



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION III  
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November 9, 2016

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

SUBJECT: DONALD C. COOK NUCLEAR POWER PLANT, UNITS 1 AND 2—NRC  
INTEGRATED INSPECTION REPORT 05000315/2016003; 05000316/2016003

Dear Mr. Gebbie:

On September 30, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Donald C. Cook Nuclear Power Plant, Units 1 and 2. The enclosed report documents the results of this inspection, which were discussed on October 12, 2016, with you and other members of your staff. The enclosed report documents the results of this inspection.

Based on the results of this inspection, the NRC has identified three issues that were evaluated under the risk significance determination process as having very low safety significance (Green). The NRC has also determined that three violations are associated with these issues. These violations are being treated as a Non-Cited Violations (NCVs), consistent with Section 2.3.2 of the Enforcement Policy. These NCVs are described in the subject inspection report. Further, inspectors documented a licensee-identified violation which was determined to be of very low safety significance in this report. The NRC is treating this violation as an NCV consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest the violation or significance of any NCV, 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: (1) the Regional Administrator, Region III; (2) the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and (3) the NRC Resident Inspector at the Donald C. Cook Nuclear Power Plant.

In addition, if you disagree with the cross-cutting aspect assigned to any finding 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 Regional Administrator, Region III, and the NRC Resident Inspector at the Donald C. Cook Nuclear Power Plant.

J. Gebbie

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In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390, "Public Inspections, Exemptions, Requests for Withholding," of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC's Public Document Room or from the Publicly Available Records System (PARS) component of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

**/RA/**

Kenneth Riemer, Chief  
Branch 2  
Division of Reactor Projects

Docket Nos. 50-315; 50-316  
License Nos. DPR-58; DPR-74

Enclosure:  
IR 05000315/2016003; 05000316/2016003

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos: 05000315; 05000316

License Nos: DPR-58; DPR-74

Report No: 05000315/2016003; 05000316/2016003

Licensee: Indiana Michigan Power Company

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

Location: Bridgman, MI

Dates: July 1 through September 30, 2016

Inspectors: J. Ellegood, Senior Resident Inspector  
T. Taylor, Resident Inspector  
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A. Shaikh, Senior Reactor Inspector

Approved by: K. Riemer, Chief  
Branch 2  
Division of Reactor Projects

Enclosure

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## SUMMARY

Inspection Report (IR) 05000315/2016003, 05000316/2016003; 07/01/2016 – 09/30/2016; Donald C. Cook Nuclear Power Plant; Units 1 & 2; Fire Protection; Maintenance Effectiveness; Operability Determinations and Functional Assessments.

This report covers a 3-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. Three Green findings were identified by the inspectors and these findings involved Non-Cited Violations (NCVs) of the U.S. Nuclear Regulatory Commission (NRC) requirements. The significance of inspection findings is indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," dated April 29, 2015. Cross-cutting aspects are determined using IMC 0310, "Aspects Within the Cross-Cutting Areas," dated December 4, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated February 4, 2015. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6, dated July 2016.

### Cornerstone: Mitigating Systems

- Green. A finding of very low safety significance with an associated NCV of Title 10 of the *Code of Federal Regulations* (CFR) 50 Appendix B, Criterion III, "Design Control," was self-revealed when a thru-wall leak was identified on a branch connection off of the Unit 1 west coolant charging pump (CCP) discharge piping while it was in-service. The licensee failed to ensure the branch line design would remain intact when subjected to the vibratory conditions in the line. As a result, a vibration induced fatigue crack developed. This design issue caused a thru-wall leak on a similar line associated with the opposite-train charging pump in 2011. When the licensee addressed the prior leak, assumptions were made regarding the Unit 1 west CCP line. Since the length was slightly different, the belief was it would not be subject to the same increase in vibrations. However, when measuring the vibrations after the recent leak was identified, the results indicated the same elevated vibrations existed. The licensee secured the pump to stop the leak, declared the 'B' train of the emergency core cooling system (ECCS) inoperable, and repaired the leaking weld.

The issue was more than minor because it adversely affected the Design Control Attribute of the Mitigating Systems cornerstone, whose objective is to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The finding screened as Green, or very low safety significance, because there was no loss of system function and the repairs were completed within the 72 hour timeframe allowed by Technical Specifications (TS). No cross-cutting aspect was assigned because the issue occurred in 2011 and was not reflective of current licensee performance. (Section 1R12)

- Green. A finding of very low safety significance with an associated NCV of TS 5.4, Procedures, was self-revealed on June 21, 2016, when safety-related N-Train Battery Charger 2-BC-B was found soaked with water from a roof leak above. The licensee failed to follow administrative procedures for control of temporary catch basins. TS 5.4 states, in part, that the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978, be established, implemented, and maintained. Regulatory Guide 1.33 states, in part, that maintenance that can affect the performance

of safety-related equipment should be properly preplanned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances. Contrary to this requirement, the licensee installed and subsequently removed a drip-catch above battery charger 2-BC-B that was being used to protect the charger from a water leak in the area pending roof repairs. On June 3, 2016, the Performance Assurance department noted the catch had been installed outside of any formal process. In response, the licensee removed the catch but did not put anything in its place to protect the charger. On June 21, 2016, a severe rainstorm occurred, resulting in the wetting of the charger. The other charger was in-service at the time, so there was no impact to the affected N-Train distribution system. In response, the licensee added another protective device, dried out, inspected, and tested the charger. It was restored to operable status on June 23.

