accident mitigating function. Therefore, with respect to the main feedwater system, this condition has no safety significance. Following the reactor trip, both the east and west main feed pump condensers were opened and cleaned.  
 Between March 30 and April 1, 2001, Units 1 and 2 respectively were reduced to approximately 60 percent power to clean and inspect the feed pump condensers. No new scale formation was observed.

**LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION**

FACILITY NAME (1)	DOCKET NUMBER(2)	LER NUMBER (6)				PAGE (3)
		YEAR	SEQUENTIAL NUMBER		REVISION NUMBER	
		2001	--	001	--	

Donald C. Cook Nuclear Plant Unit 1

05000-315

2 of 3

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

**Conditions Prior to Event**

Unit 1 was in Mode 1, Power Operation, at 100 percent Rated Thermal Power

**Description of Event**

On February 15, 2001, at 1417 hours, while at approximately 100 percent power, a low vacuum trip on the Unit 1 east main feedwater pump turbine occurred. The operator manually tripped the reactor in accordance with plant procedures. The post trip investigation indicated that all safety related systems performed as designed.

Prior to the event, the main feedpump water box differential pressure and backpressure was being monitored on an increased frequency due to a rising trend on both parameters. The previous shift had attempted to improve this condition by flushing the circulating water side of the main condenser waterboxes. A downpower had been previously scheduled to allow cleaning of the main feedwater condenser. However, the fouling occurred more rapidly than anticipated.

In accordance with 10 CFR 50.72 (b)(3)(iv)(B)(1), a four hour ENS notification was made to the NRC at 1545 hours on February 15, 2001 as an event or condition that results in actuation of the reactor protection system when the reactor is critical. LER 315/2001-001 is being submitted in accordance with the requirements of 10 CFR 50.73 (a)(2)(iv)(A) for a condition or event that resulted in a manual or automatic actuation of the RPS system.

**Cause of Event**

The cause of the feedwater pump trip was loss of condenser vacuum as the result of corrosion debris obstructing flow at the condenser's inlet-side tubesheet. This condition lead to an elevated condenser backpressure and a subsequent low vacuum trip of the east main feedwater pump. The corrosion debris was a product of general corrosion that occurred in the vertical portion of the 24-inch carbon steel circulating water lines several feet above and below the standing water level. The corrosion was limited to the portion of the lines that were repeatedly wetted by fluctuating water level during the extended unit 1 outage.

**Analysis of Event**

As detailed in the UFSAR, the main feedwater system has one accident mitigation function; namely, feedwater isolation. This event had no impact on the ability of the main feedwater system to perform its safety function. The function of providing feedwater flow to support power operation is a not a safety related or accident mitigating function. Therefore, with respect to the main feedwater system, this condition has no safety significance.

The circulating water system provides a heat sink for waste heat from the plant thermal cycle, including the main feedwater pump condenser. As detailed in the UFSAR, the circulating water system has no safety or accident mitigation functions. The once-through circulating water system supplies cooling water to the condensers and turbine auxiliary coolers. Therefore, with respect to the Circulating Water System, this condition has no safety significance.

The variable speed turbine-driven main feedwater pumps are designed to provide the required feedwater flow to the steam generators. The main feedwater pump turbines are non-safety related, non-safety interface, balance of plant equipment. Chapter 14 of the UFSAR includes an analysis that addresses loss of normal feedwater flow. Results of the analysis show that a loss of normal feedwater does not adversely affect the core, the RCS, or the steam system.

**Corrective Actions**

Following the reactor trip, both the east and west main feed pump condensers were opened and cleaned. A significant amount of debris was removed from the east main feed pump condenser, which consisted mostly of corrosion scale. A sample of the corrosion scale removed from the Unit 1 east main feedwater pump condenser was sent to a laboratory for

**LICENSEE EVENT REPORT (LER)**  
**TEXT CONTINUATION**

FACILITY NAME (1)	DOCKET NUMBER(2)	LER NUMBER (6)				PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
Donald C. Cook Nuclear Plant Unit 1	05000-315	2001	-- 001 --	00	3 of 3	

**TEXT** (If more space is required, use additional copies of NRC Form (366A) (17))

chemical analysis. Laboratory results indicated that the corrosion scale was indicative of corrosion material derived from low-alloy carbon steel.

A visual examination was conducted to locate the source of the corrosion scale. Divers completed inspections of the following areas: (1) The forebay from the travelling water screens up to and including the circulating water pumps, (2) the circulating water discharge pipe from the circulating water pumps to the common discharge area, (3) the common discharge area downstream of the circulating water pumps, and (4) the 24-inch carbon steel lines leading to the east and west feed pump condensers. The inspections determined that the source of corrosion scale was the 24-inch carbon steel lines. No signs of corrosion scale were found in any of the other inspected areas. As stated earlier, the corrosion scale originated from the vertical portion of the 24-inch carbon steel circulating water lines several feet above and below standing water level. Upon discovery of the corrosion, the vertical circulating water piping leading to both the east and the west feed pump condensers were cleaned with high-pressure sprays and the resulting debris was removed by vacuum. Based on the thickness of corrosion scale removed during cleaning, wall thinning was considered negligible.

Between March 30 and April 1, 2001, Units 1 and 2 respectively were reduced to approximately 60 percent power to clean and inspect the feed pump condensers. No new scale formation was observed.

**Previous Similar Events**

None