



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

REGION IV  
1600 EAST LAMAR BOULEVARD  
ARLINGTON, TEXAS 76011-4511

February 3, 2021

Mr. John Dent, Jr.  
Vice President and Chief Nuclear Officer  
Nebraska Public Power District  
Cooper Nuclear Station  
72676 648A Avenue  
P.O. Box 98  
Brownville, NE 68321

SUBJECT: COOPER NUCLEAR STATION – INTEGRATED INSPECTION  
REPORT 05000298/2020004

Dear Mr. Dent:

On December 31, 2020, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Cooper Nuclear Station. On January 22, 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.

No findings or violations of more than minor significance were identified during this inspection.

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,

Jason W. Kozal, Chief  
Reactor Projects Branch C  
Division of Reactor Projects

Docket No. 05000298  
License No. DPR-46

Enclosure:  
As stated

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COOPER NUCLEAR STATION – INTEGRATED INSPECTION REPORT 05000298/2020004 – DATED FEBRUARY 3, 2021

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

Docket Number: 05000298

License Number: DPR-46

Report Number: 05000298/2020004

Enterprise Identifier: I-2020-004-0006

Licensee: Nebraska Public Power District

Facility: Cooper Nuclear Station

Location: Brownville, NE

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

Inspectors: R. Alexander, Senior Emergency Preparedness Inspector  
B. Baca, Health Physicist  
J. Drake, Senior Reactor Inspector  
J. O'Donnell, Senior Health Physicist  
E. Simpson, Health Physicist  
A. Siwy, Senior Resident Inspector  
M. Stafford, Resident Inspector

Approved By: Jason W. Kozal, Chief  
Reactor Projects Branch C  
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 Cooper Nuclear Station, 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**

No findings or violations of more than minor significance were identified.

### **Additional Tracking Items**

None.

## PLANT STATUS

Cooper Nuclear Station began the inspection period in a scheduled refueling outage. The station performed a reactor startup on October 26, 2020, ending the outage. The unit reached rated thermal power on October 29, 2020. On October 30, 2020, the operators lowered power to 70 percent for a control rod sequence exchange. The unit reached rated thermal power on October 31, 2020. The unit was manually scrammed on November 1, 2020, due to an electro-hydraulic fluid leak on the main turbine generator. The unit reached rated thermal power on November 4, 2020. On November 4, 2020, the operators lowered power to 70 percent for a control rod sequence exchange. The unit reached rated thermal power on November 5, 2020. On November 6, 2020, the operators lowered power to 72 percent for a control rod sequence exchange. The unit reached rated thermal power on November 7, 2020. On December 9, 2020, the operators lowered power to 70 percent for a control rod sequence exchange and to replace the 'A' condensate pump motor due to an oil leak on the motor bearing seal. The unit reached rated thermal power on December 11, 2020. On December 12, 2020, the operators lowered power to 70 percent for a control rod sequence exchange. The unit reached rated thermal power on December 13, 2020. The unit was at rated thermal power for the remainder of the inspection period.

## 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**

### 71111.01 - Adverse Weather Protection

#### Seasonal Extreme Weather Sample (IP Section 03.01) (1 Sample)

- (1) The inspectors evaluated readiness for seasonal extreme weather conditions prior to the onset of seasonal cold temperatures for the following systems:
  - Standby liquid control
  - Service water

### 71111.04 - Equipment Alignment

#### Partial Walkdown Sample (IP Section 03.01) (4 Samples)

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

- (1) Reactor water cleanup system on October 1, 2020
- (2) Fuel pool cooling system A on October 10, 2020
- (3) Division 1 service water system on November 9, 2020
- (4) Core spray A on November 13, 2020

### 71111.05 - Fire Protection

#### Fire Area Walkdown and Inspection Sample (IP Section 03.01) (3 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) Reactor water cleanup valve, pump, and heat exchanger rooms on October 1, 2020
- (2) Fuel pool cooling heat exchanger and pump rooms on October 10, 2020
- (3) Reactor equipment cooling area, reactor building, 931 foot elevation, on November 19, 2020

### 71111.08G - Inservice Inspection Activities (BWR)

#### BWR Inservice Inspection Activities Sample - Nondestructive Examination and Welding Activities (IP Section 03.01) (1 Sample)

- (1) The inspectors verified that the reactor coolant system boundary, reactor vessel internals, risk-significant piping system boundaries, and containment boundary are appropriately monitored for degradation and that repairs and replacements were appropriately fabricated, examined and accepted by reviewing the following activities from October 5, 2020 to October 9, 2020:

##### 03.01.a - Nondestructive Examination and Welding Activities.

The inspectors evaluated non-destructive examination activities by reviewing the following records:

(1) Ultrasonic Examinations

- a) Reactor Vessel Shell, Weld VLC-BB-2, Longitudinal. This review involved a previous indication that was analytically evaluated and accepted.
- b) Reactor Vessel Shell, Weld VLB-BA-3, Longitudinal. This review involved a previous indication that was analytically evaluated and accepted.
- c) Reactor Vessel Shell, Weld VLA-BA-3, Longitudinal. This review involved a previous indication that was analytically evaluated and accepted.
- d) Reactor Vessel Shell, Weld VCB-BC-5, Vessel to Flange. This review involved a previous indication that was analytically evaluated and accepted.
- e) Reactor Recirculation, RRP-1 B-B, Recirculation Pump Studs.
- f) Reactor Recirculation, RAS-BJ-11, Elbow to Elbow.
- g) Residual Heat Removal, RHA-BJ-6, Valve to Elbow.

