



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, ILLINOIS 60532-4352

February 8, 2021

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

SUBJECT: DONALD C. COOK NUCLEAR PLANT – INTEGRATED INSPECTION REPORT
05000315/2020004 AND 05000316/2020004

Dear Mr. Gebbie:

On December 31, 2020, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Donald C. Cook Nuclear Plant. On January 12, 2021, 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 did not involve a violation of NRC requirements.

If you disagree with a cross-cutting aspect assignment or a finding not associated with a regulatory requirement 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 Nuclear Plant.

The NRC identified an administrative error in the NRC Integrated Inspection Report 05000315/05000316/2020003 (ADAMS Accession Number ML 20302A422), dated October 28, 2020. Specifically, the sample for Inspection Procedure (IP) 71114.06, "Drill Evaluation," was inadvertently listed under IP Section 03.02. It should be listed under IP Section 03.01. Since the error has been corrected in the NRC's internal tracking system, a corrected report will not be issued.

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 Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Néstor J. Félix Adorno, Chief
Branch 4
Division of Reactor Projects

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

Enclosure:
As stated

cc w/ encl: Distribution via LISTSERV®

Letter to Joel P. Gebbie from Néstor J. Félix Adorno dated February 8, 2021.

SUBJECT: DONALD C. COOK NUCLEAR PLANT – INTEGRATED INSPECTION REPORT
05000315/2020004 AND 05000316/2020004

DISTRIBUTION:

Jessie Quichocho

Mark Haire

Richard Skokowski

RidsNrrDorlLpl3

RidsNrrPMDCCook Resource

RidsNrrDrolrib Resource

John Giessner

Kenneth O'Brien

Jamnes Cameron

Allan Barker

DRPIII

DRSIII

ROPreports.Resource@nrc.gov

ADAMS ACCESSION NUMBER: ML21039A705

<input checked="" type="checkbox"/> SUNSI Review		<input checked="" type="checkbox"/> Non-Sensitive <input type="checkbox"/> Sensitive		<input checked="" type="checkbox"/> Publicly Available <input type="checkbox"/> Non-Publicly Available	
OFFICE	RIII	RIII			
NAME	RNg:wc via email	NFélixAdorno via email			
DATE	2/8/2021	2/8/2021			

OFFICIAL RECORD COPY

U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Numbers: 05000315 and 05000316

License Numbers: DPR-58 and DPR-74

Report Numbers: 05000315/2020004 and 05000316/2020004

Enterprise Identifier: I-2020-004-0060

Licensee: Indiana Michigan Power Company

Facility: Donald C. Cook Nuclear Plant

Location: Bridgman, Michigan

Inspection Dates: October 1, 2020 to December 31, 2020

Inspectors: S. Bell, Health Physicist
M. Domke, Reactor Inspector
E. Fernandez, Reactor Inspector
M. Garza, Emergency Preparedness Inspector
P. Laflamme, Senior Resident Inspector, Palisades Nuclear Plant
J. Mancuso, Resident Inspector
P. Zurawski, Senior Resident Inspector

Approved By: Néstor J. Félix Adorno, Chief
Branch 4
Division of Reactor Projects

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting an integrated inspection at Donald C. Cook Nuclear Plant, 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

Unit 2 Reactor Trip due to Failure to Follow Procedure			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green FIN 05000316/2020004-01 Open/Closed	[H.12] - Avoid Complacency	71153
A self-revealed Green finding was identified when the licensee failed to follow revision 66 of procedure 2-OHP-4021-025-001, "Steam Generator Blowdown," Attachment 6, "Termination of Steam Generator Blowdown." Specifically, procedure 2-OHP-4021-025-001, Attachment 6, step 4.7.3 required operators to close start-up blowdown flash tank 2-TK-49 outlet valves 2-BDI-162 and 2-BDI-128. Operators failed to close these valves causing a later step to open a vent from the main condenser to atmosphere. This caused a low condenser vacuum condition which led to degraded main feed pump (MFP) performance and ultimately caused an automatic reactor trip on low-low steam generator level.			

Additional Tracking Items

None.

PLANT STATUS

Unit 1 began the inspection period in a refueling outage. The unit was returned to rated thermal power on October 26, 2020. Unit 2 began the inspection period at rated thermal power. On October 12, 2020, the unit automatically tripped due to a loss of condenser vacuum. On October 16, 2020, the unit was returned to rated thermal power. Unit 2 power reduced to approximately 96 percent on December 2, 2020, due to a failed heater drain pump discharge valve. The unit was returned to full rated power on December 4, 2020.

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.

Starting on March 20, 2020, in response to the National Emergency declared by the President of the United States on the public health risks of the Coronavirus Disease 2019 (COVID-19), resident inspectors were directed to begin telework and to remotely access licensee information using available technology. During this time, the resident inspectors performed periodic site visits each week; conducted plant status activities as described in IMC 2515, Appendix D, "Plant Status"; observed risk-significant activities; and completed on-site portions of IPs. In addition, resident and regional baseline inspections were evaluated to determine if all or portions of the objectives and requirements stated in the IP could be performed remotely. If the inspections could be performed remotely, they were conducted per the applicable IP. In some cases, portions of an IP were completed remotely and on-site. The inspections documented below met the objectives and requirements for completion of the IP.

REACTOR SAFETY

71111.04 - Equipment Alignment

Partial Walkdown Sample (IP Section 03.01) (2 Samples)

The inspectors evaluated system configurations during partial walkdowns of the following systems/trains:

- (1) Unit 1 component cooling water (CCW) heat exchanger on October 1, 2020
- (2) Unit 1/2 emergency diesel generators (EDGs) 1AB, 2AB, 2CD, protected for major switchyard work on October 28, 2020

Complete Walkdown Sample (IP Section 03.02) (2 Samples)

- (1) The inspectors evaluated system configurations during a complete walkdown of the core spray system on November 30, 2020.

