



August 13, 2002

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

Operating Licenses DPR-58  
Docket Nos. 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:

LER 315/2002-005-00: "Unit 1 Manual Trip due to Trip of East Main Feedwater Pump"

The following commitment has been identified in this submittal.

- CNP will take actions to mitigate the effects of debris on CW pump startups with the unit on line. Specifically, precautions will be added to the CW system operating procedure to identify the potential vulnerability for debris intrusion associated with starting CW pumps with the unit on-line. The procedures will also include guidance for use of MFP turbine condenser waterbox lancing when starting a CW pump with a unit on-line.

Should you have any questions regarding this correspondence, please contact Mr. Gordon P. Arent, Manager, Regulatory Affairs, at (616) 697-5553.

Sincerely,

A handwritten signature in black ink that reads "J E Molten for".

Michael J. Finissi  
Plant Manager

BWO/pae  
Attachment

c: G. P. Arent  
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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 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

<b>1. FACILITY NAME</b> Donald C. Cook Nuclear Plant Unit 1	<b>2. DOCKET NUMBER</b> 05000-315	<b>3. PAGE</b> 1 of 4
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**4. TITLE**  
Unit 1 Manual Trip due to Trip of East Main Feedwater Pump

5. EVENT DATE			6. LER NUMBER				7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER	
06	14	2002	2002	-- 005 --	00	08	13	2002	FACILITY NAME	DOCKET NUMBER	

<b>9. OPERATING MODE</b>	1	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)</b>									
<b>10. POWER LEVEL</b>	88%	20.2201(b)		20.2203(a)(3)(ii)		50.73(a)(2)(ii)(B)		50.73(a)(2)(ix)(A)			
		20.2201(d)		20.2203(a)(4)		50.73(a)(2)(iii)		50.73(a)(2)(x)			
		20.2203(a)(1)		50.36(c)(1)(i)(A)		X	50.73(a)(2)(iv)(A)		73.71(a)(4)		
		20.2203(a)(2)(i)		50.36(c)(1)(ii)(A)		50.73(a)(2)(v)(A)		73.71(a)(5)			
		20.2203(a)(2)(ii)		50.36(c)(2)		50.73(a)(2)(v)(B)		OTHER Specify in Abstract below or in NRC Form 366A			
		20.2203(a)(2)(iii)		50.46(a)(3)(ii)		50.73(a)(2)(v)(C)					
		20.2203(a)(2)(iv)		50.73(a)(2)(i)(A)		50.73(a)(2)(v)(D)					
		20.2203(a)(2)(v)		50.73(a)(2)(i)(B)		50.73(a)(2)(vii)					
20.2203(a)(2)(vi)		50.73(a)(2)(i)(C)		50.73(a)(2)(viii)(A)							
20.2203(a)(3)(i)		50.73(a)(2)(ii)(A)		50.73(a)(2)(viii)(B)							

<b>12. LICENSEE CONTACT FOR THIS LER</b>					
NAME Brenda W. O'Rourke, Compliance Engineer				TELEPHONE NUMBER (Include Area Code) (616) 465-5901, x 2604	

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

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

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

At 1443 hrs on June 14, 2002, Unit 1 was manually tripped following the trip of the East main feedwater (FW) pump (MFP). The East MFP tripped due to a loss of main feed pump turbine condenser vacuum caused by an influx of debris following the start of the #13 circulating water (CW) pump. On June 14, 2002, at 1751 hours, in accordance with 10 CFR 50.72 (b)(2)(iv)(B), a four-hour ENS notification (Event No. 38993) was made to the NRC for a condition that resulted in an actuation of the reactor protection system when the reactor is critical.

The cause of this event was the transport of debris (primarily zebra mussel shells and sand) into the East MFP turbine condenser upon the start of the #13 CW pump. A contributing factor was the closure of 12-WMO-30 (the center lake water intake valve) a few days prior to the start of the #13 CW pump.

The safety significance of this event was minimal since plant procedures and operator training provided sufficient direction for control room personnel to shutdown the plant and maintain it in a safe shutdown condition. In addition, this event had no impact on the ability of the main FW system to perform its feedwater isolation accident mitigation function.

The Unit 1 East and West MFP turbine condenser tubes and waterboxes were cleaned on June 14, 2002.

CNP will take actions to mitigate the effects of debris on CW pump startups with the unit on line. Specifically, precautions will be added to the CW system operating procedure to identify the potential vulnerability for debris intrusion associated with starting CW pumps with the unit on-line. The procedures will also include guidance for use of MFP turbine condenser waterbox lancing when starting a CW pump with a unit on-line.

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

**Conditions Prior to Event**

Unit 1 – Mode 1, 88 percent power  
Unit 2 – Mode 1, 100 percent power

**Description of Event**

At 1443 hrs on June 14, 2002, Unit 1 was manually tripped following the trip of the East main feedwater (FW) [EIS:SJ] pump (MFP) [EIS:P]. The East MFP tripped due to a loss of main feed pump condenser vacuum caused by an influx of debris (zebra mussel shells, silt, sand, and sticks) following the start of the #13 circulating water (CW) pump.

The post-trip investigation indicated that all control rods fully inserted. The three auxiliary feedwater (AFW) [EIS:BA] pumps automatically started as expected. The reactor coolant system (RCS) [EIS:AB] cooled down below no-load T<sub>avg</sub> (541 degrees Fahrenheit) for approximately 70 minutes. The excessive cooldown was attributed to: 1) the large amount of feedwater flow from the operation of the three AFW pumps; and 2) the reactor core had limited power history and therefore little decay heat. The turbine-driven AFW pump and other secondary loads were manually secured in accordance with plant procedures to stabilize RCS temperature.