The issue was more than minor because it adversely affected the Protection Against External Factors attribute of the Mitigating Systems cornerstone, whose objective is to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The finding screened as Green, or very low safety significance, because there was no loss of system operability. The finding had an associated cross-cutting aspect in the Human Performance area, specifically, H.7., Documentation. Had the licensee kept their leak detection log up-to-date with the addition of the catch over the charger initially, it would have prompted the licensee to ensure the repairs to the roof were complete before removing the barrier. Further, it would not have been identified as an issue by Performance Assurance. (Section 1R15)

- Green. A self-revealed finding of very low safety significance (Green) and associated NCV of the license condition for a fire protection program occurred when the licensee failed to ensure excavation activities preserved the functionality of the fire main. Specifically, the licensee improperly backfilled an excavation performed to inspect buried piping. The improper backfill led to a catastrophic failure of the fire main. The performance deficiency was a violation. License conditions 2.C(4) and 2.C(3)(o) of the Donald C. Cook Nuclear Power Plant, Unit 1 and Unit 2 Operating Licenses, respectively, require, in part, that the licensee implement and maintain in effect all provisions of the approved fire protection program that comply with 10 CFR 50.48(a) and 10 CFR 50.48(c), "National Fire Protection Association (NFPA) Standard NFPA 805," as specified in the licensee's amendment request dated July 1, 2011, as supplemented, and as approved in the Safety Evaluation dated October 24, 2013. Section 3.3.1.1(3) of NFPA 805 requires that, "Administrative controls addressing the review of plant modifications and maintenance to ensure that both fire hazards and the impact on plant fire protection systems and features are minimized." Immediate actions included isolation of the faulted section of the fire main and repair of the break. The issue has been entered into the CAP as AR-2016-7626.

The inspectors determined that the finding was more than minor because the performance deficiency was more than minor, because it impacted the mitigating system cornerstone attribute of protection against external factors and adversely impacted the cornerstone objective of ensuring the availability of systems to respond to initiating events to prevent undesirable consequences. Using Appendix F, Attachment 1 dated September 20, 2013, the inspector determined that the licensee probable risk assessment should be reviewed to determined significance. With the short duration, the licensee determined the delta cdf to be less than  $(1e-6)$ . These results were reviewed

and accepted by the Senior Reactor Analyst. The inspectors determined the finding included a cross cutting aspect of Challenge the Unknown, H.11, in the human performance area. (Section 1R05)

### **Other Findings**

- A violation of very low safety or security significance that was identified by the licensee has been reviewed by the NRC. Corrective actions taken or planned by the licensee have been entered into the licensee's CAP. This violation and CAP tracking numbers are listed in Section 4OA7 of this report.

## **REPORT DETAILS**

### **Summary of Plant Status**

Unit 1 operated at or near 100 percent for the entire inspection period.

Unit 2 operated at or near 100 percent power until July 6, when a Moisture Separator Reheater bellows failed causing operators to manually trip the unit. After completing repairs, the licensee restarted the unit. The plant reached 100 percent power July 14 and remained at or near 100 percent power until July 21, when the transmission system coordinator requested that the Unit 2 power be reduced to approximately 50 percent to address an offsite transformer failure on the grid. The plant raised power to 100 percent on August 3, and remained at or near that power for the remainder inspection period.

### **1. REACTOR SAFETY**

#### **Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity**

##### **1R04 Equipment Alignment (71111.04)**

##### **.1 Quarterly Partial System Walkdowns**

##### **a. Inspection Scope**

The inspectors performed partial system walkdowns of the following risk-significant systems:

- Unit 2 east containment spray following maintenance and testing; and
- Unit 2 north safety injection.

The inspectors selected these systems based on their risk significance relative to the Reactor Safety Cornerstones at the time they were inspected. The inspectors attempted to identify any discrepancies that could impact the function of the system and, therefore, potentially increase risk. The inspectors reviewed applicable operating procedures, system diagrams, Updated Final Safety Analysis Report (UFSAR), Technical Specification (TS) requirements, outstanding work orders (WOs), condition reports, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have rendered the systems incapable of performing their intended functions. The inspectors also walked down accessible portions of the systems to verify system components and support equipment were aligned correctly and operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no obvious deficiencies. The inspectors also verified that the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers and entered them into the corrective action program (CAP) with the appropriate significance characterization. Documents reviewed are listed in the Attachment to this report.

These activities constituted two partial system walkdown samples as defined in Inspection Procedure (IP) 71111.04–05.



b. Findings

No findings were identified.

1R05 Fire Protection (71111.05)

.1 Routine Resident Inspector Tours (71111.05Q)

a. Inspection Scope

The inspectors conducted fire protection walkdowns which were focused on availability, accessibility, and the condition of firefighting equipment in the following risk-significant plant areas:

- Unit 2 CD emergency diesel generator (EDG) room;
- Unit 2 auxiliary feedwater (AFW) Pump Rooms (Fire Zone 17);
- Unit 1 residual heat removal and containment spray pump rooms; and
- Unit 2 residual heat removal and containment spray pump rooms.

The inspectors reviewed areas to assess if the licensee had implemented a fire protection program that adequately controlled combustibles and ignition sources within the plant, effectively maintained fire detection and suppression capability, maintained passive fire protection features in good material condition, and implemented adequate compensatory measures for out-of-service, degraded or inoperable fire protection equipment, systems, or features in accordance with the licensee's fire plan.

The inspectors selected fire areas based on their overall contribution to internal fire risk as documented in the plant's Individual Plant Examination of External Events with later additional insights, their potential to impact equipment which could initiate or mitigate a plant transient, or their impact on the plant's ability to respond to a security event.

Using the documents listed in the Attachment to this report, the inspectors verified that fire hoses and extinguishers were in their designated locations and available for immediate use; that fire detectors and sprinklers were unobstructed; that transient material loading was within the analyzed limits; and fire doors, dampers, and penetration seals appeared to be in satisfactory condition. The inspectors also verified that minor issues identified during the inspection were entered into the licensee's CAP.

Documents reviewed are listed in the Attachment to this report.

These activities constituted four quarterly fire protection inspection samples as defined in IP 71111.05–05.

b. Findings

Introduction: A self-revealed finding of very low safety significance (Green) and associated Non-Cited Violation (NCV) of the license condition for a fire protection program occurred when the licensee failed to ensure excavation activities preserved the functionality of the fire main. Specifically, the licensee improperly backfilled an excavation performed to inspect buried piping. The improper backfill led to a catastrophic failure of the fire main.