- (2) The inspectors evaluated system configurations during a complete walkdown of the Unit 1 EDGs with predicted geomagnetic disturbance on December 10, 2020.

71111.05 - Fire Protection

Fire Area Walkdown and Inspection Sample (IP Section 03.01) (4 Samples)

The inspectors evaluated the implementation of the fire protection program by conducting a walkdown and performing a review to verify program compliance, equipment functionality, material condition, and operational readiness of the following fire areas:

- (1) Fire Area AA19; Unit 1 turbine driven auxiliary feed pump room on December 3, 2020
- (2) Fire Area 20; Unit 1 east motor driven auxiliary feed pump room on December 3, 2020
- (3) Fire Zone 42D; Unit 1 emergency power supply (EPS) (AB) battery room on December 3, 2020
- (4) Fire Area 48; Unit 1 switchgear room cable vault & auxiliary cable vault on December 3, 2020

Fire Brigade Drill Performance Sample (IP Section 03.02) (1 Sample)

- (1) The inspectors evaluated the on-site fire brigade training and performance during an unannounced fire drill on November 5, 2020.

71111.06 - Flood Protection Measures

Inspection Activities - Internal Flooding (IP Section 03.01) (2 Samples)

The inspectors evaluated internal flooding mitigation protections in the:

- (1) Unit 2 EDG rooms 2AB & 2CD on December 10, 2020
- (2) Unit 1 service water pump area and essential service water on December 15, 2020

71111.08P - Inservice Inspection Activities (PWR)

PWR Inservice Inspection Activities Sample (IP Section 03.01) (1 Sample)

- (1) The inspectors verified that the reactor coolant system boundary, steam generator tubes, reactor vessel internals, risk-significant piping system boundaries, and containment boundary were appropriately monitored for degradation and that repairs and replacements were appropriately fabricated, examined and accepted by reviewing the following activities from September 21, 2020 to October 1, 2020:

03.01.a - Nondestructive Examination and Welding Activities.

- Volumetric examination reviews of feedwater (FW) system welds 1-FW-17-02S, 1-FW-17-03S, 1-FW-17-11S, and 1-FW-17-12F which are risk-informed welds with no known degradation mechanism examined 03/20/2019
- Ultrasonic thickness examination of piping 1-B-020-1-2D-9E for flow accelerated corrosion in turbine building

- Work order no. 55525844-01, Riser clamp for pipe support 1-GCCW-R274 exceeds code allowable stresses and needs replacement with larger capacity riser clamp, welds OW-17, OW-18, OW-19, OW-20, and OW-21

03.01.b - Pressurized-Water Reactor Vessel Upper Head Penetration Examination Activities

- Work Order (WO) no. 55530746-01, Bare Metal Visual of RVCH (Reactor Vessel Closure Head) examination of upper head nozzles and general areas

03.01.c – Pressurized-Water Reactor Boric Acid Corrosion Control Activities. The following boric acid evaluations and corrective action records were reviewed:

- Action Request (AR) 2019-4591, Boric Acid on the Bottom of the U1 Reactor Vessel
- AR 2019-2406, Refueling Cavity
- AR 2019-4771, Refueling Cavity
- AR 2019-7401, Refueling Water Purification Filter Outlet to Unit 1 Refueling Cavity Shutoff Valve

71111.11Q - Licensed Operator Regualification Program and Licensed Operator Performance

Licensed Operator Performance in the Actual Plant/Main Control Room (IP Section 03.01) (1 Sample)

- (1) The inspectors observed and evaluated licensed operator performance in the Unit 1 Control Room during start-up on October 18, 2020.

Licensed Operator Regualification Training/Examinations (IP Section 03.02) (4 Samples)

- (1) The inspectors observed and evaluated a licensed operator regualification exercise in the simulator on November 4, 2020.
- (2) The inspectors observed and evaluated a licensed operator regualification exercise in the simulator on November 17, 2020.
- (3) The inspectors observed and evaluated a licensed operator regualification exercise in the simulator on November 24, 2020.
- (4) The inspectors observed and evaluated a licensed operator regualification exercise in the simulator on December 15, 2020.

71111.12 - Maintenance Effectiveness

Maintenance Effectiveness (IP Section 03.01) (3 Samples)

The inspectors evaluated the effectiveness of maintenance to ensure the following structures, systems, and components (SSCs) remain capable of performing their intended function:

- (1) 1DG-101A, ABS starting air compressor outlet check valve on December 14, 2020
- (2) Unit 2 north heater drain pump discharge valve on December 16, 2020
- (3) Unit 2 pressurizer heater transformer rollup door following a failure on December 16, 2020

Quality Control (IP Section 03.02) (1 Sample)

The inspectors evaluated the effectiveness of maintenance and quality control activities to ensure the following SSC remains capable of performing its intended function:

- (1) Upper containment purge exhaust valve, Train A, for the 2-XSO-126 solenoid replacement on November 2, 2020

71111.13 - Maintenance Risk Assessments and Emergent Work Control

Risk Assessment and Management Sample (IP Section 03.01) (2 Samples 1 Partial)

The inspectors evaluated the accuracy and completeness of risk assessments for the following planned and emergent work activities to ensure configuration changes and appropriate work controls were addressed:

- (1) (Partial)
Unit 1 airlock equalizing valve removal on November 18, 2020
- (2) Unit 2 2-CRV-252 north heater drain pump not responding correctly to demand on December 2, 2020
- (3) Unit 1 & 2 online work week (Cycle 116, Week 11) with fire risk evaluation on December 2, 2020