The four steam generator (SG) stop valves [EIS:V] drifted partially closed and had to be manually reopened by the operations staff. This occurred only once for the #11 and #12 SG stop valves, but #13 and #14 continued to drift closed at regular intervals.

The "AB" reserve feed [EIS:EA] transformer tap changer did not lower Train "B" bus voltages to the expected level, resulting in a standing alarm in the control room due to Train "B" bus over voltage. However, the 4-kilovolt (kV) and 600-volt busses voltages remained within the operable range.

In accordance with 10 CFR 50.72 (b)(2)(iv)(B), a four-hour ENS notification (Event No. 38993) was made to the NRC on June 14, 2002, at 1751 hours for a condition that resulted in an actuation of the reactor protection system (RPS) when the reactor is critical. As such, this Licensee Event Report (LER) is being submitted in accordance with the requirements of 10 CFR 50.73 (a)(2)(iv)(A) for a condition that resulted in an actuation of the RPS system.

**Cause of Event**

The cause of this event was the transport of debris into the East MFP turbine condenser [EIS:COND] upon the start of the #13 CW pump. The debris is thought to have accumulated at the #13 CW pump suction in the forebay [EIS:NN] and in the CW tunnel behind the #13 CW pump discharge valve (1-WMO-13) as a result of back-leakage past the valve with the #11 and #12 CW pumps operating.

A contributing factor was the closure of 12-WMO-30 (the center lake water intake valve) a few days prior to the start of the #13 CW pump. With 12-WMO-30 closed, higher velocities in the North and South intake tunnels occur, resulting in the potential for increased debris transport into the forebay.

**Analysis of Event**

At the time of this event, the center lake water intake tunnel had been isolated (via valve 12-WMO-30) for several days. In addition, two of the three Unit 1 CW pumps were running and all four Unit 2 CW pumps were in service, but the #13 CW pump had been out of service for several months for replacement. Based on investigation results from the Unit 2

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

September 2001 ESW silt/sand intrusion event (LER 316/2001-003), having valve 12-WMO-30 closed with the units at power results in higher velocities in the North and South lake water intake tunnels, with a potential for increased debris transport into the forebay and the CW system. During the recent Unit 1 refueling outage, the #13 CW pump discharge valve (1-WMO-13) was identified to have a damaged seal [EIS:SEAL]. As a result, some back-leakage through valve 1-WMO-13 from CW pumps #11 and #12 occurred, allowing the formation of a new debris pile in the CW tunnel just downstream of valve 1-WMO-13.

The geometry of the #13 CW pump discharge tunnel is such that with CW pump #13 not operating, system flow can deposit debris in the tunnel. The configuration of the #13 CW pump discharge tunnel and FW pump turbine condenser inlet piping can direct debris passing through the #13 CW pump towards the inlet lines of the Unit 1 FW pump turbine condensers. This vulnerability exists whether a local debris pile accumulates on the discharge side of 1-WMO-13 or at the base of the #13 CW pump.

A review of the CW, ESW and NESW system performance was performed following the trip. The ESW and NESW pump strainers [EIS:STR] limit the vulnerability of these systems to debris intrusion. The post-trip investigation concluded that no adverse pressure drops were identified for the ESW pump strainers, the EDG lube oil coolers, the main condensers, or the NESW components.

With respect to the main FW system, the system has one active accident mitigation function, namely feedwater isolation. However, this event had no impact on the ability of the main FW system to perform its safety function. In addition, the CW system has no safety or accident mitigation function.

Based on the discussion above, the safety significance of this event was minimal since plant procedures and operator training provided sufficient direction for control room personnel to shut down the plant and maintain it in a safe shutdown condition. There was no impact on the health and safety of the public as a result of this event.

**Corrective Actions**

The Unit 1 East and West MFP turbine condenser tubes and waterboxes were cleaned on June 14, 2002. The debris removed from the waterboxes consisted mostly of zebra mussels, a small percentage of sticks, and sand/silt.

A post-trip walkdown of the ESW system did not identify any high-pressure differential or low flows on the equipment serviced by the ESW system.

CNP will take actions to mitigate the effects of debris on CW pump startups with the unit on line. Specifically, precautions will be added to the CW system operating procedure to identify the potential vulnerability for debris intrusion associated with starting CW pumps with the unit on-line. The procedures will also include guidance for use of MFP turbine condenser waterbox lancing when starting a CW pump with a unit on-line.

**Previous Similar Events**

LER 316/94-005-00: With Unit 2 in Mode 1 at 60 percent power, Unit 2 tripped on loss of feed pump turbine condenser vacuum. This occurred while securing the #21 CW pump from service to troubleshoot a spurious low-low voltage alarm on the 4-kV bus. The cause of this event was attributed to zebra mussels within the circulating water system that temporarily blocked cooling flow to the MFP condensers causing a MFP trip on low vacuum and a subsequent reactor trip on low feed flow coincident with low steam generator level. The corrective actions associated with this LER would not have prevented this 2002 event from occurring since the actions taken in 1994 only addressed the use of biocide chemicals for zebra mussel control (on a yearly basis) in the forebay and intake tunnels.

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

LER 315/2001-001-00: On February 15, 2001, the Unit 1 East MFP tripped due to high condenser back pressure (i.e., loss of vacuum). As a result, Unit 1 was manually tripped. The cause of this event was due to the low circulating water flow and fouled condenser tube sheets. The debris that was removed from the tube sheets consisted of metallic flakes determined to have originated from the inside of the vertical circulating water line leading to the FW pump turbine condenser. Some zebra mussels and sand were also present. The extended shutdown of Unit 1 and 2 allowed corrosion products (i.e., metallic flakes) to develop on the vertical portion of the lines leading to the condensers.