(2) VT-1 Examinations

- a) RF, Constant Support RFH-71. Supplemental inspection due to rejectable conditions. This review involved a previous indication that was analytically evaluated and accepted.
- b) Core Spray, Weld CS-A21@10-P8b, Shell to pipe. This review involved a previous indication that was analytically evaluated and accepted.

(3) VT-3 Examinations

- a) Suppression Chamber Bay 13 and 14 Saddle Support , SC-SAD-S13. This review involved a previous indication that was analytically evaluated and accepted.
- b) Suppression Chamber Bay 12 and 13 Saddle Support, SC-SAD-S12. This review involved a previous indication that was analytically evaluated and accepted.
- c) Primary Containment, DWI-MB, Drywell Interior Moisture Barrier. This review involved a previous indication that was analytically evaluated and accepted.
- d) Reactor Feedwater, Constant Support, RFH-71. This review involved a previous indication that was analytically evaluated and accepted.

(4) Magnetic Particle Examinations

- a) Core Spray, CSB-CC-57, Elbow Lug

(5) Dye Penetrant Examinations

- a) Core Spray, CS-RV-11RV, Weld 1, Socket weld pipe to valve
- b) Core Spray, CS-RV-11RV, Weld 3, Socket weld pipe to valve
- c) Core Spray, CS-RV-11RV, Weld 2, Socket weld pipe to flange
- d) Core Spray, CS-RV-11RV, Weld 4, Socket weld pipe to flange
- e) Core Spray, CS-RV-13RV, Weld 1, Socket weld pipe to valve
- f) Core Spray, CS-RV-13RV, Weld 3, Socket weld pipe to valve
- g) Core Spray, CS-RV-13RV, Weld 2, Socket weld pipe to flange
- h) Core Spray, CS-RV-13RV, Weld 4, Socket weld pipe to flange

The inspectors evaluated welding activities by reviewing the following records:

(1) Gas Tungsten Arc Welding

- a) Weld Checklist 19-101, (W.O. 5283283) on Core Spray System, CS-RV-13RV, Weld 1, Socket weld pipe to valve
- b) Weld Checklist 19-101, (W.O. 5283283) on Core Spray System, CS-RV-13RV, Weld 3, Socket weld pipe to valve
- c) Weld Checklist 19-139, (W.O. 5283283) on Core Spray System, CS-RV-13RV, Weld 2, Socket weld pipe to flange
- d) Weld Checklist 19-278, (W.O. 5282883) Core Spray, CS-RV-13RV, Weld 4, Socket weld pipe to flange
- e) Weld Checklist 19-094, (W.O. 5283284) on Core Spray System, CS-RV-11RV, Weld 1, Socket weld pipe to valve
- f) Weld Checklist 19-094, (W.O. 5283284) on Core Spray System, CS-RV-11RV, Weld 3, Socket weld pipe to valve
- g) Weld Checklist 19-119, (W.O. 5283284) on Core Spray System, CS-RV-13RV, Weld 2, Socket weld pipe to flange
- h) Weld Checklist 19-120, (W.O. 5282884) Core Spray, CS-RV-13RV, Weld 4, Socket weld pipe to flange

The inspector evaluated a sample of 43 condition reports associated with inservice inspection activities. The inspector did not identify any findings or violations of more than minor significance.

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 control room during reactor startup on October 26, 2020.

Licensed Operator Regualification Training/Examinations (IP Section 03.02) (1 Sample)

- (1) The inspectors observed and evaluated a licensed operator regualification scenario on December 4, 2020.