71111.15 - Operability Determinations and Functionality Assessments

Operability Determination or Functionality Assessment (IP Section 03.01) (6 Samples)

The inspectors evaluated the licensee's justifications and actions associated with the following operability determinations and functionality assessments:

- (1) 600VAC switchgear fire damper #17 found closed as documented in AR 2020-0177 on November 6, 2020
- (2) Reactor coolant loop #1 cold and hot leg wide range temperature recorder thermal sensor were oscillating as documented in AR 2020-9182 on November 6, 2020
- (3) 2CD EDG jacket water leak rate change as documented in AR 2020-0221 on November 9, 2020
- (4) Oil leak from 2-DL-166C; 2CD EDG lube oil cooler as documented in AR 2020-9590 on November 30, 2020
- (5) U2 AHU alarm; ice condenser air handling abnormal as documented in AR 2020-9766 on December 1, 2020
- (6) Debris found on 1-AIRLOCK-C650 door frame concentric seal as documented in AR 2020-9822 on December 2, 2020

71111.19 - Post-Maintenance Testing

Post-Maintenance Test Sample (IP Section 03.01) (8 Samples)

The inspectors evaluated the following post-maintenance test activities to verify system operability and functionality:

- (1) Unit 1 CRID-3 inverter on October 1, 2020

- (2) Unit 1 AB EDG on October 2, 2020
- (3) Unit 1 low power physics testing on October 18, 2020
- (4) Unit 1 west diesel fire pump on October 27, 2020
- (5) Upper containment purge exhaust valve, Train A, for 2-XSO-126 solenoid replacement on November 2, 2020
- (6) East charging pump maintenance on November 3, 2020
- (7) East essential service water on November 4, 2020
- (8) Unit 2 main generator hydrogen seal oil cooler hydrogen leakage on December 14, 2020

71111.20 - Refueling and Other Outage Activities

Refueling/Other Outage Sample (IP Section 03.01) (1 Sample)

- (1) Refueling outage U1C30 began the previous inspection period. The inspector's evaluation of refueling outage activities continued from October 1, 2020 to October 19, 2020.

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Surveillance Tests (other) (IP Section 03.01) (3 Samples)

- (1) Unit 1 east containment spray pump operability and Group B pump test on November 1, 2020
- (2) Unit 2 pressurizer level instruments 2-NLP-151 and 2-NLP-153 on November 2, 2020
- (3) 1-OHP-4030-119-022E east essential service water system test on November 4, 2020

RCS Leakage Detection Testing (IP Section 03.01) (1 Sample)

- (1) 2-OHP-4021-002-006 PRT leak rate determination on October 31, 2020

Containment Isolation Valve Testing (IP Section 03.01) (1 Sample)

- (1) Upper containment purge exhaust valve, Train A, for 2-XSO-126 solenoid replacement on November 2, 2020

Ice Condenser Testing (IP Section 03.01) (1 Sample)

- (1) Unit 1 ice condenser basket weighing on December 28, 2020

FLEX Testing (IP Section 03.02) (1 Sample)

- (1) FLEX 500 and 250 Mw surveillance on December 15, 2020

71114.04 - Emergency Action Level and Emergency Plan Changes

Inspection Review (IP Section 02.01-02.03) (1 Sample)

- (1) The inspectors completed an evaluation of submitted emergency action level and emergency plan changes on October 8, 2020. This evaluation does not constitute NRC approval.

71114.06 - Drill Evaluation

Integrated Inspection Report 05000315/2020003 and 05000316/2020003 credited an inspection sample to IP 71114.06 Section 03.02 rather than 03.01. The Reactor Program System has been updated to properly account for that inspection sample under IP Section 03.01.

Drill/Training Evolution Observation (IP Section 03.02) (2 Samples)

The inspectors evaluated:

- (1) Fire scenario training evolution with emergency preparedness (EP) classification on November 5, 2020
- (2) Licensed operator requalification training with EP classification on November 18, 2020

RADIATION SAFETY

71124.01 - Radiological Hazard Assessment and Exposure Controls

Radiological Hazard Assessment (IP Section 03.01) (1 Sample)

- (1) The inspectors evaluated how the licensee identifies the magnitude and extent of radiation levels and the concentrations and quantities of radioactive materials and how the licensee assesses radiological hazards.

Instructions to Workers (IP Section 03.02) (1 Sample)

- (1) The inspectors evaluated radiological protection related instructions to plant workers.

Contamination and Radioactive Material Control (IP Section 03.03) (2 Samples)

The inspectors evaluated licensee processes for monitoring and controlling contamination and radioactive material.

- (1) Observed workers exiting the radiological controlled area (RCA) during the Unit 1 refueling outage.
- (2) Evaluated licensee methods and processes for the release surveys of potentially contaminated material leaving the RCA during the Unit 1 refueling outage.

Radiological Hazards Control and Work Coverage (IP Section 03.04) (3 Samples)

The inspectors evaluated in-plant radiological conditions during facility walkdowns and observation of radiological work activities.

- (1) Unit 1 RCP#4 Seal/O-ring replacement performed under Radiation Work Permit (RWP) 201151
- (2) Unit 1 Reactor head inspections and cleaning performed under RWP 201151
- (3) Unit 1 West Residual Heat Removal Heat Exchanger Outlet to Safety Injection Pump Suction Shutoff Valve (IMO-350 Valve) repair performed under RWP 20028

High Radiation Area and Very High Radiation Area Controls (IP Section 03.05) (4 Samples)

The inspectors evaluated licensee controls of the following High Radiation Areas and Very High Radiation Areas:

- (1) Unit 1 Volume Control Tank Room
- (2) Spent Resin Storage Tank Room
- (3) Unit 1 Reactor Pit
- (4) Clean and Dirty Hold Up Tank (HUT) Room

Radiation Worker Performance and Radiation Protection Technician Proficiency (IP Section 03.06) (1 Sample)

- (1) The inspectors evaluated radiation worker and radiation protection technician performance as it pertains to radiation protection requirements.

