



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION III  
2443 WARRENVILLE ROAD, SUITE 210  
LISLE, ILLINOIS 60532-4352

October 28, 2019

Mr. Joel P. Gebbie  
Chief Nuclear Officer  
Indiana Michigan Power Company  
Nuclear Generation Group  
One Cook Place  
Bridgman, MI 49106

**SUBJECT: DONALD C. COOK NUCLEAR PLANT, UNITS 1 AND 2 – TRIENNIAL FIRE  
PROTECTION INSPECTION REPORT 05000315/2019012 AND  
05000316/2019012**

Dear Mr. Gebbie:

On September 27, 2019, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Donald C. Cook Nuclear Plant, Units 1 and 2. On September 26, 2019, the NRC inspectors discussed the results of this inspection with you and other members of your staff. The results of this inspection are documented in the enclosed report.

One finding of very low safety significance (Green) is documented in this report. This finding involved a violation of NRC requirements. We are treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest the violation or significance or severity of the violation documented in this inspection report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region III; the Director, Office of Enforcement; and the NRC Resident Inspector at D.C. Cook.

If you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region III; and the NRC Resident Inspector at Donald C. Cook.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

*/RA/*

Robert C. Daley, Chief  
Engineering Branch 3  
Division of Reactor Safety

Docket Nos. 05000315 and 05000316  
License Nos. DPR-58 and DPR-74

Enclosure:  
As stated

cc w/ encl: Distribution via LISTSERV®

SUBJECT: DONALD C. COOK NUCLEAR PLANT, UNITS 1 AND 2 – TRIENNIAL FIRE PROTECTION INSPECTION REPORT 05000315/2019012 AND 05000316/2019012 DATED OCTOBER 28, 2019

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**U.S. NUCLEAR REGULATORY COMMISSION  
Inspection Report**

Docket Numbers: 05000315 and 05000316

License Numbers: DPR-58 and DPR-74

Report Numbers: 05000315/2019012 and 05000316/2019012

Enterprise Identifier: I-2019-012-0027

Licensee: Indiana Michigan Power Company Nuclear Generation Group

Facility: Donald C. Cook Nuclear Plant, Units 1 and 2

Location: Bridgman, MI

Inspection Dates: August 26, 2019 to September 27, 2019

Inspectors: I. Hafeez, Reactor Inspector  
G. Hausman, Senior Reactor Inspector  
A. Shaikh, Senior Reactor Inspector

Approved By: Robert C. Daley, Chief  
Engineering Branch 3  
Division of Reactor Safety

## SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting a triennial fire protection inspection at Donald C. Cook Nuclear Plant, Units 1 and 2 in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to <https://www.nrc.gov/reactors/operating/oversight.html> for more information.

### List of Findings and Violations

Failure to Include Appropriate Acceptance Criteria In Fire Protection Water System Flow Test Procedure			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000316,05000315/2019012-01 Open/Closed	[H.6] - Design Margins	71111.05XT
The inspectors identified a finding of very-low safety significance and associated violation of Technical Specification 5.4 "Procedures," for the licensee's failure to maintain fire protection water system flow test procedure. Specifically, the licensee failed to maintain Procedure 12-FPP-4030-066-006, "Three Year Fire Protection System Unobstructed Flow Test," by not including appropriate acceptance criteria in the procedure to demonstrate that adequate fire protection water flow and pressure would be delivered to various fire suppression loads in the plant.			

### Additional Tracking Items

None.

## INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at <http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

## REACTOR SAFETY

### 71111.05XT - Fire Protection - NFPA 805

#### Fire Protection Inspection Requirements (IP Section 02.01a) (4 Samples)

The inspectors evaluated fire protection program implementation in the following selected areas and/or fire zones, including analyzed electrical circuits:

- (1) [AA5/6](#) (6M) Unit 2 Auxiliary Building (Aux Building Middle West)  
Analyzed Circuits: (Include if applicable)
  - West Charging Pump
- (2) [AA40](#) (41) Unit 1 ESS and MCC Rooms  
Analyzed Circuits: (Include if applicable)
  - SG#1 Water Level(Wide Range) Control Rm Indication
- (3) [AA44](#) (46A/B/C/D) Unit 2 Emergency Power Area (All zones)  
Analyzed Circuits: (Include if applicable)
  - RHR Pump Minimum Flow MOV
- (4) [AA48](#) (55 & 56) Unit 1 SWGR Cable Vault and Aux Cable Vault

#### B.5.b Inspection Activities (IP Section 02.03) (1 Sample)

The inspectors evaluated the following B.5.b Mitigating Strategies:

- (1)
  - Make up to Refueling Water Storage Tank (RWST)
  - Make up to Condensate Storage Tank (CST)

## INSPECTION RESULTS

Failure to Include Appropriate Acceptance Criteria In Fire Protection Water System Flow Test Procedure			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000316,05000315/2019012-01 Open/Closed	[H.6] - Design Margins	71111.05XT
<p>The inspectors identified a finding of very-low safety significance and associated violation of Technical Specification 5.4 "Procedures," for the licensee's failure to maintain fire protection water system flow test procedure. Specifically, the licensee failed to maintain Procedure 12-FPP-4030-066-006, "Three Year Fire Protection System Unobstructed Flow Test," by not including appropriate acceptance criteria in the procedure to demonstrate that adequate fire protection water flow and pressure would be delivered to various fire suppression loads in the plant.</p>			
<p><u>Description:</u> On September 29, 2016, Procedure 12-FPP-4030-066-006, Revision 7 was implemented to meet the requirements of Technical Requirements Surveillance (TRS) 8.7.5.20 and thereby, establish operability of the fire suppression water system per Technical Requirements Manual (TRM) 8.7.5. TRM 8.7.5, states, in part, that the fire suppression water system shall be operable with an operable flow path capable of taking suction from either one of the fire water tanks and transferring the water through protected area distribution piping and TRS 8.7.5.20 requires, in part, that the licensee verify, by a series of full flow tests, every fire main segment to be clear of obstruction. Section 1.0 of procedure 12-FPP-4030-066-006 states, in part, that the purpose of this procedure is to verify that the fire mains are clear and free of obstructions and that this procedure complies with Unit 1 and Unit 2 TRM TRS 8.7.5.20. Procedure 12-FPP-4030-066-006, Section 5.0, "Acceptance Criteria," states, in part, that the fire protection engineer verifies that the flow loop test demonstrates adequate, unimpeded system flow for the system to perform its intended fire protection functions. However, the inspectors identified that no quantitative acceptance criteria was included in the procedure for the fire protection engineer to verify that the flow and pressure measurements taken during the flow test demonstrated unimpeded flow and that the fire suppression system would be able to perform its intended fire protection function of supplying adequate flow and pressure to various suppression loads throughout the plant. Specifically, the licensee stated that at the time of the test, no quantitative acceptance criteria for maximum allowed pressure loss in the system piping had been established for this test and a general trend in pressure and flow measurements taken during each test was used to qualitatively assess the degradation of the fire suppression system piping. The inspectors determined that the licensee could therefore not have verified the operability of the fire suppression water system because the maximum allowed pressure loss for the system to still be able to perform its fire protection functions was not known. The inspectors further determined that in December 2016, the licensee performed a calculation to determine the maximum allowed pressure losses in the system piping to be used as the acceptance criteria for procedure 12-FPP-4030-066-006 for future tests. The inspectors questioned the licensee's acceptance of the September 29, 2016, test against the new quantitative acceptance criteria and the licensee stated that no determination had been conducted to ensure that the previous September 29, 2016, test was satisfactory. In order to address the inspector's question and concern regarding the September 29, 2016, test, the licensee reconciled the test data against the new quantitative acceptance criteria and determined that the test had failed the acceptance criteria and therefore, the licensee would have failed to</p>			

meet TRS 8.7.5.20 and TRM 8.7.5. In addition, during the inspection, the licensee conducted its "Three Year Fire Protection System Unobstructed Flow Test" to meet TRM 8.7.5 and TRS 8.7.5.20 requirements utilizing the new quantitative acceptance criteria and again failed the test. Therefore, the licensee declared the fire suppression water system inoperable per TRM 8.7.5.

Corrective Actions: The licensee documented the failed flow tests of 2016 and 2019 and the inspectors' concerns into its corrective action program (CAP) and implemented immediate corrective action to align a backup source of fire suppression system water distribution as required by TRM 8.7.5 action item. In addition, the licensee had reached out to its contractor that performed the quantitative hydraulic calculation to re-evaluate the plant's fire suppression system piping flow model and the licensee intends to inspect and determine which sections of piping may be obstructed.