71111.12 - Maintenance Effectiveness

Maintenance Effectiveness (IP Section 03.01) (2 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) Startup station service transformer on November 6, 2020
- (2) Service water system on November 18, 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) Emergency diesel generator lube oil heat exchanger on December 7, 2020

#### 71111.13 - Maintenance Risk Assessments and Emergent Work Control

##### Risk Assessment and Management Sample (IP Section 03.01) (4 Samples)

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) Work controls for Division 1 work window and lowered reactor pressure vessel inventory to start refueling outage on October 2, 2020
- (2) Yellow risk window while shutdown cooling was unavailable during reactor pressure vessel pressure test on October 20, 2020
- (3) Yellow risk window during Division 2 undervoltage relay testing on November 16, 2020
- (4) Increased aggregate risk window during multiple maintenance activities on December 10, 2020

#### 71111.15 - Operability Determinations and Functionality Assessments

##### Operability Determination or Functionality Assessment (IP Section 03.01) (2 Samples)

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

- (1) Residual heat removal valves found un-sealed on December 3, 2020
- (2) Post-work inservice test not performed on control rod drive check valves 25 and 26 on December 16, 2020

#### 71111.18 - Plant Modifications

##### Temporary Modifications and/or Permanent Modifications (IP Section 03.01 and/or 03.02) (1 Sample)

The inspectors evaluated the following temporary or permanent modifications:

- (1) Main steam isolation valve limit switch wiring assembly change on November 17, 2020

#### 71111.19 - Post-Maintenance Testing

##### Post-Maintenance Test Sample (IP Section 03.01) (9 Samples)

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

- (1) Source range monitor D replacement on October 3, 2020
- (2) Core spray A injection valve maintenance on October 8, 2020
- (3) Core spray pump A discharge relief valve maintenance on October 9, 2020
- (4) Emergency service water return from control room air conditioner maintenance on October 9, 2020
- (5) Outboard main steam isolation valve actuator replacement on October 20, 2020
- (6) Emergency diesel generator 1 governor valve replacement on October 23, 2020
- (7) Control rod scram timing for replaced control rods on November 19, 2020
- (8) Control room emergency filtration system damper maintenance on November 27, 2020
- (9) High pressure coolant injection inboard steam isolation valve repairs on December 18, 2020

#### 71111.20 - Refueling and Other Outage Activities

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

- (1) The inspectors evaluated Refueling Outage 31 activities from October 1, 2020, to October 26, 2020. The inspectors completed inspection procedure Sections 03.01c, 03.01d, and 03.01e.

#### 71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

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

- (1) High-pressure coolant injection isolation valve local leak-rate test on October 20, 2020
- (2) Reactor core isolation cooling beginning of cycle test on November 24, 2020
- (3) High pressure coolant injection beginning of cycle test on November 30, 2020

#### 71114.06 - Drill Evaluation

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

The inspectors evaluated:

- (1) Emergency preparedness Technical Support Center training exercise on December 2, 2020
- (2) Emergency preparedness training evolution on December 8, 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) (3 Samples)

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

- (1) Observed licensee surveys of potentially contaminated material leaving the radiologically controlled area (RCA)
- (2) Observed workers exiting the drywell during a refueling outage
- (3) Observed workers exiting the control rod drive mechanism (CRDM) bullpen during a 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) CRDM removal and replacement activities under technical specification high radiation area (LHRA) Radiation Work Permits 2020-506, "Undervessel CRDMs Changeout," Revision 0, and 2020-507, "CRDM Work Excluding Changeout," Revision 0
- (2) Local power range monitor (LPRM) exchange activities under technical specification high radiation area (LHRA) Radiation Work Permit 2020-529, "Under Vessel Miscellaneous Activities," Revision 0
- (3) Diving operations to clean and inspect the torus under technical specification high radiation area (LHRA) Radiation Work Permit 2020-509, "Torus Desludge Diving - For Divers Only," Revision 0

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) Reactor water clean up (RWCU) phase separator pump room (reactor building 931 foot elevation)
- (2) Fuel pool cooling heat exchanger room (reactor building 958 foot elevation)
- (3) Spent resin tank room (radwaste basement)
- (4) Travelling in-core probe (TIP) room (reactor building 903 foot elevation)

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

### Implementation of ALARA and Radiological Work Controls (IP Section 03.03) (4 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) Control rod drive mechanism removal and replacement activities under ALARA Package 2020-01, "Control Rod Drive Mechanism Exchange," Revision 0, and its associated radiation work permits and specific work permits
- (2) Diving operations to remove sludge in the torus and inspect/repair the torus liner under ALARA Package 2020-08, "Torus Desludge," Revision 0, and its associated radiation work permits and specific work permits
- (3) High pressure core injection (HPCI) motor operated valve [HPCI MO-15] maintenance and repairs under ALARA Package 2020-15, "Refueling Outage 31 Motor Operated Valve, Air Operated Valve, and Solenoid Operated Valve Team Work," Revision 0, and its associated radiation work permits and specific work permits
- (4) Instrument and component repair and replacement and general under vessel maintenance under ALARA Package 2020-16, "Undervessel," Revision 0, and its associated radiation work permits and specific work permits

### Radiation Worker Performance (IP Section 03.04) (1 Sample)

The inspectors evaluated radiation worker and radiation protection technician performance during:

- (1) The inspectors evaluated the implementation of ALARA techniques for work activities during Refueling Outage 31.