71124.02 - Occupational ALARA Planning and Controls

Radiological Work Planning (IP Section 03.01) (3 Samples)

The inspectors evaluated the integration of as low as is reasonably achievable planning into the following work activities:

- (1) U1C29 Containment Install, Modify and Remove Scaffold performed under RWP 19-1142, Revision 0
- (2) U1C29 Reactor Baffle Bolt Inspection and Repair Activities to Include Lower Internal Movements performed under RWP 19-1105, Revisions 0-1
- (3) U1C29 Under Vessel Inspections performed under RWP 19-1187, Revision 0

Verification of Dose Estimates and Exposure Tracking Systems (IP Section 03.02) (3 Samples)

The inspectors evaluated dose estimates and exposure tracking.

- (1) U1C29 Containment Install, Modify and Remove Scaffold performed under RWP 19-1142, Revision 0
- (2) U1C29 Reactor Baffle Bolt Inspection and Repair Activities to Include Lower Internal Movements performed under RWP 19-1105, Revisions 0-1
- (3) U1C29 Under Vessel Inspections performed under RWP 19-1187, Revision 0

Implementation of ALARA and Radiological Work Controls (IP Section 03.03) (3 Samples)

The inspectors evaluated the licensee's communication of as low as is reasonably achievable ALARA and radiological work controls for the following work activities:

- (1) U1C29 Containment Install, Modify and Remove Scaffold performed under RWP 19-1142, Revision 0
- (2) U1C29 Reactor Baffle Bolt Inspection and Repair Activities to Include Lower Internal Movements performed under RWP 19-1105, Revisions 0-1
- (3) U1C29 Under Vessel Inspections performed under RWP 19-1187, Revision 0

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

MS06: Emergency AC Power Systems (IP Section 02.05) (2 Samples)

- (1) Unit 1 (October 1, 2019–September 30, 2020)
- (2) Unit 2 (October 1, 2019–September 30, 2020)

MS07: High Pressure Injection Systems (IP Section 02.06) (2 Samples)

- (1) Unit 1 (October 1, 2019–September 30, 2020)
- (2) Unit 2 (October 1, 2019–September 30, 2020)

BI01: Reactor Coolant System (RCS) Specific Activity Sample (IP Section 02.10) (2 Samples)

- (1) Unit 1 (January 1, 2019–September 30, 2020)
- (2) Unit 2 (January 1, 2019–September 30, 2020)

BI02: RCS Leak Rate Sample (IP Section 02.11) (2 Samples)

- (1) Unit 1 (October 1, 2019–September 30, 2020)
- (2) Unit 2 (October 1, 2019–September 30, 2020)

OR01: Occupational Exposure Control Effectiveness Sample (IP Section 02.15) (1 Sample)

- (1) (January 1, 2019–September 30, 2020)

71152 - Problem Identification and Resolution

Semiannual Trend Review (IP Section 02.02) (1 Sample)

- (1) The inspectors reviewed the licensee's corrective action program for potential adverse trends in ARs that might be indicative of a more significant safety issue on December 16, 2020.

Annual Follow-up of Selected Issues (IP Section 02.03) (1 Sample)

The inspectors reviewed the licensee's implementation of its corrective action program related to the following issues:

- (1) Unit 1 unidentified leakage on December 17, 2020

71153 – Follow-up of Events and Notices of Enforcement Discretion

Personnel Performance (IP Section 03.03) (1 Sample)

- (1) The inspectors evaluated the licensee's performance during an automatic trip of Unit 2 on low-low steam generator level on October 12, 2020.

INSPECTION RESULTS

Observation: Unit 1 Elevated Calculated Reactor Coolant System Unidentified Leakage	71152
<p>The inspectors reviewed the circumstance and licensee corrective actions, including condition evaluation, associated with Unit 1 elevated calculated Reactor Coolant System (RCS) unidentified leakage that occurred in November and December of 2020.</p> <p>On November 9, 2020, the Tier 1 Action Level 1 (9 days above mean) was exceeded. The licensee initiated AR 2020-9315 and investigated the condition. Licensee actions included verifying the affected parameters (RCS level, volume control tank (VCT) level, average RCS temperature, and pressurizer pressure). Additionally, the licensee reviewed other leakage indicators (containment radiation monitors, dew point, and containment sump level). No anomalies were noted. The licensee also ran multiple confirmatory leak rate calculations with different times. Results were near normal. As a result, the Tier 1 Action Level was exited on November 10, 2020.</p> <p>On December 16, 2020, during performance of a daily RCS leak rate evaluation, the licensee noted calculated Unit 1 RCS leakage had risen. The next night leakage had risen again. A confirmatory leak rate was completed with leakage again slightly risen. Although these leak rate rises did not result in entry into a Tier Action Level at the time, the licensee initiated corrective action AR 2020-10277 in anticipation that the RCS calculated leakage trend would eventually result in a Tier level action requirement. The licensee initiated similar action as previously described and inspectors independently reviewed confirmatory RCS parameters as well as other licensee actions. While the licensee's investigation for AR 2020-10277 was still being conducted, on December 22, 2020, Tier Action Level 1 was again exceeded. The licensee initiated AR 2020-10406 and its actions were tied to those of AR 2020-10277 already in progress. Similar confirmatory checks, in addition to a containment walkdown, were conducted. Inspectors reviewed the licensee's condition evaluation which concluded the leakage did not appear to be due to any external leakage into containment, there was no evidence of increased sump inventory, or elevated radiation levels. The condition evaluation concluded the most probable cause was some form of intersystem leakage which could not be identified at the very low leak rates observed. Inspector review of licensee actions and independently validating confirmatory leakage parameters resulted in no anomalies being identified. Although the source of leakage had not been determined by the close of this inspection period, the licensee continued to investigate the issue. The inspectors also continued monitoring the condition and licensee actions.</p>	