Description: In May 2016, the licensee excavated soil in order to perform a piping inspection of a transformer drain line. Because of drawing inaccuracies and buried lines confounding attempts to locate the subject line, the licensee performed a second

excavation. After locating the subject pipe, the licensee excavated about twenty feet of the transformer drain line. The excavation exposed several other buried pipes including the fire main. Despite locating unexpected buried lines, the licensee continued with the work to locate and inspect the buried line.

After completing the inspection, the licensee backfilled the excavation. Although the licensee used a work order, neither the work order nor the documents referenced in the work order provided guidance on how to conduct the backfill since licensee personnel considered backfill to be a skill of the craft. Initially, the licensee moved soil into one end of the excavation and manually shoveled the soil under the exposed pipes. Workers then used a hose to sluice soil into the area. Because of concerns that the soil compactor could damage the pipe, the licensee did not use a compactor until the excavation was within three feet of grade. At this level, the licensee began to use the compactor. During a work break, the fire main failed catastrophically, rendering the entire fire loop non-functional for about four hours. The licensee was able to isolate the break and restore firewater to most of the plant.

In the licensee's root cause, the licensee documented that improper backfill caused the line to break. The licensee analyzed the maximum unsupported span for the failed line and determined the line had about four feet of margin. However, with the additional weight of soil applied during backfill and improper backfill under the pipe, the fire main failed. In addition, analysis of the pipe documented that pipe condition was acceptable.

Analysis: The failure to ensure plant maintenance impacts on the plant fire protection systems were minimized was a performance deficiency. Specifically, the licensee failed to ensure the backfill off an excavation sufficiently compacted soil and eliminated voids such that the replaced soil could support the fire main. The improper backfill led to the rupture of the fire main and loss of the fire for approximately four hours. The inspectors screened the performance deficiency using Inspection Manual Chapter (IMC) 0612, "Inspection Reports", Appendix B, and determined the performance deficiency was more than minor, and thus a finding, because it impacted the mitigating system cornerstone attribute of protection against external factors and adversely impacted the cornerstone objective of ensuring the availability of systems to respond to initiating events to prevent undesirable consequences. The inspectors applied Appendix F, Attachment 1 dated September 20, 2013, and determined that the finding impacted the fire water supply. Since the finding impacted the ability to reach safe shutdown and resulted in a more than 50 percent loss in fire water capacity, the inspectors performed an initial quantitative screening. The inspectors determined that since the fire main failure rendered all automatic sprinkler systems and manual hose stations non-functional, a non-suppression factor of 1 was appropriate. Using the generic fire area frequencies, the inspectors determined multiple areas were impacted and that multiple areas would yield a delta cdf in excess of  $1\text{E}-6$ . For example, a transient induced fire in the turbine building has a frequency of  $1.6\text{e}-03$ . Multiplied by a duration factor of .01 yields a delta cdf of  $1.6\text{e}-05$  for this area alone. The inspectors then reviewed the results of the licensee fire probabilistic risk assessment. With the short duration, the licensee determined the delta cdf to be less than  $(1\text{e}-6)$ . These results were reviewed and accepted by the Senior Reactor Analyst. Therefore, the inspectors determined the finding was of very low safety significance (Green).

In addition, the inspectors determined the finding included a cross cutting aspect of Challenge the unknown, H.11, in the human performance area. Specifically, personnel performing the excavation and backfill activities did not question the adequacy of backfill instructions nor the discovery of additional lines during the excavation.

Enforcement: License conditions 2.C(4) and 2.C(3)(o) of the Donald C. Cook Nuclear Power Plant, Unit 1 and Unit 2 Operating Licenses, respectively, require, in part, that the licensee implement and maintain in effect all provisions of the approved fire protection program that comply with Title 10 of the *Code of Federal Regulations* (CFR) 50.48(a) and 10 CFR 50.48(c), "National Fire Protection Association (NFPA) Standard NFPA 805," as specified in the licensee's amendment request dated July 1, 2011, as supplemented, and as approved in the Safety Evaluation dated October 24, 2013. Section 3.3.1.1(3) of NFPA 805 requires that, "Administrative controls addressing the review of plant modifications and maintenance to ensure that both fire hazards and the impact on plant fire protection systems and features are minimized."

Contrary to the above, on June 28, 2016, the licensee failed to provide administrative controls to the backfill activities to minimize the impact on fire protection systems. Specifically, the licensee's failure to control the backfill activities led the rupture of the fire main and the loss of the fire water system for four hours.

This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy, because it was of very-low safety significance (Green), and was entered into the licensee's CAP as AR 2016-7626. The licensee isolated the break and restored the fire water system. **(NCV 05000315/2016003-01; Improper Backfill Severs Fire Main)**

.2 Annual Fire Protection Drill Observation (71111.05A)

a. Inspection Scope

On July 13, 2016, the inspectors observed a fire brigade activation for a drill which simulated a fire in the Fire Pump House. Based on this observation, the inspectors evaluated the readiness of the plant fire brigade to fight fires. The inspectors verified that the licensee staff identified deficiencies openly discussed them in a self-critical manner at the drill debrief, and took appropriate corrective actions. Specific attributes evaluated were:

- proper wearing of turnout gear and self-contained breathing apparatus;
- proper use and layout of fire hoses;
- employment of appropriate firefighting techniques;
- sufficient firefighting equipment brought to the scene;
- effectiveness of fire brigade leader communications, command, and control;
- search for victims and propagation of the fire into other plant areas;
- smoke removal operations;
- utilization of pre-planned strategies;
- adherence to the pre-planned drill scenario; and
- drill objectives.

Documents reviewed are listed in the Attachment to this report.

While most of the inspection elements were met, the inspectors did not have an opportunity to observe control room actions in response to the drill. Therefore, these activities do not constitute an annual fire protection inspection sample as defined in IP 71111.05–05. Further drill(s) will be evaluated in the fourth quarter to satisfy the remaining inspection sample requirements.

b. Findings

No findings were identified.