## **OTHER ACTIVITIES – BASELINE**

### 71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

#### EP01: Drill/Exercise Performance (IP Section 02.12) (1 Sample)

- (1) April 1, 2019, through June 30, 2020

#### EP02: ERO Drill Participation (IP Section 02.13) (1 Sample)

- (1) April 1, 2019, through June 30, 2020

#### EP03: Alert & Notification System Reliability (IP Section 02.14) (1 Sample)

- (1) April 1, 2019, through June 30, 2020

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

- (1) April 1, 2019, through September 30, 2020

PR01: Radiological Effluent Technical Specifications/Offsite Dose Calculation Manual  
Radiological Effluent Occurrences (RETS/ODCM) Radiological Effluent Occurrences Sample  
(IP Section 02.16) (1 Sample)

(1) July 1, 2019, through 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 human performance issues that might be indicative of a more significant safety issue.

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) Emergency station service transformer bus fault corrective action follow-up on December 15, 2020

71153 - Followup of Events and Notices of Enforcement Discretion

Event Followup (IP Section 03.01) (1 Sample)

(1) The inspectors evaluated the manual reactor scram due to an unisolable leak on the main turbine high pressure fluid system and the licensee's response on November 3, 2020.

**INSPECTION RESULTS**

Observation: Semi-Annual Trend	71152
<p>The inspectors reviewed trends in the licensee's corrective action program (CAP) and human performance clock resets and observed that issues associated with human performance have been trending upwards for several years. The trend is not specific to any one work group or type of human performance.</p> <p>The total number of condition reports (CRs) generated each year peaked in 2011 and has been trending downward since. The decreasing trend in CRs from 2011 is expected for several reasons. Among these reasons are the extensive flooding in the area in 2011 as well as the nuclear industry's modifications to their CAPs in order to reduce the number of nonadverse issues entered into the CAPs.</p> <p>The licensee categorizes their CRs into various levels to prioritize issues based on significance. Category A are the most significant. Categories B, C, and D are less significant, in decreasing order of significance. Categories other than those four are not required to be corrected via the CAP and are often closed to other processes. The inspectors compiled trends using the total of all four of these categories ("Group 1") as well as the total of Categories A, B, and C ("Group 2"). The inspectors did not compile trends using only categories A and/or B since the CRs in these categories make up a small percentage of the total number of CRs. The number of CRs for both Groups 1 and 2 has decreased from 2011,</p>	

which is expected since the overall number of CRs decreased.

For Groups 1 and 2, the inspectors separated the number of CRs with trend codes relating to human performance from the rest of the CRs to provide meaningful year-over-year comparisons. The inspectors then divided the human-performance-related CRs in each respective group by the total number of CRs in each respective group. This showed that the percentage of human-performance-related CRs for both groups has increased since 2011. Many factors can affect these numbers, including consistency of trend code application, changes in the total number of CRs, and changes in the number of CRs not related to human performance. Regardless of the driving forces, human performance issues are accounting for a greater percentage of all issues.

The inspectors identified five different human-performance-related sub-trends in CRs from 2020: clearance order issues, radiological controlled area (RCA) access issues, bumped equipment, mispositioned equipment, and security equipment handling issues. Examples of these sub-trends are given subsequently. These sub-trends and examples are not exhaustive.

Examples of clearance order issues include: divers entered a section of the suppression pool that was not protected by their clearance (Condition Report CR-CNS-2020-04392); maintenance staff performed work without all required clearance tags in place (Condition Report CR-CNS-2020-04924); and operation staff removed an incorrect fuse while hanging a clearance (Condition Report CR-CNS-2020-05313). The breakdown in human performance for each of these issues could have led to individuals either receiving higher unexpected radiological doses or working on pressurized or energized equipment.

Examples of RCA access issues include: chemistry staff entered a high radiological area (HRA) on the wrong radiological worker permit (RWP) (Condition Report CR--CNS--2020--00980); maintenance staff entered a locked HRA on the wrong RWP (Condition Report CR-CNS-2020-01677); and radiological protection staff improperly allowed maintenance staff to move an administratively posted locked HRA boundary (Condition Report CR-CNS-2020-04533). The breakdown in human performance for each of these issues either allowed or had the potential to allow workers to enter radiological areas for which they had not been properly authorized.

Examples of bumped equipment issues include: maintenance staff bumped service water pump room halon switch (Condition Report CR-CNS-2020-01363); maintenance staff induced vibration on instrument at instrument rack 25-6 (Condition Report CR-CNS-2020-01490); and radiological protection staff bumped refueling floor seismic sensor (Condition Report CR-CNS-2020-04047). The breakdown in human performance for each of these issues resulted in unexpected control room alarms and an inadvertent half scram of the reactor.

Examples of mispositioned equipment issues include: operations staff inadvertently isolated the high-pressure coolant injection (HPCI) system outboard steam isolation valve (Condition Report CR-CNS-2020-00181); operations staff inadvertently started fire protection pump C (Condition Report CR-CNS-2020-02609); and radiological protection staff inadvertently manipulated the incorrect fuel pool cooling valve (Condition Report CR-CNS-2020-05031). The breakdown in human performance for each of these issues resulted in running a pump with the discharge valve closed, unexpected lowering of the fuel pool skimmer surge tank water level, and an unplanned unavailability of HPCI with an unplanned increase of online risk.

