

January 9, 2020

AEP-NRC-2020-02
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 316/2020-001-00
Failure of Source Range Nuclear Instrumentation Resulting
in a Condition Prohibited by Technical Specifications

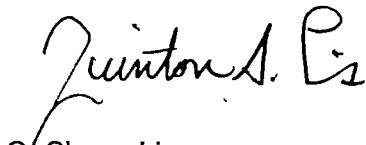
In accordance with 10 CFR 50.73, Licensee Event Report (LER) System, Indiana Michigan Power Company, the licensee for Donald C. Cook Nuclear Plant Unit 2, is submitting as an enclosure to this letter the following report:

LER 316/2020-001-00: Failure of Source Range Nuclear Instrumentation Resulting in a
Condition Prohibited by Technical Specifications

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/kmh

Enclosure: Licensee Event Report 316/2020-001-00: Failure of Source Range Nuclear
Instrumentation Resulting in a Condition Prohibited by Technical Specifications

IE22
NRR

c: R. J. Ancona – MPSC
R. F. Kuntz – NRC Washington DC
EGLE – RMD/RPS
NRC Resident Inspector
D. J. Roberts – NRC Region III
A. J. Williamson – AEP Ft. Wayne

Enclosure to AEP-NRC-2020-02

Licensee Event Report 316/2020-001-00
Failure of Source Range Nuclear Instrumentation Resulting
in a Condition Prohibited by Technical Specifications



LICENSEE EVENT REPORT (LER)

(See Page 2 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 Information Services Branch (T-2 F43), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@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.

1. FACILITY NAME

Donald C. Cook Nuclear Plant Unit 2

2. DOCKET NUMBER

05000316

3. PAGE

1 OF 4

4. TITLE

Failure of Source Range Nuclear Instrumentation Resulting in a Condition Prohibited by Technical Specifications

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
11	13	2019	2020	001	00	01	09	2020	N/A	05000

9. OPERATING MODE		11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)			
3	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(vii)(A)	
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(vii)(B)	
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)	
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)	
10. POWER LEVEL	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)	
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)	
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.77(a)(1)	
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(2)(i)	
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(vi)	<input type="checkbox"/> 73.77(a)(2)(ii)	
	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> OTHER	Specify in Abstract below or in NRC Form 366A		

12. LICENSEE CONTACT FOR THIS LER

LICENSEE CONTACT

Michael K. Scarpello, Regulatory Affairs Director

TELEPHONE 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 ICES	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO ICES
X	IG	DET	WEST	Y					

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE)☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 14 single-spaced typewritten lines)

On November 13, 2019, with Unit 2 in Mode 3, Operators were conducting rod drop measurement tests and the Channel 2 Source Range Neutron Flux Detector failed to indicate properly. A partial calibration of the detector channel was performed and declared operable. Following calibration, the detector again failed to respond as expected to reactor rod withdrawals during sub-critical physics testing.

An evaluation concluded that the channel 2 source range detector was inoperable longer than allowed by Technical Specifications. Additionally, both channel 1 and channel 2 source range detectors were simultaneously inoperable for approximately 25 minutes on November 13, 2019. During the time when both source range detectors were inoperable, there were other nuclear instrumentation monitors available to alert Operators of any unexpected increase in neutron flux within the reactor core. The cause of the failure was determined to be a degraded connection on a newly installed triaxial cable connector. The cable and the degraded connectors were replaced with an installed spare.

Therefore, this event is reportable as an Operation or Condition Prohibited by Technical Specifications in accordance with 10CFR50.73(a)(2)(i)(B) and as an Event or Condition that Could Have Prevented Fulfillment of a Safety Function in accordance with 10CFR50.73(a)(2)(v)(A).