Unit 2 Reactor Trip Due to Failure to Follow Procedure			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green FIN 05000316/2020004-01 Open/Closed	[H.12] - Avoid Complacency	71153
<p>A self-revealed Green finding was identified when the licensee failed to follow revision 66 of procedure 2-OHP-4021-025-001, "Steam Generator Blowdown," Attachment 6, "Termination of Steam Generator Blowdown." Specifically, procedure 2-OHP-4021-025-001, Attachment 6, step 4.7.3 required operators to close start-up blowdown flash tank 2-TK-49 outlet valves 2-BDI-162 and 2-BDI-128. Operators failed to close these valves causing a later step to open a vent from the main condenser to atmosphere. This caused a low condenser vacuum condition which led to degraded main feed pump (MFP) performance and ultimately caused an automatic reactor trip on low-low steam generator level.</p>			
<p><u>Description:</u></p> <p>On October 11, 2020, Unit 2 operators were briefed to realign Unit 2 steam generator blowdown to support Unit 1 refueling outage work. This brief included a discussion regarding the risk of a reactor trip if certain valves were mispositioned as well as the importance of ensuring the start-up blowdown flash tank 2-TK-49 outlet valves (i.e., 2-BDI-162 and 2-BDI-128) were closed prior to opening the drain valves to prevent creating an approximate 2 inch vent path to the atmosphere from the condenser. Following this brief, field operators carried out the realignment using revision 66 of procedure 2-OHP-4021-025-001, "Steam Generator Blowdown," Attachment 3, "Normal Flash Tank via 2-DRV-352 - Bypassing Demineralizers," and Attachment 6, "Termination of Steam Generator Blowdown."</p> <p>After completing step 4.7.1 of Attachment 6, the operators incorrectly marked step 4.7.3 complete instead. Step 4.7.3 required operators to close valves 2-BDI-162 and 2-BDI-128. The operators then continued to complete Attachment 6 without closing these valves. On October 12, 2020, at 00:20, operators opened drain valve 2-BDI-129 in accordance with step 4.9.2 of Attachment 3. Because valves 2-BDI-162 and 2-BDI-128 were opened and in communication with valve 2-BDI-129, a vent path was created from the main condenser to the atmosphere. This rapidly created a low condenser vacuum condition which was noted by the main control room, leading them to direct the operators in the field to undo their actions. The field operators closed valve 2-BDI-129 and, thus, the vent from the main condenser to atmosphere. At this time, main condenser vacuum began to recover. However, due to the initial low condenser condition, the performance of the MFPs rapidly degraded, causing a low-level condition in the steam generators. While condenser vacuum recovered, MFP performance ultimately did not recover in time to correct the condition, causing Unit 2 to trip on low-low steam generator level at 00:26. NRC inspectors were notified of the trip at around 01:30 and the Headquarters Operations Officer (HOO) was made aware of the event via EN-54944 for Automatic Reactor Trip.</p> <p>Corrective Actions: Initial corrective actions were to close 2-BDI-129 followed by correcting the initial mispositioning of 2-BDI-162 and 2-BDI-128. The proposed long-term corrective actions at the time of this inspection included additional operator training.</p> <p>Corrective Action References: AR 2020-8488</p>			

Performance Assessment:

Performance Deficiency: The inspectors determined that the licensee's failure to close valves 2-BDI-162 and 2-BDI-128 when realigning Unit 2 steam generator blowdown was contrary to step 4.3.1 of procedure 2-OHP-4021-025-001 revision 66, Attachment 6, and was a performance deficiency. Specifically, this step required, in part, operators to close valves 2-BDI-162 and 2-BDI-128. Contrary to this, on October 11, 2020, operators did not close either valve when performing procedure 2-OHP-4021-025-001, Attachment 6.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Human Performance attribute of the Initiating Events cornerstone and adversely affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, the failure to follow procedure caused a momentary low condenser vacuum condition which initiated a transient that ultimately led to an automatic trip of Unit 2.

Significance: The inspectors assessed the significance of the finding using Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." Using Exhibit 1, "Initiating Events Screening Questions," under Block B, "Transient Initiators," the inspectors answered affirmatively to the question "Did the finding cause a reactor trip AND the loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition (e.g., loss of condenser, loss of feedwater)?" This affirmative answer was based on the initial low condenser condition causing a lock-out of the steam dumps, which are used by operators to transition the unit from an operating condition to a stable shutdown condition. Based on this screening, a detailed risk evaluation was performed. A regional Senior Reactor Analyst used the Donald C. Cook SPAR model and calculated the impact of the performance deficiency by setting the Loss of Condenser Heat Sink (LOCHS) equal to 1.0. The nominal risk of a LOCHS, in a given year, was subtracted from the non-conforming case resulting in a delta-CDF = $3.6E-7$ /year (i.e., Green). The dominant sequence was a LOCHS, where both auxiliary feedwater and feed & bleed core cooling fail, leading to core damage. External events and large early release frequency were considered qualitatively and determined to have negligible impact on the result.