Corrective Action References:

AR 2019-9028; NRC Identified Finding for 12-FPP-4030-066-006 Done in 2016

AR 2019-8760; Loop 3 FP Flow Test Did Not Meet Acceptance Criteria

Performance Assessment:

Performance Deficiency: The inspectors determined that the licensee's failure to include appropriate acceptance criteria in the fire protection suppression water system flow test procedure 12-FPP-4030-066-006, Revision 7 was a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Protection Against External Factors attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to include acceptance criteria in the flow test procedure resulted in the licensee accepting the fire protection suppression system flow test as satisfactory even though the system would not be able to automatically meet the pressure and flow requirements for various automatic suppression loads in the plant. Therefore, this failure adversely affected the mitigating system cornerstone objective of ensuring the availability, reliability and capability of systems that respond to initiating events (fire) to prevent undesirable consequences (i.e., core damage).

Significance: The inspectors assessed the significance of the finding using Appendix F, "Fire Protection and Post - Fire Safe Shutdown SDP." The inspectors screened the finding using Appendix F, Attachment 1, "Part 1: Fire Protection SDP Phase 1 Worksheet," dated September 20, 2013. The inspectors answered "YES" to Question 1.4.3.A, "Would adequate fire water capacity (flow and required pressure) still be available for protection of equipment important to safe shutdown in the most limiting location onsite?" Specifically, the licensee had the capability to manually start a second fire pump to augment the lowered pressure and flow seen by the fire suppression system due to the main distribution piping obstructions. Therefore, the inspectors determined that adequate fire water capacity would still be available to provide protection of equipment important to safe shutdown in the most limiting location onsite and that the finding screened as having very-low safety significance (Green).

Cross-Cutting Aspect: H.6 - Design Margins: The organization operates and maintains equipment within design margins. Margins are carefully guarded and changed only through a



systematic and rigorous process. Special attention is placed on maintaining fission product barriers, defense-in-depth, and safety related equipment. Specifically, the inspectors determined that the licensee failed to understand, calculate and guard the absolute design margins of pressure and flow required for adequate suppression capabilities onsite and instead relied on relative trending data to establish system capability resulting in the licensee's failure to incorporate acceptance criteria into its flow test procedure that would maintain the fire water system within its design margins.

Enforcement:

Violation: TRM 8.7.5, states, in part, that the fire suppression water system shall be operable with an operable flow path capable of taking suction from either one of the fire water tanks and transferring the water through protected area distribution piping and TRS 8.7.5.20 requires, in part, that the licensee verify, by a series of full flow tests, every fire main segment to be clear of obstruction. Procedure 12-FPP-4030-066-006 Revision7 was used to ensure this requirement was met; however, this procedure contained no acceptance criteria to ensure the adequacy of flow. Technical Specification 5.4.1.d requires, in part, that, written procedures shall be established, implemented, and maintained covering the Fire Protection Program implementation. Contrary to the above, on September 29, 2016, the licensee did not have a procedure that implemented the Fire Protection Program requirement in the TRM (8.7.5) to verify that the fire distribution piping was free of obstruction and operable. Specifically, procedure 12-FPP-4030-066-006 Revision 7, "Three Year Fire Protection Water System Unobstructed Flow Test" did not contain acceptance criteria to verify that the fire protection water system could meet its intended fire protection function.

Enforcement Action: This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.

## **EXIT MEETINGS AND DEBRIEFS**

The inspectors verified no proprietary information was retained or documented in this report.

- On September 26, 2019, the inspectors presented the triennial fire protection inspection results to Joel P. Gebbie and other members of the licensee staff.

**DOCUMENTS REVIEWED**

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.05XT	Calculations	MD-12-HV-013-N	AB & CD Battery Rooms Hydrogen Evolution	2
		PRA-NB-FIRE-FQ	Fire PRA Model Quantification Notebook	1
		R2684-1098-000	Unobstructed Flow Test Acceptance Criteria	12/22/2016
	Corrective Action Documents	AR 2016-7239	NFPA 805 Monitoring Program FPRA/Maintenance Performance	06/16/2016
		GT 2014-13933	Change NFPA 805 Higher Risk Evaluation (HRE) Definition	11/05/2014
		GT 2016-12812	NFPA 805 Monitoring Program - return systems to a(2) status	11/04/2016
	Corrective Action Documents Resulting from Inspection	AR 2019-8242	12-OHP-4026-EDM-001 Observations	08/28/2019
		AR 2019-8593	Additional Spare Batteries needed for NFPA 805 Headlamps	09/10/2019
		AR 2019-8712	Possible Enhancements to 12-OHP-4025-001-002	09/12/2019
		AR 2019-9028	NRC Identified Finding for 12-FPP-4030-066-006 Done in 2016	09/24/2019
		AR 2019-9101	NRC Observation from 2019 Fire Protection Triennial	09/26/2019
	Drawings	2-5724E	Heating & Ventilation Cable Enclosure Area & Battery Room @ El.625'-0" Unit 2	1
		OP-2-5148C	Flow Diagram Diesel Generator Area & Elec. Switchgear Rooms Heating & Ventilation Sys. Unit #2	31
		OP-2-98731	Area Heating Elementary Diagram	15
		OP-2-98741	Aux Bldg Ventilation Sheet No. 1 Elementary Diagram	36
	Engineering Changes	EC-0000053523	Modify U1 East 600V SWGR RM Mezz Area C02 from Manual to Automatic	5
	Engineering Evaluations	Engineering Equivalency Evaluation 11-71	Emergency Power Systems Area and EPS Control Rod Drive Room Fire Door Closure Evaluation	04/03/2017
	Fire Plans	FPMP	NFPA 805 Monitoring Program Analysis	3
		FSA	Fire Area: AA5/6 - Auxiliary Building (El. 587 ft.)	3
		FSA	Fire Area: AA40 - Unit 1 Engineered Safeguards Systems and Motor Control Center Room	3