Examples of security equipment handling issues include: dropped equipment was unattended (Condition Report CR-CNS-2020-02524); unsecured equipment (Condition Report CR-CNS-2020-03001); and improper control of equipment (Condition Report CR-CNS-2020-03328). None of these issues resulted in an event reportable under 10 CFR 73.71.

The licensee has periodically identified and documented negative trends in human performance, typically as a bundle of various human performance issues. The licensee and a corporate functional area manager previously identified two sub-trends listed above: clearance order issues and mispositioned equipment.

The trends from the human-performance-related CRs show that the percentage of adverse human performance CRs has increased. Sub-trends in human performance issues show that they are not attributed to any one workgroup, nor any one type of human performance. The inspectors continue to review CRs in the CAP and monitor for any trends.

## **EXIT MEETINGS AND DEBRIEFS**

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

- On October 8, 2020, the inspectors presented the occupational radiation safety inspection results to Mr. K. Dia, General Manager of Plant Operations, and other members of the licensee staff.
- On October 9, 2020, the inspectors presented the inservice inspection results to Mr. J. Dent, Vice President and Chief Nuclear Officer, and other members of the licensee staff.
- On November 19, 2020, the inspectors presented the emergency preparedness-related performance indicator verification inspection results to Mr. B. Chapin, Director of Nuclear Safety Assurance, and other members of the licensee staff.
- On January 22, 2021, the inspectors presented the integrated inspection results to Mr. J. Dent, Vice President and Chief Nuclear Officer, and other members of the licensee staff.

## DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.01	Procedures	2.1.14	Seasonal Weather Preparations	35
		2.2.42	HVAC Intake Structure	20
	Work Orders	WO	5210368	
71111.04	Drawings	2030, Sheet 1	Flow Diagram Fuel Pool Cooling and Clean-up System	36
		2030, Sheet 2	Flow Diagram Fuel Pool Cooling and Clean-up System	17
	Procedures	2.2.32A	Fuel Pool Cooling and Demineralizer System Component Checklist	22
		2.2.66A	Reactor Water Cleanup Component Checklist	22
		2.2A.CS.DIV1	Core Spray Component Checklist (Div 1)	5
		2.2A.SW.DIV1	Service Water System Component Checklist (Div 1)	21
71111.05	Corrective Action Documents	CR-CNS-	2020-04718, 2020-05705, 2020-05725	
	Fire Plans	CNS-FP-218	Reactor Building – Second Floor Elevation 931’-6	11
		CNS-FP-219	Reactor Building – Third Floor Elevation 958’-3”	14
	Procedures	0-BARRIER-MAPS	Barrier Maps	11
71111.08G	Corrective Action Documents	CR-CNS-	2016-08766, 2018-05684, 2018-05691, 2018-05713, 2018-05716, 2018-05856, 2018-05898, 2018-05908, 2018-05909, 2018-05987, 2018-06090, 2018-06138, 2018-06140, 2018-06250, 2018-06475, 2018-06492, 2018-06564, 2018-06706, 2018-07312, 2018-08417, 2019-00495, 2019-00726, 2019-00727, 2019-00729, 2019-01402, 2019-01664, 2019-01687, 2019-01694, 2019-01697, 2019-01869, 2019-02249, 2020-00051, 2020-00906, 2020-01083, 2020-01457, 2020-03385, 2020-04136, 2020-04194, 2020-04359, 2020-04417, 2020-04430, 2020-04457,	
	Corrective Action Documents Resulting from Inspection	CR-CNS-	2020-04658, 2020-04659, 2020-04660, 2020-04661	
	Miscellaneous	EPG-17	Engineering Program Guide Welding Program	2



Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Procedures	CNS Assessment CNSLO-2011- 0013 - 0029	Welding & Repair/ Replacement Program Assessment Report	12/08/2011
		CNS Operations Manual Administrative Procedure 0- CNS-12	CNS Technical Program Administration	21 and 22
		CNS Operations Manual Administrative Procedure 0- CNS-25	Self-Assessment and Benchmarking Process	20
		CNS Operations Manual Administrative Procedure 0- CNS-LI-102	Corrective Action Process	8
		CNS Operations Manual Administrative Procedure 0- CNS-MDMP	Materials Degradation Management Program (MDMP)	10
		CNS Operations Manual Administrative Procedure 0.30	ASME Section XI Repair/Replacement and Temporary Code and Non-Code Repair Procedure	8
		CNS Operations Manual Administrative Procedure 0.40	Work Control Program	96
		CNS Operations Manual Engineering	Engineering Programs Control and Oversight	1