Cross-Cutting Aspect: H.12 - Avoid Complacency: Individuals recognize and plan for the possibility of mistakes, latent issues, and inherent risk, even while expecting successful outcomes. Individuals implement appropriate error reduction tools. Specifically, the operators did not implement appropriate error reduction tools when managing the risk associated with the performance of procedure 2-OHP-4021-0025-001. While the operators were briefed of the potential to cause a low condenser vacuum condition, they did not perform the procedure with the diligence and oversight required of a trip transient initiator.

Enforcement:

Inspectors did not identify a violation of regulatory requirements associated with this finding.

EXIT MEETINGS AND DEBRIEFS

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

- On January 12, 2021, the inspectors presented the integrated inspection results to Mr. J. Gebbie, Senior Vice President, and other members of the licensee staff.
- On October 1, 2020, the inspectors presented the radiation protection baseline inspection results to Mr. J. Gebbie, Senior Vice President, and other members of the licensee staff.
- On October 1, 2020, the inspectors presented the U1C30 ISI Exit Meeting inspection results to Mr. J. Gebbie, Senior Vice President, and other members of the licensee staff.
- On October 8, 2020, the inspectors presented the IP 71114.04 Exit Meeting inspection results to Ms. D. Burgoyne, Emergency Preparedness Supervisor, and other members of the licensee staff.
- On December 3, 2020, the inspectors presented the radiation protection baseline inspection results to Mr. S. Lies, Site Vice President, and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.04	Drawings	OP-1-5135-41	Flow Diagram CCW Pumps and Heat Exchangers	41
		OP-1-5135-46	CCW Safety Related Loads	46
		OP-1-5151A	EDG Lube Oil System	50
		OP-1-5151B	Flow Diagram Generator AB	61
		OP-1-5151D	Flow Diagram Emergency Diesel Generator 'CD'	74
		OP-2-5151B	Flow Diagram Generator 'AB'	59
		OP-2-5151B-69	Flow Diagram Emergency Diesel Generator 'AB'	69
		OP-2-5151C-52	Flow Diagram Emergency Diesel Generator 'CD' Unit No 2	52
		OP-2-5151D	Flow Diagram Emergency Diesel Generator 'CD' Unit No 2	69
		OP-5151C	Flow Diagram Emergency Diesel Generator 'CD'	58
71111.05	Fire Plans	Fire Protection Program - Fire Pre-Plans	Fire Zone 14; PZR Transformer Room	38
		Fire Protection Program - Fire Pre-Plans	Fire Area AA19; Unit 1 Turbine Driven Auxiliary Feed Pump (TDAFP) Room	38
		Fire Protection Program - Fire Pre-Plans	Fire Area 20; Unit 1 East Motor Driven Auxiliary Feed Pump (MDAFP) Room	38
		Fire Protection Program - Fire Pre-Plans	Fire Zone 42D; Unit 1 EPS (AB) Battery Room	38
		Fire Protection Program - Fire Pre-Plans	Fire Area 48; Unit 1 Switchgear Room Cable Vault & Auxiliary Cable Vault	38
	Miscellaneous	420-060-D	OHI-2270, Fire Drills Data Sheet 1, Pressurizer Transformer Room	000
	Procedures	12-OHP-4025-001-002	Fire Response Guidelines	21
71111.06	Procedures	PMP-5091-FLD-001	Flood Protection Program	006
71111.08P	Corrective Action	2014-12836-4	Preventative Measures for U1C27 BMI Examination	03/27/2015

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Documents	2019-10017	NRC Unit 2 ISI Inspection Issue of Concern	10/17/2019
		2019-2454	Incorrect Examination Location Identification	03/12/2019
		2019-2985	Foreign Material Identified During U1 RPV Visual Examination	03/22/2019
		2019-3555	Scope Surface Exam 1-OME-3-01 MS Nozzle U1C29	04/05/2019
		2019-4591	Boric Acid on the Bottom of the U1 Reactor Vessel	05/01/2019
		2019-4771-1	Boric Acid Identified in U1 Upper Refueling Cavity Sandbox	05/30/2019
		2020-7521	Evidence of Boric Acid Found Reactor Bottom Penetration 53	09/22/2020
		2020-7659	Evaluate Relevant Conditions Identified during BMI Exam	09/24/2020
	Corrective Action Documents Resulting from Inspection	2020-7597	NRC Unit 1 ISI Inspection Observation	09/23/2020
		2020-7699	Improper Evaluation of BMI Inspection Relevant Indications	09/25/2020
		2020-7837	Evaluate Relevant Conditions Identified During RVCH Exam	09/28/2020
	Procedures	12-QHP-5050-NDE-008	Ultrasonic Examination Using Longitudinal Wave (Straight Beam)	7
		12-QHP-5050-NDE-014	Grid Layout for Flow Accelerated Corrosion Examinations	4
		12-QHP-5050-NDE-027	Visual Examination for Boric Acid and Condition of Component Surface	5
		EH1-5054-RHI	Reactor Head Inspection Program	1
		PMP-5030-001-001	Boric Acid Corrosion Control	23
	Work Orders	3190013-07	Visual Examination for Boric Acid and Condition of Component Surface	10/22/2003
		55377628 01	NQQS, 1-OME-1, Perform VT-2, Bare Metal Reactor Vessel	09/20/2011
		5542499-02	ENU, (PH01) Review Inspection Results	03/27/2016
		55452499-01	NQQS, 1-OME-1, Perform Lower Vessel BMI Penetration	03/27/2016
		55506733-01	NQQS, 1-OME-1, Perform Lower Vessel BMI Penetration	03/05/2019
		55506733-02	ENU, (PH01) Review Inspection Results	03/08/2019
		55511807-45	EISI, 1-OME-1 Perform RV Visual Re-Examinations	04/11/2019
		55511808-02	EIS, Vendor Perform Exams on 1-FW-17-02S/03S/11S/12F	08/21/2018
		55525844-01	WLD, 1-GCCW-R-274 EC-56943 Modify Riser Clamp Support	11/14/2019