1R06 Flooding (71111.06)

.1 Internal Flooding

a. Inspection Scope

The inspectors reviewed selected risk important plant design features and licensee procedures intended to protect the plant and its safety-related equipment from internal flooding events. The inspectors reviewed flood analyses and design documents, including the UFSAR, engineering calculations, and abnormal operating procedures to identify licensee commitments. The specific documents reviewed are listed in the Attachment to this report. In addition, the inspectors reviewed licensee drawings to identify areas and equipment that may be affected by internal flooding caused by the failure or misalignment of nearby sources of water, such as the fire suppression or the circulating water systems. The inspectors also reviewed the licensee's corrective action documents with respect to past flood-related items identified in the corrective action program to verify the adequacy of the corrective actions. The inspectors performed a walkdown of the following plant area(s) to assess the adequacy of watertight doors and verify drains and sumps were clear of debris and were operable, and that the licensee complied with its commitments:

- service water screen house

Documents reviewed during this inspection are listed in the Attachment to this report. This inspection constituted one internal flooding sample as defined in IP 71111.06–05. In addition, the inspectors did not identify a history of cable degradation or failure due to submergence at the site. The underground vaults inspection sample was not performed as defined in IP 71111.06, Section–02.

b. Findings

No findings were identified.

1R08 Inservice Inspection Activities (71111.08P)

From March 28, 2016, – April 1, 2016, the inspectors conducted a review of the implementation of the licensee's Inservice Inspection (ISI) Program for monitoring degradation of the reactor coolant system (RCS), risk-significant piping and components and containment systems.

The inspections described in Sections 1R08.1, 1R08.2, 1R08.3, and 1R08.5 below constituted one ISI sample as defined in Inspection Procedure 71111.08.

.1 Piping Systems Inservice Inspection

a. Inspection Scope

The inspectors either observed or reviewed the following non-destructive examinations (NDEs) mandated by the American Society of Mechanical Engineers (ASME), Section XI Code, to evaluate compliance with the ASME Code Section XI and Section V requirements, and if any indications and defects were detected, to determine if these were dispositioned in accordance with the ASME Code or a Nuclear Regulatory Commission (NRC)-approved alternative requirement.

- Ultrasonic Examination of Pipe to Elbow Weld 1-SI-39-10S;
- Magnetic Particle Examination of Main Steam Isolation Valve Weld 1-MSIV-MRV-230-S2;
- Liquid Penetrant Examination of Socket Weld Ends of Globe Valve 1 NFP-220-V1;
- Visual examination (VT-3) of Safety Injection pipe supports 1-GSI-R-658 and 1-GSI-R-703;
- VT-3 of AFW pipe support 1-AC-L-905;
- Unit 1 Reactor Pressure Vessel Supports Visual Examination;
- Unit 1 Metallic Containment Liner Visual Examination;
- Unit 1 Concrete Containment Visual Examination;
- Bare Metal Visual (BMV) of Reactor Vessel Closure Head; and
- BMV of Reactor Vessel Bottom Mounted Instrument Nozzles and Surfaces.

The inspectors reviewed the following examination completed during the previous outage with relevant/recordable conditions/indications accepted for continued service to determine if acceptance was in accordance with the ASME Code Section XI, or an NRC-approved alternative.

- During non-destructive surface and volumetric examinations performed since the previous refueling outage, the licensee had not identified any recordable indications. Therefore, no NRC review was completed for this inspection procedure attribute.

The inspectors either observed or reviewed the following pressure boundary welds completed for risk-significant systems since the beginning of the last refueling outage to determine if the licensee applied the preservice NDEs, and acceptance criteria required by the Construction Code and ASME Code, Section XI. Additionally, the inspectors reviewed the welding procedure specification and supporting weld procedure qualification records to determine if the weld procedures were qualified in accordance with the requirements of Construction Code and the ASME Code Section IX.

- socket weld ends of globe valve 1-NFP-220-V1.

b. Findings

No findings were identified.

## .2 Reactor Pressure Vessel Upper Head Penetration Inspection Activities

### a. Inspection Scope

A BMV examination was required this outage pursuant to CFR, Part 50.55a(g)(6)(ii)(D).

The inspectors observed portions of the BMV examination conducted on the reactor vessel head at each of the penetration nozzles to determine whether the activities were conducted in accordance with the requirements of ASME Code Case N-729-1 and 10 CFR 50.55a(g)(6)(ii)(D). Specifically, to determine:

- If the required VT scope/coverage was achieved and limitations (if applicable were recorded), in accordance with the licensee procedures;
- If the licensee criteria for VT quality and instructions for resolving interference and masking issues were adequate; and
- For indications of potential through-wall leakage, that the licensee entered the condition into the corrective action system and implemented appropriate corrective actions.

A non-VT of the reactor vessel head penetrations was not required this outage. Therefore, no NRC review was completed for this inspection procedure attribute.

The licensee did not perform any welded repairs to vessel head penetrations since the beginning of the preceding outage. Therefore, no NRC review was completed for this inspection procedure attribute.

### b. Findings

No findings were identified.

## .3 Boric Acid Corrosion Control

### a. Inspection Scope

The inspectors performed an independent walkdown of the RCS and related lines in the containment, which had received a recent licensee boric acid walkdown, and verified whether the licensee's boric acid corrosion control VTs emphasized locations where boric acid leaks can cause degradation of safety significant components.

The inspectors reviewed the following licensee evaluations of RCS components with boric acid deposits to determine if degraded components were documented in the CAP. The inspectors also evaluated corrective actions for any degraded RCS components to determine if they met the ASME Section XI Code.

- 1-QFI-301, letdown heat exchanger outlet flow indicator transmitter; and
- 1-ILA-141-IH, high pressure side instrument shutoff valve.

The inspectors reviewed the following corrective actions related to evidence of boric acid leakage to determine if the corrective actions completed were consistent with the requirements of the ASME Code Section XI and 10 CFR Part 50, Appendix B, Criterion XVI.

- Action Request (AR) 2015-16290, Dry boric acid on valve body 1-CS-3115;
- AR 2015-10004, Leak from piping above 1-CLV-3; and
- AR 2014-12764, U1C26 Refueling Cavity Leakage.

b. Findings

No findings were identified.