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		Procedure 3-CNS-DC-329		
		CNS Operations Manual Engineering Procedure 3.38	Welding/Repair-Replacements Program	2 and 6
		CNS Operations Manual Maintenance Procedure 7.7.3.1	General Welding Standard for ASME And ANSI Code Applications	7
		CNS Operations Manual Surveillance Procedure 6.2SW.501	ASME Section XI System Leakage Test of The Class 3 Service Water (SW) System Loop B	19
		GEH-UT.717	Procedure for the Examination of Reactor Pressure Vessel Welds from the Inside Surface with MicroTomo in Accordance with Appendix VIII	4
		GEH-VT-101	Procedure for VT-1 Examination	8.1
		GEH-VT-103	Procedure for VT-3 Examination	12
		GEH-VT-204	Procedure for In-Vessel Visual Inspection (IVVI) Of BWR 4 RPV Internals	18
		GEH.UT.300	Procedure for Manual Examination of Reactor Vessel Assembly Welds in Accordance with PDI	12C1
		Operations Manual Engineering Maintenance Procedure 7.7.10.2	P1-B Welding Procedure Specification	6
		Operations Manual Engineering Maintenance	P1-B (CVN) Welding Procedure Specification	5

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		Procedure 7.7.10.3		
		Operations Manual Engineering Maintenance Procedure 7.7.10.4	P1-G Welding Procedure Specification	6
		Operations Manual Engineering Maintenance Procedure 7.7.10.80	P8-A Welding Procedure Specification	4
		Operations Manual Engineering Maintenance Procedure 7.7.10.83	P1-P8a Welding Procedure Specification	4
		Operations Manual Engineering Maintenance Procedure 7.7.50.1	Visual Inspection Procedure for ANSI B31.1	3
		Operations Manual Engineering Maintenance Procedure 7.7.50.2	Visual Inspection Procedure for ANSI B31.7	3
	Self-Assessments	2017-0033-001	WELD Program Self-Assessment - March 2017	04/27/2017

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		CNS Assessment CNSLO-2011-0013 - 0029	Welding & Repair/ Replacement Program Assessment Report	12/08/2011
		LO-2019-0201	2020 Inservice Inspection Program Self-Assessment	07/01/2020
71111.11Q	Miscellaneous	SKL052-52-176	Licensed Operator Requalification Exam Scenario 176	0
	Procedures	2.4EX-STM	Extraction Steam Abnormal	20
		2.4PC	Primary Containment Control	21
71111.12	Corrective Action Documents	CR-CNS-	2019-06302, 2020-00263, 2020-04054, 2020-04069	
	Miscellaneous		Maintenance Rule Function SW-F01 Performance Criteria Basis	8
				Maintenance Rule Function SW-F03 Performance Criteria Basis
	Procedures	12.1	CNS QC Program Description	29
		12.6	CNS QC Inspection	28
	Work Orders	WO	5072900, 5283363, 5314819	
71111.13	Corrective Action Documents	CR-CNS-	2020-04151, 2020-06225	
	Miscellaneous		Protected Equipment Postings for: Shutdown Cooling, Division 1 RHR Relay Maintenance	
	Procedures	0-PROTECT-EQP	Protected Equipment Program	56
		0.50.5	Outage Shutdown Safety	42
	Work Orders	WO	5167518, 5302642	
71111.15	Corrective Action Documents	CR-CNS-	2020-05279, 2020-06086	
	Drawings	2040, Sheet 1	Flow Diagram, Residual Heat Removal System	83
	Procedures	2.2A.RHR.DIV1	Residual Heat Removal System Component Checklist	10
71111.18	Corrective Action Documents	CR-CNS-	2020-04421	
	Procedures	7.3.25	NAMCO EA180 Series Limit Switch Installation and Removal	13
		7.3.28	Crimping Tool Calibration and Lug Selection Guide	24
		7.3.28.1	Lead Removal/Installation and Lug Installation	32
	Work Orders	WO	5283004, 5365943	

