



**INDIANA
MICHIGAN
POWER**

A unit of American Electric Power

Indiana Michigan Power
Cook Nuclear Plant
One Cook Place
Bridgman, MI 49106
IndianaMichiganPower.com

February 25, 2021

AEP-NRC-2021-06
10 CFR 50.73

Docket No.: 50-316

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
11555 Rockville Pike
Rockville, MD 20852

Donald C. Cook Nuclear Plant Unit 2
LICENSEE EVENT REPORT 316/2020-004-01
Unit 2 Automatic Reactor Trip on Low-Low #24 Steam Generator Water Level

In accordance with 10 CFR 50.73, Licensee Event Report (LER) System, Indiana Michigan Power Company, the licensee for Donald C. Cook Nuclear Plant Unit 2, is submitting as an enclosure to this letter the following report:

LER 316/2020-004-01: Unit 2 Automatic Reactor Trip on Low-Low #24 Steam Generator Water Level

The enclosed LER has been revised to update the cause of the event and the corrective actions.

There are no commitments contained in this submittal.

Should you have any questions, please contact Mr. Michael K. Scarpello, Regulatory Affairs Director, at (269) 466-2649.

Sincerely,

Q. Shane Lies
Site Vice President

MPH/ml

Enclosure: Licensee Event Report 316/2020-004-01: Unit 2 Automatic Reactor Trip on Low-Low #24 Steam Generator Water Level

IE22
NRR

c: R. J. Ancona – MPSC
EGLE – RMD/RPS
J. B. Giessner – NRC Region III
D. L. Hille – AEP Ft. Wayne
NRC Resident Inspector
R. M. Sistevaris – AEP Ft. Wayne
S. P. Wall – NRC, Washington D.C.
A. J. Williamson – AEP Ft. Wayne

Enclosure to AEP-NRC-2021-06

Licensee Event Report 316/2020-004-01: Unit 2 Automatic Reactor Trip on Low-Low #24 Steam
Generator Water Level

**LICENSEE EVENT REPORT (LER)**

(See Page 3 for required number of digits/characters for each block)

(See NUREG-1022, R.3 for instruction and guidance for completing this form <http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/>)

Estimated burden per response to comply with this mandatory collection request 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Library, and Information Collections Branch (T-6 A10M), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to infocollections.Resource@nrc.gov, and the OMB reviewer at [OMB Office of Information and Regulatory Affairs, \(3150-0104\), Attn: Desk at oira_submission@omb.eop.gov](mailto:OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk at oira_submission@omb.eop.gov). The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

1. Facility Name Donald C. Cook Nuclear Plant Unit 2	2. Docket Number 05000316	3. Page 1 OF 4
---	------------------------------	-------------------

4. Title Unit 2 Automatic Reactor Trip on Low-Low #24 Steam Generator Water Level
--

5. Event Date			6. LER Number			7. Report Date			8. Other Facilities Involved	
Month	Day	Year	Year	Sequential Number	Revision No.	Month	Day	Year	Facility Name	Docket Number
10	12	2020	2020	004	01	2	25	2021	Facility Name	05000
									Facility Name	Docket Number 05000

9. Operating Mode 1	10. Power Level 100
------------------------	------------------------

11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: (Check all that apply)				
10 CFR Part 20	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.36(c)(2)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	10 CFR Part 73
<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.69(g)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(4)
<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.71(a)(5)
<input type="checkbox"/> 20.2203(a)(2)(i)	10 CFR Part 21	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(1)(i)
<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 21.2(c)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(v)(E)	<input type="checkbox"/> 73.77(a)(2)(i)
<input type="checkbox"/> 20.2203(a)(2)(iii)	10 CFR Part 50	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(F)	<input type="checkbox"/> 73.77(a)(2)(ii)
<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(G)	
<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)	
<input type="checkbox"/> OTHER (Specify here, in abstract, or NRC 366A).				

12. Licensee Contact for this LER	
Licensee Contact Michael K. Scarpello, Regulatory Affairs Director	Phone Number (Include area code) (269) 466-2649

13. Complete One Line for each Component Failure Described in this Report									
Cause	System	Component	Manufacturer	Reportable to IRIS	Cause	System	Component	Manufacturer	Reportable to IRIS
A	SG	N/A	N/A	Y					

14. Supplemental Report Expected					15. Expected Submission Date			Month	Day	Year
<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes (If yes, complete 15. Expected Submission Date)									

16. Abstract (Limit to 1560 spaces, i.e., approximately 15 single-spaced typewritten lines)

On October 12, 2020, at 0026, Donald C. Cook Nuclear Plant Unit 2 Reactor automatically tripped from 100% power due to a Low-Low Steam Generator (SG) Water Level in #24 SG.