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		55529757-01	Visual Examination for Boric Acid and Condition of Component Surface	09/22/2020
71111.11Q	Miscellaneous	RQ-S-4505-U2	RQ-S-4505-U2-Training Session 3	0
	Procedures	1-OHP-4021-001-002	Reactor Start-Up	068
71111.12	Corrective Action Documents	AR 2020-10146	1-DG-101A, AB2 Starting Air Compressor Outlet Check Valve Surveillance Failure	0
		AR 2020-10170	Pressurizer Heater Transformer Room Rolling Door Failed	0
		AR 2020-9874	Unit 2 North Heater Drain Pump Discharge Valve	0
	Miscellaneous	31284200	Material Issue Ticket - Solenoid Valve Cat ID 0430034130-1	08/10/2020
	Work Orders	55540383	2-XSO-126, Install EQ Solenoid	06/19/2020
		55555065	Unit 2 North Heater Drain Pump Discharge Valve	0
		55555478	Pressurizer Heater Transformer Room Rolling Door Failed	0
71111.13	Corrective Action Documents	AR 2020-8528	Question Regarding Containment Integrity	0
		AR-2020-9874	2-CRV-252 Stuck Open at 50%, U2 Power Reduction	0
	Miscellaneous		Unit 2 Online Risk (Cycle 116, Week 11)	0
			Detailed Fire Risk Evaluation (Cycle 116, Work Week 11)	0
			Operational Logs (December 1-3, 2020)	0
			Unit 1 Online Risk (Cycle 116, Week 11)	0
	Procedures	12-IHP-4030-046-002	Unit 1 and Unit 2 Personnel Airlock Door Seal Leak Rate Surveillance	2
	Work Orders	55553729-01	1-AIRLOCK-C612; Perform 12-IHP-4030-046-002 Seal LRT	10/29/2020
		55555065	North Heater Drain Pump Not Responding to Demand	0
71111.15	Corrective Action Documents	AR 2020-9177	1-HV-SGTR-FD-17 Found Closed	0
		AR 2020-9182	1-NTR-110 and 1-NTR-210 are Oscillating	0
		AR 2020-9221	2CD EDG Jacket Water Leak Rate Change	0
		AR 2020-9590	Oil Leak from 2-DL-166C	0
		AR 2020-9766	U-2 AHU Alarm	0
		AR 2020-9822	Debris Found on 1-Airlock-C650 Door Frame Concentric Seal	0
71111.19	Corrective Action Documents	AR 2020-10465	Hydrogen Gas Leak on U2 North H2 Seal Oil Cooler	0
		AR 2020-9096	Unit 2 Main Generator Cooler Oil Leak Worsens	0
	Procedures	2-OHP-4030-	East Centrifugal Charging Pump Operability Test	23

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		052E		
	Work Orders	5553733	Unit 2 Main Generator Hydrogen Seal Oil Cooler Hydrogen Leak	0
		55540383-01	2-XSO-126, Containment Upper Compartment Purge Exhaust 'A' Containment Isolation Valve VCR-106 Control Solenoid	11/02/2020
		55550677	East ESW Post-Maintenance Test	0
71111.22	Procedures	1-OHP-4030-109-007E	East Containment Spray System Test	40
		1-OHP-4030-119-022E	East Essential Service Water System Test	36
		12-OHP-5030-FSG-421	FLEX 500kW DG Functional Test	1
		12-OHP-5030-FSG-422	FLEX 250/350 kW DG Functional Test	1
		12-OHP-5030-FSG-423	FLEX 26kW DG Functional Test	2
		2-IHP-4030-202-005	Pressurizer Level Protection Set 1 Operational Test and Calibration	16
		2-IHP-4030-202-007	Pressurizer Protection Level Set 3 Operational Test and Calibration	19
		2-OHP-4021-002-006	Pressurizer Relief Tank Operation	35
	Work Orders	55538191	12-FLEX-GEN-500-1, FLEX 500kw, 600 VAC Diesel Generator #1	0
		55540383-01	2-XSO-126, Containment Upper Compartment Purge Exhaust 'A' Containment Isolation Valve VCR-106 Control Solenoid	11/02/2020
		55546503	Perform Surveillance 2-IHP-4030-202-005 (PZR LVL SET 1)	08/04/2020
		55548708-01	Perform Surveillance 2-IHP-4030-202-007 (PZR LVL SET 3)	08/04/2020
		55550103-01	Perform 1-OHP-4030-109-107E	0
71114.04	Corrective Action Documents	AR 2019-1428	Emergency Action Level for Fire	02/13/2019
		AR 2019-7097	Simulator Data Import to DAP	07/22/2019
	Miscellaneous	19-114	10 CFR 50.54(q) Effectiveness Evaluation Form	03/12/2020