NRC FORM 366A (04-2018)	U.S. NUCLEAR REGULATORY COMMISSION <div style="display: flex; align-items: center; justify-content: center;"> <div> LICENSEE EVENT REPORT (LER) CONTINUATION SHEET </div> </div>	<div style="display: flex; justify-content: space-between;"> APPROVED BY OMB: NO. 3150-0104 EXPIRES: 03/31/2020 </div> <p style="font-size: small;">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 Information Services Branch (T-2 F43), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollect.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NE08-10202, (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.</p>						
(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/)								
1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER						
Donald C. Cook Nuclear Plant Unit 2	05000316	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 33%;">YEAR</th> <th style="width: 33%;">SEQUENTIAL NUMBER</th> <th style="width: 33%;">REV NO</th> </tr> <tr> <td style="text-align: center;">2020</td> <td style="text-align: center;">- 001</td> <td style="text-align: center;">- 00</td> </tr> </table>	YEAR	SEQUENTIAL NUMBER	REV NO	2020	- 001	- 00
		YEAR	SEQUENTIAL NUMBER	REV NO				
2020	- 001	- 00						
<p>NARRATIVE</p> <p>EVENT DESCRIPTION</p> <p>Technical Specification (TS) Limiting Condition for Operation (LCO) 3.3.1, Reactor Trip System (RTS) Instrumentation, requires two Source Range Neutron Flux Trip channels to be operable in Modes 3, 4, and 5 when the Rod Control System [AA] is capable of rod withdrawal, or one or more rods are not fully inserted. With one Source Range Neutron Flux Trip Channel inoperable in Modes 3, 4, or 5, the required action is to restore the channel to operable status within 48 hours. If the required action completion time is not met, then the requirement is to immediately take actions to fully insert all rods and to place the Rod Control System in a condition incapable of rod withdrawal within 1 hour. Additionally, if two Source Range Neutron Flux Trip Channels are inoperable in Modes 3, 4, or 5, the required action is to immediately open the Reactor Trip Breakers (RTBs).</p> <p>TS LCO 3.3.8, Boron Dilution Monitoring Instrumentation (BDMI), requires two Source Range Neutron Flux Monitoring channels to be operable in Modes 3, 4 and 5. When one Source Range Neutron Flux Monitoring Channel is inoperable in Modes 3, 4, or 5, the Required Action is to restore the Channel to operable status within 7 days.</p> <p>On November 13, 2019, at 2102 hours, with Donald C. Cook Nuclear Plant Unit 2 in Mode 3, during performance of the procedure for Multiple Rod Drop Measurements, 2-NRI-32 (Nuclear Instrumentation Channel 2 Source Range Neutron Flux Detector) [IG] [DET] failed to indicate properly. A partial calibration of the detector channel was performed and 2-NRI-32 was declared operable at 1428 hours on November 14, 2019. Subsequently, during sub-critical physics testing at 2002 hours on November 14, 2019, 2-NRI-32 again failed to respond as expected to Shutdown and Control Bank withdrawals.</p> <p>As a result of the second failure, a Past Operability Determination Evaluation (PODE) was performed and concluded that 2-NRI-32 was inoperable per TS 3.3.1 from 0050 hours on November 13, 2019, when the Unit 2 RTBs were closed, until the RTBs were re-opened at 1556 hours on November 15, 2019, for a total of 63 hours and 6 minutes. The period over which 2-NRI-32 was inoperable exceeded the time allowed by TS 3.3.1. Additionally, both Source Range Channels were inoperable from 0307 hours to 0332 hours on November 13, 2019 when 2-NRI-31 (Nuclear Instrumentation Channel 1 Source Range Neutron Flux Detector) was removed from service and rendered inoperable during high flux shutdown adjustments and 2-NRI-32 was also inoperable.</p> <p>The PODE also determined that 2-NRI-32 was inoperable, per TS LCO 3.3.8, from the time Unit 2 entered Mode 5 at 0052 hours on November 5, 2019, until 1017 hours on November 18, 2019, for a period of 13 days, 9 hours and 25 minutes. The period over which 2-NRI-32 was inoperable exceeded the time allowed by TS 3.3.8.</p> <p>Therefore, this event is reportable as an Operation or Condition Prohibited by Technical Specifications in accordance with 10CFR50.73(a)(2)(i)(B) and as an Operation or Condition that Could Have Prevented Fulfillment of a Safety Function in accordance with 10CFR50.73(a)(2)(v)(A).</p>								

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

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		YEAR	SEQUENTIAL NUMBER	REV NO
Donald C. Cook Nuclear Plant Unit 2	05000316	2020	- 001	- 00

COMPONENTS

2-NRI-32: Nuclear Instrumentation Channel 2 Source Range Neutron Flux Detector.

CAUSE OF THE EVENT

The cause of the failure was determined to be a degraded connection on a newly installed triaxial cable connector.

CORRECTIVE ACTIONS

The cable and the degraded connectors were replaced with an installed spare.

ASSESSMENT OF SAFETY CONSEQUENCES**NUCLEAR SAFETY**

For the 13 days, 9 hours and 25 minutes, when 2-NRI-32 was inoperable for indication and audible count rate, per TS 3.3.8, 2-NRI-31 was operable, except for the 25 minutes that both Source Range Channels were inoperable, and would have been the primary method of detection for an unintended increase in reactivity. Additionally, Operators were monitoring both the Thermo Gamma-Metrics neutron flux monitors and the Volume Control Tank (VCT) level. A sudden increase in neutron flux observed in the Gamma-Metrics monitor or an unexpected change to VCT level would prompt Operators to investigate and subsequently discover the boron dilution event.

For the 63 hours and 6 minutes, when 2-NRI-32 trip function was inoperable per TS 3.3.1, 2-NRI-31, except for the 25 minutes that both Source Range Channels trip functions were inoperable, as well as the intermediate range and power range detectors were capable of detecting neutron flux and would have provided a reactor trip signal.

For the 25 minutes that both Source Range Channels were inoperable for indication and audible count rate, per TS 3.3.8, the Thermo Gamma-Metrics monitor and VCT level indications were available to the Operators to monitor and respond to a boron dilution event. For the 25 minutes that both Source Range Channels trip functions were inoperable, the intermediate range and power range detectors were capable of detecting neutron flux and would have provided a reactor trip signal.

Therefore, there was no actual or potential nuclear safety hazard resulting from the inoperable Source Range Neutron Flux Detector(s).

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CONTINUATION SHEET**

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Donald C. Cook Nuclear Plant Unit 2	05000316	2020	- 001	- 00

INDUSTRIAL SAFETY

There was no actual or potential industrial safety hazard resulting from the inoperable Source Range Neutron Flux Detector(s).

RADIOLOGICAL SAFETY

There was no actual or potential radiological safety hazard resulting from the inoperable Source Range Neutron Flux Detector(s).

PROBABILISTIC RISK ASSESSMENT

The Probabilistic Risk Assessment (PRA) model does not credit the source range detectors as indicators to take plant actions, and thus a qualitative approach was used to assess risk of the event. During the time that one or both source range detectors were inoperable, The Intermediate Range detectors, the Power Range detectors, and the Thermo Gamma-Metrics neutron flux monitors were all available as visual indicators in the control room to monitor core flux in the event of a Boron Dilution. The trip functions for Intermediate and Power Range were all available to protect against an uncontrolled rod withdrawal. Therefore the overall risk is estimated to be of very low safety significance.

PREVIOUS SIMILAR EVENTS

A review of Licensee Event Reports for the past three years found no similar events.