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.19	Corrective Action Documents	CR-CNS-	2020-04414, 2020-04621, 2020-04680, 2020-04697, 2020-04701, 2020-04791, 2020-04792, 2020-04856, 2020-05196, 2020-05229, 2020-05237, 2020-05250	
	Procedures	10.9	Control Rod Scram Time Evaluation	72
		14.17.1	DG-1 Annual Calibration	41
		14.17.GOV-TUN-10	DG Dynamic Governor Tuning	0
		6.1CS.102	Reference Leg Injection Flow Verification and IST Check Valve Testing (Div 1)	11
		6.1CS.202	CS-MO-12A Operability Test with Reactor Pressure < 450 PSIG (IST) (Div 1)	6
		6.2SRM.302	SRM Channel Functional Test (Reactor not in Run with Shorting Link Switches Closed) (Div 2)	19
		6.HV.104	Control Room Emergency Filter System Flow Test, Charcoal and HEPA Filter Leak Test, Filter DP Test, and Charcoal Sample Analysis	19
		6.SW.102	Service Water System Post-LOCA Flow Verification	52
		7.0.5	CNS Post-Maintenance Testing	59
		7.2.24.1	MSIV Operator Maintenance and Adjustment	24
	7.2.24.2	MSIV Speed Adjustment	4	
	Work Orders	WO	5209799, 5211495, 5254654, 5282126, 5282143, 5282155, 5282684, 5282923, 5283005, 5283351, 5283385, 5322550, 5365949	
71111.20	Corrective Action Documents	CR-CNS-	2020-04440, 2020-04531, 2020-04729, 2020-04873, 2020-05031, 2020-05033, 2020-05035, 2020-05353	
	Miscellaneous		Shutdown Safety Contingency Plan RE31-0002 RCIC-CV-14	
	Procedures	0.50.5	Outage Shutdown Safety	42
		13.3	ECCS Strainer/Suppression Pool Cleaning Program	8
		2.1.20.2	Cycle Specific Fuel Transfer and Alternate Cooling Guideline	22
		2.1.6	Primary Containment Access Preparation and Closeout Activities	19
		2.2.32	Fuel Pool Cooling and Demineralizer System	111
		2.4FPC	Fuel Pool Cooling Trouble	39
2.4SDC	Shutdown Cooling Abnormal	18		

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		5.10FLEX.11	Spend Fuel Supply FLEX Operations	4
		6.PC.501	Primary Containment Leak Rate Tests	44
		EN-MA-118	Foreign Material Exclusion	9
		WO	5166166, 5210211, 5282884, 5283389, 5333161	
71111.22	Corrective Action Documents	CR-CNS-	2020-04529, 2020-04413, 2020-04414, 2020-04415, 2020-04857	
	Procedures	6.HPCI.313	HPCI (< or = 165 PSIG) Beginning of Cycle Test	38
		6.PC.511	High Pressure Coolant Injection (HPCI) Local Leak Rate Tests	18
		6.RCIC.309	RCIC (< or = 165 PSIG) Beginning of Cycle Test	36
Work Orders	WO	5210219, 5210635, 5282470		
71114.06	Corrective Action Documents	CR-CNS-	2020-06195	
	Miscellaneous		EP Training Exercise Package	12/12/2020
	Procedures	5.7.6	Notification	77
		5.7.7	Activation of TSC	41
71124.01	Corrective Action Documents	CR-CNS-	2019-03953, 2019-04877, 2019-05214, 2019-06305, 2019-06473, 2020-00317, 2020-00980, 2020-01114, 2020-01677, 2020-03300, 2020-04392, 2020-04533, 2020-04617	
	Procedures	7.4.32	Work Over, Near, or in Reactor Vessel, Dryer/Separator Storage Pool, or Spent Fuel Storage Pool	20
		9.EN-RP-100	Radiation Worker Expectations	17
		9.EN-RP-101	Access Control for Radiologically Controlled Areas	21
		9.EN-RP-108	Radiation Protection Posting and Labeling	17
		9.EN-RP-123	Radiological Controls for Highly Radioactive Objects	4
		9.EN-RP-151	Radiological Diving	3
		9.ENN-RP-102	Radiological Control	3
		9.ENN-RP-106-1	Radiation and Contamination Surveys	22
		9.NISP-RP-03	Radiological Air Sampling	0
	9.RADOP.1	Radiation Protection at CNS	15	
	Radiation Surveys	CNS-1810-0089	Dose Rates and Smears taken on RPV Head Flange	10/08/2018
		CNS-2009-0071	CNS-RP-920 Inside of Torus	09/28/2020
		CNS-2009-0083	CNS-RP-920 Inside of Torus	09/28/2020
CNS-2010-0106		CNS-RP-108E - Drywell - Under Vessel	10/05/2020	