.4 Steam Generator Tube Inspection Activities

a. Inspection Scope

No exams were required this outage. Therefore, no NRC review was completed for this inspection procedure attribute.

b. Findings

No findings were identified.

.5 Identification and Resolution of Problems

a. Inspection Scope

The inspectors performed a review of ISI/SG-related problems entered into the licensee's CAP, and conducted interviews with licensee staff to determine if:

- the licensee was in compliance with the requirements of 10 CFR 50.55a, as discussed in Regulatory Information Summary 2010-06, "In-service Inspection and Testing of Dynamic Restraints (Snubbers)";
- the licensee was in compliance with the requirements of 10 CFR 50.55a, as discussed in Information Notice 2014-02; Failure to Properly Pressure Test Reactor Vessel Flange Leak-off Lines; dated February 25, 2014; and
- the licensee was in compliance with the requirements of 10 CFR 50.55a, with respect to system leakage testing (VT-2) the reactor head vent system.

The inspectors performed these reviews to evaluate compliance with 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requirements. The corrective action documents reviewed by the inspectors are listed in the Attachment to this report.

b. Findings

No findings were identified.

1R11 Licensed Operator Regualification Program (71111.11)

.1 Resident Inspector Quarterly Review of Licensed Operator Regualification (71111.11Q)

a. Inspection Scope

On August 31, 2016, the inspectors observed a crew of licensed operators receive training on systems associated with the main generators. Following the training, the

inspectors observed a crew in the plant's simulator during licensed operator requalification training. The inspectors verified that operator performance was adequate, evaluators were identifying and documenting crew performance problems, and that training was being conducted in accordance with licensee procedures. The inspectors evaluated the following areas:

- licensed operator performance;
- crew's clarity and formality of communications;
- ability to take timely actions in the conservative direction;
- prioritization, interpretation, and verification of annunciator alarms;
- correct use and implementation of abnormal and emergency procedures;
- control board manipulations;
- oversight and direction from supervisors; and
- ability to identify and implement appropriate TS actions and Emergency Plan actions and notifications.

The crew's performance in these areas was compared to pre-established operator action expectations and successful critical task completion requirements. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one quarterly licensed operator requalification program simulator sample as defined in IP 71111.11-05.

b. Findings

No findings were identified.

.2 Resident Inspector Quarterly Observation During Periods of Heightened Activity or Risk (71111.11Q)

a. Inspection Scope

On July 21, 2016, the inspectors observed the operating crew response to a rapid power reduction from 100 percent to approximately 50 percent. The Unit 2 crew was asked to perform the power reduction by the transmission system coordinator due to the failure of a transformer on the transmission system (not on Cook plant property). Power was safely reduced and plant systems responded as expected. Power was restored to 100 percent several days later. This was an activity that required heightened awareness or was related to increased risk. The inspectors evaluated the following areas:

- licensed operator performance;
- crew's clarity and formality of communications;
- ability to take timely actions in the conservative direction;
- prioritization, interpretation, and verification of annunciator alarms (if applicable);
- correct use and implementation of procedures;
- control board (or equipment) manipulations;
- oversight and direction from supervisors; and
- ability to identify and implement appropriate TS actions and Emergency Plan actions and notifications (if applicable).



The performance in these areas was compared to pre-established operator action expectations, procedural compliance and task completion requirements. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one quarterly licensed operator heightened activity/risk sample as defined in IP 71111.11–05.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12)

a. Inspection Scope

The inspectors evaluated degraded performance issues involving the following risk-significant systems:

- charging pumps; and
- radiation monitors.

The inspectors reviewed events such as where ineffective equipment maintenance had resulted in valid or invalid automatic actuations of engineered safeguards systems and independently verified the licensee's actions to address system performance or condition problems in terms of the following:

- implementing appropriate work practices;
- identifying and addressing common cause failures;
- scoping of systems in accordance with 10 CFR 50.65(b) of the maintenance rule;
- characterizing system reliability issues for performance;
- charging unavailability for performance;
- trending key parameters for condition monitoring;
- ensuring 10 CFR 50.65(a)(1) or (a)(2) classification or re-classification; and
- verifying appropriate performance criteria for structures, systems, and components (SSCs)/functions classified as (a)(2), or appropriate and adequate goals and corrective actions for systems classified as (a)(1).

The inspectors assessed performance issues with respect to the reliability, availability, and condition monitoring of the system. In addition, the inspectors verified maintenance effectiveness issues were entered into the CAP with the appropriate significance characterization. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two quarterly maintenance effectiveness samples as defined in IP 71111.12–05.

b. Findings

Introduction: A finding of very low safety significance (Green) with an associated NCV of 10 CFR 50 Appendix B, Criterion III, "Design Control," was self-revealed on June 23, 2016. Plant personnel discovered steam originating from a thru-wall leak in a branch connection off of the Unit 1 west coolant charging pump (CCP) discharge piping.

Description: On June 23, 2016, licensee personnel on routine rounds entered the Unit 1 west CCP area and discovered steam in the room. Investigation by the licensee revealed a through wall leak on a small branch connection just upstream of the discharge pressure indicator instrument line. The through wall leak was in the safety related instrument line associated with the west centrifugal charging pump line and is designated as ASME code class 2. Operators secured the west CCP and placed the east CCP in-service, which stopped the leak. Operators also declared Train B of the Emergency Core Cooling System (ECCS) inoperable and entered limited condition for operation (LCO) 3.5.2 Condition A, which required the train to be restored to operable status within 72 hours. The licensee removed the weld and replaced it with a weld-type more resistant to vibration induced fatigue. The licensee completed the work and restored the ECCS to operable status within the 72 hour requirement.

