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February 18, 2010

AEP-NRC-2010-13
10 CFR 50.73

Docket No. 50-316

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

Donald C. Cook Nuclear Plant Unit 2
LICENSEE EVENT REPORT 316/2009-001-01
MANUAL REACTOR TRIP DUE TO RCP SEAL DEGRADATION
CAUSED BY ACCUMULATION OF CORROSION PRODUCTS

In accordance with the criteria established by 10 CFR 50.73, Licensee Event Report System, the following supplemental report is being submitted:

LER 316/2009-001-01: "Manual Reactor Trip Due to RCP Seal Degradation Caused by Accumulation of Corrosion Products"

There are no commitments contained in this submittal.

Should you have any questions, please contact Mr. James M. Petro, Regulatory Affairs Manager, at (269) 466-2489.

Sincerely,

Lawrence J. Weber
Site Vice President

RAW/rdw

Attachment

c: T. A. Beltz – NRC Washington DC
INPO Records Center
J. T. King – MPSC, w/o attachment
S. M. Krawec – AEP Ft. Wayne, w/o attachment
MDNRE – WHMD/RPS, w/o attachment
NRC Resident Inspector
M. A. Satorius – NRC Region III

IE22
NRR

NRC Form 366 (9-2007) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES 08/31/2010

Estimated burden per response to comply with this mandatory 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 and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@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 an 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.

LICENSEE EVENT REPORT (LER)

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

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4. TITLE

Manual Reactor Trip Due To RCP Seal Degradation Caused by Accumulation of Corrosion Products

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
07	26	2009	2009	-- 001 --	01	02	18	2010	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE

1

10. POWER LEVEL

100

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	X 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER Specify in Abstract below or in NRC Form 366A
☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
James M. Petro, Regulatory Affairs Manager	(269) 466-2489

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
E	AB	SEAL	Westinghouse	Y						

14. SUPPLEMENTAL REPORT EXPECTED				15. EXPECTED SUBMISSION DATE	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)

On July 26, 2009, at 1506 hours, Donald C. Cook Nuclear Plant (CNP) Unit 2 Control Room Operators performed a manual reactor trip in response to a malfunctioning reactor coolant pump (RCP) seal. All control rods fully inserted and the auxiliary feedwater system (AFW) started and performed as designed.

The reactor trip was uncomplicated and all major plant components functioned as designed; as such, there were no safety system functional failures. The reactor trip was reported in accordance with 10 CFR 50.72(b)(2)(iv)(B) and the AFW actuation was reported in accordance with 10 CFR 50.72(b)(3)(iv)(A). The reactor trip and AFW actuation are reportable as a Licensee Event Report in accordance with 10 CFR 50.73(a)(2)(iv)(A).

As Control Room Operators were responding to indications of a malfunctioning RCP seal, they were procedurally directed to perform a manual reactor trip and then remove the RCP from service.

The immediate cause of the trip was manual actuation due to a malfunctioning RCP seal. The root cause was a failure by the station to recognize that a buildup of corrosion products had the potential to enter the seal, causing failure. The seal assemblies in RCP 21 and RCP 22 were replaced. A plan has been developed and will be implemented for flushing the RCP seal components.

LICENSEE EVENT REPORT (LER)

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

Conditions Prior to Event

100 percent reactor power

Description of Event

On July 26, 2009, at 1506 hours, Donald C. Cook Nuclear Plant (CNP) Unit 2 Control Room Operators performed a manual Reactor [RCT] trip in response to a malfunctioning reactor coolant pump (RCP) [P] seal [SEAL]. All control rods [AA] fully inserted and the auxiliary feedwater system (AFW) [BA] started and performed as designed; this included the East and West AFW pumps and the turbine driven AFW pump.

No structures, systems, or components were inoperable at the start of the event and contributed to the event.

The event commenced on July 26, 2009, at 1458 hours when Control Room Operators received the annunciator [ANN] for RCP 22 Seal 1 Leakoff Flow Low. At this time, the low range seal leakoff flow indicated 0.90 gpm and lowering. Based on the low seal leakoff flow, the annunciator response procedure directed the operators to the RCP malfunction procedure.

The RCP malfunction procedure requires removing the RCP from service when seal leakoff flow is less than 1.0 gallon per minute (gpm) and temperature is continuously rising on either the lower bearing water or on the Number 1 seal leakoff. With the seal leakoff flow of 0.81 gpm and lowering, the lower bearing water temperature was 167 degrees Fahrenheit and rising, and the Number 1 seal leakoff temperature was 178 degrees Fahrenheit and rising.

With the criteria met to remove the malfunctioning RCP from service, control room operators performed the following actions in accordance with the RCP malfunction procedure:

- reactor was manually tripped
- entered procedure for reactor trip or safety injection
- 22 RCP was tripped

The reactor trip was uncomplicated and all major plant components functioned as designed; as such, there were no safety system functional failures. The reactor trip was reported in accordance with 10 CFR 50.72(b)(2)(iv)(B). The AFW actuation was reported in accordance with 10 CFR 50.72(b)(3)(iv)(A). The report text inadvertently referenced an automatic reactor protection system actuation rather than the engineered safety feature actuation when discussing the AFW pump starts. The reactor trip and AFW actuation are reportable as a Licensee Event Report (LER) in accordance with 10 CFR 50.73(a)(2)(iv)(A).

This LER supplement is being submitted to include information related to the completed root cause evaluation. It replaces the previous LER in its entirety.

LICENSEE EVENT REPORT (LER)

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

Cause of Event

The immediate cause of the trip was manual actuation due to a malfunctioning RCP seal. The root cause of the lowering RCP 22 seal leakoff flow was a failure by the station to recognize that a buildup of normal corrosion products had the potential to enter the seal, causing seal failure. Corrosion products present in the RCP seal area accumulated and bound the mating surface of the double-delta seal to the Number 1 insert. This binding eliminated the necessary tolerance for axial movement, seizing the Number 1 seal and causing the loss of seal leakoff flow. The RCP seal had been in service since the March 2009 refueling outage.

Analysis of Event

No Probabilistic Risk Assessment study was generated as no risk significant equipment failures posed elevated risk. It is recognized that there was an RCP seal malfunction, but the malfunction affected the seal by closing it off and preventing significant leak-off past the seal face.

Based on review of the control room log and Plant Process Computer (PPC) information, along with the post-trip review, from which the information above was obtained, all plant systems performed as designed to shut down the unit and remove decay heat following the July 26, 2009, trip and the event did not represent a significant risk. No risk-significant equipment functions were affected/failed and no significant operator actions outside those required for normal trips were required.

Corrective Actions

The RCP 22 seal assembly was inspected and replaced.

The RCP 21 seal assembly was inspected and replaced.

A comprehensive plan has been developed and will be implemented for flushing the RCP seal components.

Previous Similar Events

LERs for both units for the past three years were reviewed for similar events. While there have been reactor trips, none have been manual reactor trips which were performed as a result of RCP malfunction.