The initiating event for this trip was a Human Performance Error that resulted in a degraded Main Condenser Vacuum. Auxiliary Operators were in the process of realigning blowdown, when a procedure use error resulted in a reduction of Vacuum. Unit 2 Control Room Operators recognized the degrading condenser vacuum, and took action to raise Main Feedwater demand while directing field operators to close a valve to restore vacuum. Vacuum subsequently recovered; however, Main Feedwater Pump performance had degraded to the point that sufficient Feedwater flow could not be supplied to the SGs to avoid tripping on Low-Low SG Water Level in #24 SG.

The cause of this error was a procedure use error and the immediate corrective action was restoration of the SG Blowdown System to a normal operational alignment. This event was reported via Event Notification 54944 in accordance with 10 CFR 50.72(b)(2)(iv)(B), and 10 CFR 50.72(b)(3)(iv)(A). This event is also reportable as a Licensee Event Report in accordance with 10 CFR 50.73(a)(2)(iv)(A).

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

(See NUREG-1022, R.3 for instruction and guidance for completing this form
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/>)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Library, and Information Collections Branch (T-6 A10M), U. S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@nrc.gov, and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk Officer for the Nuclear Regulatory Commission, 725 17th Street NW, Washington, DC 20503, e-mail: oma_submission@omb.eop.gov. The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Donald C. Cook Nuclear Plant Unit 2	05000316	2020	- 004	- 01

NARRATIVE**EVENT DESCRIPTION**

On October 12, 2020, at 0026, Donald C. Cook Nuclear Plant (CNP) Unit 2 Reactor automatically tripped from 100% power due to a Low-Low Steam Generator (SG) [SB] [SG] Water Level in #24 SG.

The initiating event for this trip was a Human Performance Error that resulted in a degraded Main Condenser [SG][COND] Vacuum. Unit 2 Control Room Operators recognized the reduction in condenser vacuum, and took action to raise Main Feedwater [SJ] demand while directing field operators to close a valve to restore vacuum. Vacuum subsequently recovered; however, Main Feedwater Pump [SJ][P] performance had degraded to the point that sufficient Feedwater flow could not be supplied to the SGs to avoid tripping on Low-Low SG Water Level in #24 SG.

Main Feedwater is supplied by two turbine driven pumps, each with their own condensers, with shell side cross-tied to the Main Condenser. Degraded vacuum in any one of the condensers affects the Main Condenser and both Main Feedwater Pump Condensers. Degradation in condenser vacuum adversely affects the thermodynamic efficiency of the Main Feedwater Pump turbines and pump capacity. Therefore, the lowering of vacuum reduced Main Feedwater flow to the point that SG water levels could not be maintained. Due to the recovery of Main Condenser Vacuum, Main Feedwater and the Steam Dumps [SG] [V] remained available after the trip.

Prior to the trip, actions were in progress to realign SG Blowdown [WI] from the Startup Flash Tank [TK] to the Normal Flash Tank. During this realignment, Main Condenser Vacuum lowered rapidly due to a procedure use error that introduced a direct flowpath from atmosphere to the Main Condenser. As a result of the degrading vacuum, all four Feedwater Regulating Valves [SJ][LCV] received a full open demand signal and Main Feedwater Pump demand was manually raised in response to lowering SG water level. Subsequently, SG water level recovered above the reactor trip setpoint in #21, #22 and #23 SGs. However, SG water level lowered to the trip setpoint in #24 SG.

Following the trip, Unit 2 was supplied by offsite power. All control rods fully inserted. The Auxiliary Feedwater Pumps [BA][P] started and operated, as expected. Decay heat was initially removed by the SG Power Operated Relief Valves [SG][PCV] due to the degraded condenser vacuum, however, after vacuum was recovered, the Steam Dumps were subsequently used for decay heat removal. All four Reactor Coolant Pumps [AB][P] remained running and CNP Unit 2 was stabilized in Mode 3. Reactor Coolant System temperature and pressure transient behavior were typical of an uncomplicated trip from full power and stabilized at normal values.