The licensee performed an Apparent Cause Evaluation on the leak. Evaluators determined a similar leak had occurred on the same line associated with the Unit 1 east CCP back in 2011. Both leaks had crack-like indications indicative of a vibration induced failure. Back in 2011, the licensee concluded cyclic fatigue caused the crack to develop and grow. The licensee determined the natural frequency of the cantilever that contained the root valve coinciding with the force frequency of the charging pump caused an amplified vibration response on the line. When assessing other susceptible components in 2011, the licensee determined the line associated with the recent leak on the west CCP would not have the same issue because the length of the line was slightly different. However, the licensee did not take vibration measurements to confirm this assumption. In response to the recent leak, the licensee obtained vibration measurements which revealed that the same phenomena was, in-fact, present on the line. Therefore, the same design issue which caused the leak in 2011 on the east CCP recurred on the west CCP. For corrective actions, the licensee implemented a more robust weld on the affected line. Additionally, actions were initiated to take frequency measurements on other similar lines in the plant and to evaluate a modification of the welds to a more robust design.

Analysis: The failure to design the charging system piping to withstand vibrations was a performance deficiency. This failure resulted in a crack in charging system. The issue was more than minor because it adversely affected the Design Control Attribute of the Mitigating Systems cornerstone, whose objective is to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The finding screened as Green, or very low safety significance, because the inspectors answered 'no' to the Exhibit 2, Section 'A' questions in IMC 0609 Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated July 1, 2012. A cross-cutting aspect was not assigned to the finding because the issue was not reflective of current licensee performance (the issue occurred approximately five years ago). As part of the inspection sample, the inspectors did not identify recent opportunities for the licensee to identify the condition.

Enforcement: 10 CFR 50, Appendix B, Criterion III, "Design Control," requires, in part, that measures shall be established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of the structures, systems, and components. Contrary to this requirement, the licensee failed to review for suitability parts that were subjected to vibrations that led to a failure on the piping associated with valve 1-QPI-252-V1. As a result, the piping developed a thru-wall leak while the Unit 1 west CCP was in-service.

The inspectors determined the violation occurred when the corrective action document associated with the 2011 leak was closed and the susceptible condition existed until June 23, 2016. Upon discovery of the leak in 2016, the licensee secured the pump to stop the leak, declared the associated train of ECCS inoperable, and repaired the leak. The licensee documented the issue in their CAP as AR-2016-7495. This violation is being treated as an NCV, consistent with Section 2.3.2.a of the Enforcement Policy. **(NCV 05000315/2016003-02, Charging System Thru-Wall Leak)**

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13)

a. Inspection Scope

The inspectors reviewed the licensee's evaluation and management of plant risk for the maintenance and emergent work activities affecting risk-significant and safety-related equipment listed below to verify that the appropriate risk assessments were performed prior to removing equipment for work:

- Risk management the week of July 11, 2016: Unit 1 rod position indication troubleshooting, Unit 2 letdown controller troubleshooting/repair, fire system work and fire drill, Unit 2 Control Room air conditioning issues during a mode ascension; and
- Unit 1 main turbine lube oil cooler swap while online.

These activities were selected based on their potential risk significance relative to the Reactor Safety Cornerstones. As applicable for each activity, the inspectors verified that risk assessments were performed as required by 10 CFR 50.65(a)(4) and were accurate and complete. When emergent work was performed, the inspectors verified that the plant risk was promptly reassessed and managed. The inspectors reviewed the scope of maintenance work, discussed the results of the assessment with the licensee's probabilistic risk analyst or shift technical advisor, and verified plant conditions were consistent with the risk assessment. The inspectors also reviewed TS requirements and walked down portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met.

Documents reviewed during this inspection are listed in the Attachment to this report. These maintenance risk assessments and emergent work control activities constituted two samples as defined in IP 71111.13-05.

b. Findings

No findings were identified.

1R15 Operability Determinations and Functional Assessments (71111.15)

.1 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the following issues:

- Unit 2 east CCW heat exchanger tube leakage;

- Unexpected effects of the Unit 1 operating temperature and pressure modification;
- Unit 1 CD EDG failed fuel injector during a post-maintenance test run;
- rod position indication; and
- wetting of the Unit 2 'N' train battery charger due to a roof leak.

The inspectors selected these potential operability issues based on the risk significance of the associated components and systems. The inspectors evaluated the technical adequacy of the evaluations to ensure that TS operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the TS and UFSAR to the licensee's evaluations to determine whether the components or systems were operable. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled. The inspectors determined, where appropriate, compliance with bounding limitations associated with the evaluations. Additionally, the inspectors reviewed a sampling of corrective action documents to verify that the licensee was identifying and correcting any deficiencies associated with operability evaluations. Documents reviewed are listed in the Attachment to this report.

This operability inspection constituted four samples as defined in IP 71111.15–05. The review of the Unit 1 CD EDG fuel injector issue was not complete as of the writing of this report.

b. Findings

Introduction: A finding of very low safety significance (Green) with an associated NCV of TS 5.4, Procedures, was self-revealed on June 21, 2016, when the licensee discovered N-Train battery charger 2–BC–B soaked with water from a roof leak above.

Description: On June 21, 2016, licensee personnel identified that the Unit 2 N-Train battery charger 2–BC–B had been wetted from a roof leak above the charger. The charger was not in service at the time. The "N-Train" direct current distribution system in each unit provides direct current electrical power primarily to circuits associated with the turbine-driven AFW system. The main components of the system are the battery, two chargers, and the electrical distribution components that provide power to the loads. Visual inspection by the licensee revealed that both the exterior and interior of the charger were wet. The charger was declared inoperable, however, the associated TS LCO continued to be met because the other charger was in service and operable. The licensee took action to shield the charger from the leak above and then dried-out the charger. A surveillance test confirmed that drying the charger restored it to an operable condition.

On May 5, 2016, the licensee documented the roof leak in the vicinity of the charger under AR–2016–5697. The AR described it as a 20 dpm leak "that could increase with more severe rain." The licensee determined that the charger could remain operable but a drip catch was needed until completion of roof repairs. Licensee personnel installed a drip catch but failed to follow the process that provides administrative controls for leak collection devices. Specifically, procedure PMP–5020–LCD–001, Control of Leak Collection Devices, required records of the placement catches and ensured other

controls over temporary plant equipment were followed. On June 3, 2016, the Performance Assurance department noted the catch was installed out-of-process. Based on this feedback, the licensee decided to remove the catch, with the thought that the roof repairs would be completed in about three weeks. Nothing was put in place to protect the charger in the interim. On June 21, 2016, roof repairs were in progress when heavy rain was experienced. The increased leakage resulted in flow along the ceiling/walls that wetted the charger. Had the catch remained in place (while following appropriate plant procedures), it is likely the charger would have remained dry.