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			(El. 609 ft. 6 in.)	
		FSA	Fire Area: AA44 - Unit 2 Emergency Power Systems Area (El. 609 ft. 6 in.)	3
		FSA	Fire Area: AA48 - Unit 1 Switchgear Rooms Cable Vault and Auxiliary Cable Vault (El. 625 ft. 10 in. and 620 ft. 6 in.)	3
	Miscellaneous	ES-PIPE-1013-QCN	Pipe Material Specification	10
		FAQ 10-0059	NFPA 805 Monitoring	6
		NFPA 805	Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants	2001 Edition
		TRM	Technical Requirements Manual	80
	Procedures	1-OHP-4025-LS-1	Process Monitoring from LSI Panels	3
		1-OHP-4025-LS-2	Start-up AFW	5
		1-OHP-4025-LS-2	Start-up AFW	7
		1-OHP-4025-LS-6	RCS Make-up with CVCS Cross-tie	6
		1-OHP-4025-LTI-2	Local Main Steam Isolation	1
		12-FPE-2270-FPCE-001	Fire Protection Program Change Evaluations (FPCE)	3
		12-FPE-2270-FPMP-001	Fire Protection Required SSC Monitoring Program	1
		12-FPP-2270-066-005	Fire Truck Inventory and Operability Test	14
		12-FPP-2270-066-024	Hydrostatic Testing and Re-Rack of Fire Hose	10
		12-FPP-2270-066-030	Other Fire Protection Equipment Inspections	29
		12-FPP-2270-066-037	Functional Check and Inspection of the Hale Portable Pumps	9
		12-FPP-4030-	Three Year Fire Protection Water System Unobstructed	7

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		066-006	Flow Test	
		12-OHP-4025-001-002	Fire Response Guidelines	7
		12-OHP-4025-001-002	Fire Response Guidelines	19
		12-OHP-4026-EDM-001	Extensive Damage Mitigation Initial Response	8
		12-OHP-4026-EDM-002	Extensive Damage Mitigation Enhanced Site Response Strategies	6
		2-IHP-4030-266-012	Unit 2 Engineered Safety Switchgear CO2 Fire Suppression Test	2
		2-OHP-4025-LS-1	Process Monitoring from LSI Panels	3
		2-OHP-4025-LS-6	RCS Make-up with CVCS Cross-tie	8
		NFPPM	NFPA 805 Fire Protection Program Manual	3
		PMP-2270-CCM-001	Control of Combustible Materials	24
		PMP-2270-CCM-001	Control of Combustible Materials	43
		PMP-2270-SDR-001	Fire Protection Suppression, Detection Systems, and Rated Assemblies	17
		PMP-4030--001-001	Impact of Safety Related Ventilation on the Operability of Technical Specification Equipment	31
		PMP-4100-SDR-002	Outage Risk Assessment and Management	13
		Work Orders	12-PP-144	Electric Fire Pump Test
	12-PP-145E		Diesel Fire Pump Test	07/18/2018
	55470909		3 Year Fire Protection Water Flow Test	09/26/2016
	55470910		3 Year Fire Protection Water Flow Test	09/28/2016
	55499733		OPFP, U-2 Turb Bldg, Hydro Test/Re-Rack Fire Hose	06/27/2018
	55506058		OPFP, Annual Hydro Test of Misc Fire Hose Outside P.A.	06/06/2018
55521410	OPFP, Hale Portable Pumps Accessory Inspection		07/25/2019	