This event was reported via Event Notification 54944 in accordance with 10 CFR 50.72(b)(2)(iv)(B), and 10 CFR 50.72(b)(3)(iv)(A). This event is also reportable as a Licensee Event Report in accordance with 10 CFR 50.73(a)(2)(iv)(A).

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

(See NUREG-1022, R 3 for instruction and guidance for completing this form
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/>)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Library, and Information Collections Branch (T-6 A10M), U. S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollections.Resource@nrc.gov, and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk Officer for the Nuclear Regulatory Commission, 725 17th Street NW, Washington, DC 20503, e-mail: ora_submission@omb.eop.gov. The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Donald C. Cook Nuclear Plant Unit 2	05000316	2020	- 004	- 01

CAUSE OF THE EVENT

An In-depth Apparent Cause Evaluation (IACE) was performed to further evaluate the cause of the Unit 2 Reactor Trip. This IACE determined that established online risk management tools and processes are not implemented with the same rigor when one unit is in an outage as compared to when both units are online.

A Root Cause Evaluation (RCE) was also performed to evaluate performance gaps in Procedure Use and Adherence (PU&A). This RCE determined that Operations management and supervision have not effectively reinforced proper PU&A and the Human Performance tools that support its performance.

INTERIM CORRECTIVE ACTIONS

Enhanced requirements were implemented regarding pre-job briefs, peer checks by operators involving multiple procedures, identification and communication of critical steps in procedures, and increased supervisory oversight in the field.

As a result of the IACE, the procedure for Conduct of Operations: Standards (OHI-4000) will be updated to incorporate the following enhancements:

- 1) Maintain a Lead Auxiliary Equipment Operator available to the online unit by staffing the position at all times to provide appropriate oversight of online unit work (do not suspend during outages).
- 2) Clarify roles and responsibilities between outage and online unit staffing to eliminate ownership confusion over evolutions or tasks, especially those that involve both units.
- 3) Pre-job briefs for outage work that requires system manipulation of the online unit will be performed in the online unit's control room and in the presence of the online unit's Unit Supervisor.

Additionally, a method, to ensure the online medium and high trip/transient risk tasks are identified and included for discussion in the daily online production meeting during refueling outages, will be developed and implemented.

RCE - CORRECTIVE ACTIONS TO PREVENT REPETITION (CAPR)

Revise the Continuing Training Weekly Schedule section of TPD-600-NLO, Non-Licensed Operator Training Program Description, to require one Dynamic Learning Activity or Job Performance Measure every training period, subject to Operations Management approval, to include specific criteria that evaluates for proper implementation of PU&A standards and Human Performance tools.

A full time observer, in Operations, will be assigned to focus on PU&A and the Human Performance tools that support its performance, until each crew is observed, including backshift and training sessions.



LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

(See NUREG-1022, R.3 for instruction and guidance for completing this form
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/>)

Estimated burden per response to comply with this mandatory collection request, 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Library, and Information Collections Branch (T-6 A10M), U S Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to infocollections.Resource@nrc.gov, and the OMB reviewer at OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk Officer for the Nuclear Regulatory Commission, 725 17th Street NW, Washington, DC 20503; e-mail: omb_submission@omb.eop.gov. The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
Donald C. Cook Nuclear Plant Unit 2	05000316	YEAR 2020	SEQUENTIAL NUMBER 004	REV NO. 01

ASSESSMENT OF SAFETY CONSEQUENCES

NUCLEAR SAFETY

There was no actual or potential nuclear safety hazards resulting from the Unit 2 Reactor Trip on Low-Low #24 Steam Generator Water Level.

INDUSTRIAL SAFETY

There was no actual or potential industrial safety hazard resulting from the Unit 2 Reactor Trip on Low-Low #24 Steam Generator Water Level.

RADIOLOGICAL SAFETY

There was no actual or potential radiological safety hazard resulting from the Unit 2 Reactor Trip on Low-Low #24 Steam Generator Water Level.

PROBABILISTIC RISK ASSESSMENT

A Probabilistic Risk Assessment (PRA) was completed. The safety significance of the event was derived by calculating the Conditional Core Damage Probability (CCDP) and the Conditional Large Early Release Probability (CLERP) of the general transient initiating event in the CNP PRA model. A comparison of the CCDP and CLERP estimates to regulatory guidance resulted in a categorization of this event as having very low safety significance.

PREVIOUS SIMILAR EVENTS

A review of Licensee Event Reports for the past five years found no events due to similar causes.