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		19-119	10 CFR 50.54(q) Effectiveness Evaluation Form	12/11/2019
		19-18	10 CFR 50.54(q) Effectiveness Evaluation Form	07/10/2019
		19-26	10 CFR 50.54(q) Screening Form	07/18/2019
		19-92	10 CFR 50.54(q) Effectiveness Evaluation Form	03/12/2020
		20-02	10 CFR 50.54(q) Screening Form	01/29/2020
		20-04	10 CFR 50.54(q) Effectiveness Evaluation Form	03/11/2020
		20-18	10 CFR50.54(q) Effectiveness Evaluation Form	06/17/2020
		20-22	10 CFR 50.54(q) Effectiveness Evaluation Form	06/09/2019
		20-23	10 CFR 50.54(q) Effectiveness Evaluation Form	06/09/2020
71114.06	Miscellaneous	RQ-S-4505-U2-T1	Period 4505 U2 Training Session 4	1
	Procedures	420-060-D	OHI-2270, Fire Drills Data Sheet 1, Pressurizer Transformer Room	000
71124.01	Corrective Action Documents	2019-4893	Unanticipated SRD Dose Rate Alarm from 1-RH-138	05/06/2019
		2020-3677	Electronic Key System Glitch	04/30/2020
		2020-3828	Airborne Area Created by RCS Leak in Unit 2 Containment	05/01/2020
		2020-4315	Unit 1 Containment Not Posted for Potential Airborne Area	05/21/2020
		2020-4824	Degraded LHRA Door Mechanism in the 617' Demin Room	06/01/2020
		2020-6193	Process Gap Identified Using Sentinel Access Control	08/04/2020
	Miscellaneous		Locked High Radiation Area and Very High Radiation Door Verification	09/23/2020
	Procedures	12-THP-6010-RPP-401	Performance of Radiation and Contamination Surveys	46
		12-THP-6010-RPP-420	Radiological Controls for Radiography	12
		PMP-6010-RPP-003	High, Locked High, and Very High Radiation Area Access	31
	Radiation Surveys	12-THP-6010-RPP-418	Radiological Posting	39
		2020-331	Air Sample for 1-IMO-350 Valve Breach	09/29/2020
		VSDS-M-20200926-26	U1 Reactor Head Nozzles	09/28/2020
		VSDS-M-	Breach Valve 1- IMO-350	09/29/2020

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Radiation Work Permits (RWPs)	20200928-15		
		VSDS-M-20200928-8	U1 RCP #14/#1 Seal O-Ring Replacement	09/29/2020
		201128	U1C30 - Valve Activities in the Auxiliary Building, Containment, and Plant Radiologically Controlled Areas	00
		201133	U1C30 Auxiliary Building and Containment Decontamination/Clean-up Activities to include TEDA	00
		201151	U1C30 - RCP Maintenance Setup and Support	00
71124.02	ALARA Plans	191105	U1C29 Reactor Baffle Bolt Inspection and Repair Activities to Include Lower Internal Movements; Radiation Work Permit, ALARA Plans, Work in Progress Reviews, ALARA Post Job Evaluation, Radiological Surveys and Associated ALARA Committee Meeting Minutes	0-1
		191142	U1C29 Containment Install, Modify and Remove Scaffold; Radiation Work Permit, ALARA Plans, Work in Progress Reviews, ALARA Post Job Evaluation and Radiological Surveys	0
		191187	U1C29 Undervessel Inspection; Radiation Work Permit, ALARA Plans, Work in Progress Reviews, ALARA Post Job Evaluation and Radiological Surveys	0
	Corrective Action Documents	AR 2019-11942	Remove/Install of 2-ERA-8309 Dose Estimate Exceeded	12/05/2019
		AR 2019-2964	Erected Scaffold on Incorrect Equipment	03/21/2019
		AR 2019-3003	Work Order 55511816 Dose Underreporting During U1C29	03/22/2019
		AR 2020-8534	Oversight on the ALARA Committee Process	10/13/2020
	Miscellaneous		U1C29 Refueling Outage ALARA Report	08/15/2019
			U2C25 Refueling Outage ALARA Report	03/14/2020
71151	Corrective Action Documents	AR 2019-1110	An Uptake Occurred During Work Lubricating the Seal Table	11/05/2019
		AR 2020-4824	Degraded LHRA Door Mechanism in the 617' Demineralizer Room	06/11/2020
	Miscellaneous		U1 and U2 Reactor Coolant System Dose Equivalent Iodine Data from 01/01/2019 through 09/30/2020	Various
			Electronic Dosimeter Alarm Log Records from 01/01/2019 through 09/30/2020	Various
			MSPI Derivation Report - MSPI Emergency AC Power	0

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			System (October 2019 - September 2020) - Unit 1	
			MSPI Derivation Report - MSPI High Pressure Systems (October 2019 - September 2020) - Unit 1	0
			MSPI Derivation Report - MSPI Emergency AC Power System (October 2019 - September 2020) - Unit 2	0
			MSPI Derivation Report - MSPI High Pressure Systems (October 2019 - September 2020) - Unit 2	0
			Reactor Cooling System Leakage (October 2019 - September 2020) - Unit 1	0
			Reactor Cooling System Leakage (October 2019 - September 2020) - Unit 2	0
			Operational Logs (October 2019 - September 2020) - Unit 1	0
			Operational Logs (October 2019 - September 2020) - Unit 2	0
	Procedures	12-THP-6020-CHM-101	Reactor Coolant System	48
71152	Corrective Action Documents		ARs Generated June 2020 - December 2020	0
		AR 2020-10277	Elevated Calculated RCS Leakage	0
		AR 2020-10277-2	Condition Evaluation - Elevated Calculated RCS Leakage	0
		AR 2020-10406	Unit 1 RCS Leakage Has Reached Tier 1 Criteria	0
		AR 2020-9315	Daily RCS Leak Rate in U1 Exceeded Tier 1 Action Level	0
	Procedures	PMP-5076-ULR-001	RCS Leakage Monitoring Program	006
71153	Corrective Action Documents	AR 2020-8488	Unit 2 Reactor Trip - October 12, 2020	10/12/2020
	Procedures	2-OHP-4021-025-001	Steam Generator Blowdown	66