Analysis: The removal of a barrier used to protect the safety-related 2-BC-B charger with no further actions taken to protect the equipment was a performance deficiency. The issue was more than minor because it adversely affected the Protection Against External Factors attribute of the Mitigating Systems cornerstone, whose objective is to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The finding screened as Green, or very low safety significance, because the inspectors answered 'no' to the Exhibit 2, Section 'A' questions in IMC 0609 Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated July 1, 2012.

The inspectors determined the finding had an associated cross-cutting aspect in the Human Performance area, specifically, H.7., Documentation. Had the licensee kept the leak detection log up-to-date with the addition of the catch over the charger, it would have prompted the licensee to ensure the repairs to the roof were complete before removing the barrier.

Enforcement: TS 5.4, Procedures, requires, in part, that the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978, be established, implemented, and maintained. Regulatory Guide 1.33 states, in part, that maintenance that can affect the performance of safety-related equipment should be properly preplanned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances. Contrary to this requirement, on June 5, 2016, the licensee removed a catch above battery charger 2-BC-B that was being used to protect the charger from a water leak in the area pending roof repairs. As a result, during a rainstorm on June 21, 2016, the charger was soaked with water and considered inoperable. The charger was restored to operable status on June 23 after it had been dried out and tested. The licensee documented the issue in AR-2016-7367. This violation is being treated as an NCV, consistent with Section 2.3.2.a of the Enforcement Policy. **(NCV 05000316/2016003-03, Wetting of Safety-Related Battery Charger)**

#### 1R18 Plant Modifications (71111.18)

##### a. Inspection Scope

The inspectors reviewed the following modification(s):

- UFSAR changes to address accident dose

The inspectors reviewed the configuration changes and associated 10 CFR 50.59 safety evaluation screening against the design basis, the UFSAR, and the TS, as applicable, to verify that the modification did not affect the operability or availability of the affected system. As applicable, the inspectors verified that relevant procedure, design, and

licensing documents were properly updated. Lastly, the inspectors discussed the plant modification with operations, and engineering, personnel to ensure that the individuals were aware of how the operation with the plant modification in place could impact overall plant performance. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one permanent plant modification sample as defined in IP 71111.18–05.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19)

a. Inspection Scope

The inspectors reviewed the following post-maintenance activities to verify that procedures and test activities were adequate to ensure system operability and functional capability:

- Unit 1 pressurizer heater cable failure/replacement;
- Unit 2 west motor-driven AFW cooler repairs;
- Unit 2 steam generator feed-regulating valve air hose replacement; and
- refurbishment of a safety-related 600V breaker for a rod-drive motor-generator set.

These activities were selected based upon the structure, system, or component's ability to impact risk. The inspectors evaluated these activities for the following (as applicable): the effect of testing on the plant had been adequately addressed; testing was adequate for the maintenance performed; acceptance criteria were clear and demonstrated operational readiness; test instrumentation was appropriate; tests were performed as written in accordance with properly reviewed and approved procedures; equipment was returned to its operational status following testing (temporary modifications or jumpers required for test performance were properly removed after test completion); and test documentation was properly evaluated. The inspectors evaluated the activities against TSS, the UFSAR, 10 CFR Part 50 requirements, licensee procedures, and various NRC generic communications to ensure that the test results adequately ensured that the equipment met the licensing basis and design requirements. In addition, the inspectors reviewed corrective action documents associated with post-maintenance tests to determine whether the licensee was identifying problems and entering them in the CAP and that the problems were being corrected commensurate with their importance to safety. Documents reviewed are listed in the Attachment to this report.

This inspection constituted four post-maintenance testing samples as defined in IP 71111.19–05.

b. Findings

No findings were identified.

## 1R20 Outage Activities (71111.20)

### .1 Other Outage Activities

#### a. Inspection Scope

The inspectors evaluated outage activities for an unscheduled outage that began on July 6, 2016, and continued through July 12, 2016. On July 6, operators on Unit 2 manually tripped the reactor and shut the main steam isolation valves in response to a rupture of an expansion bellows on the 'B' line of the Right Moisture Separator-Reheater. The rupture resulted in damage to the adjacent turbine building wall and the declaration of an Unusual Event. The plant was brought to a safe shutdown condition and the Unusual Event was terminated. Repairs were made and the licensee initiated a root cause evaluation to investigate the rupture. The inspectors reviewed activities to ensure that the licensee considered risk in developing, planning, and implementing the outage schedule.

The inspectors reviewed licensee actions associated with unit trip, outage equipment configuration and risk management, electrical lineups, control and monitoring of decay heat removal, startup and heatup activities, and identification and resolution of problems associated with the outage. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one other outage sample as defined in IP 71111.20–05.

#### b. Findings

No findings were identified.