Inspection Procedure	Type	Designation	Description or Title	Revision or Date	
		CNS-2010-0118	Drywell - Under Vessel Subpile	10/06/2020	
		CNS-2010-0145	CNS-RP-920 Inside of Torus	10/07/2020	
		CNS-RP-136	Air Sample - Reactor Building 921' for HPCI-15-MOV Breach	10/07/2020	
	Self-Assessments	LO 2019-0204	NRC PI Occupation Exposure Control Effectiveness	06/05/2020	
		QAD 2020-0019	QA Audit 20-04, "Radiological Controls"	07/22/2020	
71124.02	ALARA Plans	2020-01	Control Rod Drive Mechanisms (CRDMs)	0	
		2020-05	Reactor Disassembly, Refueling, Nuclear Instrumentation Exchanges and Reassembly	0	
		2020-08	Torus Desludge	0	
		2020-15	Refueling (RE) 31: Motor Operated Valves (MOV), Air Operated Valves (AOV) and Solenoid Operated Valves (SOV)	0	
		2020-16	Undervessel	0	
		2020-20	RP Support Refueling (RE) 31	0	
		2020-21	Operations Activities during RE-31 Refueling Outage	0	
	Corrective Action Documents	CR-CNS-	2019-03247, 2019-03749, 2019-04536, 2020-00661, 2020-01050, 2020-01240, 2020-01640, 2020-02536, 2020-02828, 2020-03191, 2020-03504		
	Miscellaneous			Radiological Post Outage Report - Refueling Outage 29	0
				Radiological Department Post Outage Report - Refueling Outage 30	0
				2018 CNS Average BRAC Trend Since RRS Pipe Replacement	0
		069493		Rate History for ARM: 069493 HPCI-MO-15	10/07/2020
		2020-04		In-Progress Review: LLRTs in RE-31 at 50% Job Complete	10/06/2020
		2020-12		In-Progress Review: ISI and FAC at 20% Job Complete	10/06/2020
		2020-16		In-Progress Review: Undervessel at 50% Job Complete	10/06/2020
	Procedures	9.ALARA.1		Dosimetry Administration	48
		9.ALARA.4		Radiation Work Permits	24
		9.EN-RP-110		ALARA Program	11
		9.EN-RP-110-04		Radiation Protection Risk Assessment Process	14
		9.EN-RP-110-05		ALARA Planning and Controls	7
		9.EN-RP-110-06		Outage Dose Estimating and Tracking	0
9.EN-RP-203			Dose Assessment	10	

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		9.NISP-RP-03	Radiological Air Sampling	0	
		9.NISP-RP-08	Use of HEPA Filtration Equipment	0	
		9.RADOP.16	Source Term Mitigation and Control	5	
	Radiation Surveys	CNS-2010-0141	Drywell 921' - CNS-RP-108C	10/07/2020	
	Radiation Work Permits (RWPs)	2020-511	ISI and FAC in Drywell (includes Walk-downs, Oversight, Insulation Remove/Install, Surface Preps)	0	
		2020-514	Scaffolds in Refueling (RE) 31 - Specific Radiation Work Permit (SWP) Areas	0	
		2020-515	Scaffolds in Drywell and Angle Valve Room if posted LHRA	0	
2020-520		All other Turbine Generator Building - LHRAs (not Work Order Number validate)	0		
71151	Corrective Action Documents	CR-CNS-	2019-0353, 2019-05214, 2020-04321, 2020-04392		
		CR-CNS-	2019-02558, 2019-02752, 2019-02755, 2019-02798, 2019-02841, 2019-03083, 2019-03244, 2019-04436, 2019-05153, 2019-05239, 2019-06564, 2020-00653, 2020-00978		
	Corrective Action Documents Resulting from Inspection	CR-CNS-	2020-05944, 2020-05945, 2020-05946, 2020-05947, 2020-054948		
	Miscellaneous			Test Results - 2019 Annual Full-Cycle Sounding of Alert and Notification System Sirens	09/26/2019
				Annual Radioactive Effluent Release Report for the period January 1, 2019, through December 31, 2019	04/15/2020
				Attachment 9.3 - PI Documentation and Data Review Forms: Occupational Exposure Control Effectiveness for April 2019 - September 2020	
				Attachment 9.3 - PI Documentation and Data Review Forms: RETS/ODCM Radiological Effluent Occurrence for July 2019 - September 2020	
				Basis of Calculated Dose Offsite Due to Liquid Effluent: 01/01/2019 - 09/23/2020	09/23/2020
				Basis of Calculated Dose Offsite Due to Airborne Effluent: 07/01/2020 - 10/01/2020	10/01/2020
				100 mRem Report: July 2019 - September 29, 2020	09/29/2020



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		0-EN-LI-114, Att. 9.3	Performance Indicator Process: ERO Drill Participation - Quarterly Forms & Supporting ERO Qualification Data	2Q/2019 - 2Q/2020
		0-EN-LI-114, Att. 9.3	Performance Indicator Process: Alert and Notification System Reliability - Monthly Forms & Sampled Supporting Data	04/2019 - 06/2020
		0-EN-LI-114, Att. 9.3	Performance Indicator Process: Drill and Exercise Performance (DEP) - Monthly Forms & Sampled DEP Opportunity Scenarios and Supporting Data	04/2019 - 06/2020
	Procedures	0-EN-FAP-EP-005	Emergency Preparedness Performance Indicators	9C0
		0-EN-LI-114	Regulatory Performance Indicator Process	17C0
		EPDG#2, Att. C-1	Semi-Monthly Alert and Notification System Siren Testing	21
		EPDG#2, Att. C-5	Annual Full-Cycle Sounding of Alert and Notification System Sirens	15
	Self-Assessments	LO 2019-0204	NRC PI Occupation Exposure Control Effectiveness	06/05/2020
71152	Corrective Action Documents	CR-CNS-	2017-00223, 2017-00532, 2020-06341	
	Procedures	0-CNS-LI-102	Corrective Action Process	12
		0-EN-HU-101	Human Performance Program	11C2