## 1R22 Surveillance Testing (71111.22)

#### a. Inspection Scope

The inspectors reviewed the test results for the following activities to determine whether risk-significant systems and equipment were capable of performing their intended safety function and to verify testing was conducted in accordance with applicable procedural and TS requirements:

- Control room envelope leakage testing (routine)

The inspectors observed in-plant activities and reviewed procedures and associated records to determine the following:

- did preconditioning occur;
- the effects of the testing were adequately addressed by control room personnel or engineers prior to the commencement of the testing;
- acceptance criteria were clearly stated, demonstrated operational readiness, and were consistent with the system design basis;
- plant equipment calibration was correct, accurate, and properly documented;
- as-left setpoints were within required ranges; and the calibration frequency was in accordance with TSs, the USAR, procedures, and applicable commitments;
- measuring and test equipment calibration was current;

- test equipment was used within the required range and accuracy; applicable prerequisites described in the test procedures were satisfied;
- test frequencies met TS requirements to demonstrate operability and reliability; tests were performed in accordance with the test procedures and other applicable procedures; jumpers and lifted leads were controlled and restored where used;
- test data and results were accurate, complete, within limits, and valid;
- test equipment was removed after testing;
- where applicable for inservice testing activities, testing was performed in accordance with the applicable version of Section XI, American Society of Mechanical Engineers code, and reference values were consistent with the system design basis;
- where applicable, test results not meeting acceptance criteria were addressed with an adequate operability evaluation or the system or component was declared inoperable;
- where applicable for safety-related instrument control surveillance tests, reference setting data were accurately incorporated in the test procedure;
- where applicable, actual conditions encountering high resistance electrical contacts were such that the intended safety function could still be accomplished;
- prior procedure changes had not provided an opportunity to identify problems encountered during the performance of the surveillance or calibration test;
- equipment was returned to a position or status required to support the performance of its safety functions; and
- all problems identified during the testing were appropriately documented and dispositioned in the CAP.

Documents reviewed are listed in the Attachment to this report.

This inspection constituted one routine surveillance testing sample as defined in IP 71111.22, Sections–02 and–05.

b. Findings

No findings were identified.

1EP6 Drill Evaluation (71114.06)

.1 Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors evaluated the conduct of a routine licensee emergency drills on July 26, 2016, and on September 13, 2016, to identify any weaknesses and deficiencies in classification, notification, and protective action recommendation development activities. The inspectors observed emergency response operations in the simulator control room and operations support center to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with procedures. The inspectors also attended the licensee drill critique to compare any inspector-observed weakness with those identified by the licensee staff in order to evaluate the critique and to verify whether the licensee staff was properly identifying weaknesses and entering them into the corrective action program. As part of



the inspection, the inspectors reviewed the drill package and other documents listed in the Attachment to this report.

These emergency preparedness drill inspections constituted two samples as defined in IP 71114.06–06.

b. Findings

No findings were identified.

**2. RADIATION SAFETY**

2RS6 Radioactive Gaseous and Liquid Effluent Treatment (71124.06)

.1 Walk-downs and Observations

a. Inspection Scope

The inspectors walked down select effluent radiation monitoring systems to evaluate whether the monitor configurations aligned with Offsite Dose Calculation Manual (ODCM) descriptions and to observe the materiel condition of the systems.

The inspectors walked down selected components of the gaseous and liquid discharge systems to evaluate whether equipment configuration and flow paths align with plant documentation and to assess equipment materiel condition. The inspectors also assessed whether there were potential unmonitored release points, building alterations which could impact effluent controls, and ventilation system leakage that communicated directly with the environment.

For equipment or areas associated with the systems selected for review that were not readily accessible, the inspectors reviewed the licensee's materiel condition surveillance records.

The inspectors walked down filtered ventilation systems to assess for conditions such as degraded high-efficiency particulate air/charcoal banks, improper alignment, or system installation issues that would impact the performance or the effluent monitoring capability of the effluent system.

As available, the inspectors observed selected portions of the routine processing and discharge of radioactive gaseous effluent to evaluate whether appropriate treatment equipment was used and the processing activities aligned with discharge permits.

The inspectors determined if the licensee has made significant changes to their effluent release points.

As available, the inspectors observed selected portions of the routine processing and discharging of liquid waste to determine if appropriate effluent treatment equipment was being used and that radioactive liquid waste was being processed and discharged in accordance with procedure requirements and aligned with discharge permits.

These inspection activities constituted one complete sample as defined in Inspection Procedure (IP) 71124.06–05.

b. Findings

No findings were identified.

.2 Calibration and Testing Program

a. Inspection Scope

The inspectors reviewed calibration and functional tests for select effluent monitors to evaluate whether they were performed consistent with the ODCM. The inspectors assessed whether National Institute of Standards and Technology traceable sources were used, primary calibration represented the plant nuclide mix, secondary calibrations verified the primary calibration, and calibration encompassed the alarm set points.

The inspectors assessed whether effluent monitor alarm set points were established as provided in the ODCM and procedures.

The inspectors evaluated the basis for changes to effluent monitor alarm set points.

These inspection activities constituted one complete sample as defined in IP 71124.06–05.

b. Findings

No findings were identified.

.3 Sampling and Analyses

a. Inspection Scope

The inspectors reviewed select effluent sampling activities and assessed whether adequate controls had been implemented to ensure representative samples were obtained.

The inspectors reviewed select effluent discharges made with inoperable effluent radiation monitors and assess whether controls were in place to ensure compensatory sampling was performed consistent with the ODCM and that those controls were adequate to prevent the release of unmonitored effluents.

The inspectors determined whether the facility was routinely relying on the use of compensatory sampling in lieu of adequate system maintenance.

The inspectors reviewed the results of the Inter-Laboratory Comparison Program to evaluate the quality of the radioactive effluent sample analyses and assessed whether the Inter-Laboratory Comparison Program included hard-to-detect isotopes as appropriate.

These inspection activities constituted one complete sample as defined in IP 71124.06–05.

b. Findings

No findings were identified.

#### .4 Instrumentation and Equipment

##### a. Inspection Scope

The inspectors reviewed the methodology used to determine the effluent stack and vent flow rates to determine if the flow rates were consistent with plant documentation, and that differences between assumed and actual stack and vent flow rates did not affect the results of the projected public doses.

The inspectors assessed whether surveillance test results for Technical Specification required ventilation effluent discharge systems met Technical Specification acceptance criteria.

The inspectors assessed calibration and availability for select effluent monitors used for triggering emergency action levels or for determining protective action recommendations.

These inspection activities constituted one complete sample as defined in IP 71124.06–05.

##### b. Findings

No findings were identified.

#### .5 Dose Calculations

##### a. Inspection Scope

The inspectors reviewed significant changes in reported dose values compared to the previous Radiological Effluent Release Report to evaluate the factors which may have resulted in the change.

The inspectors reviewed radioactive liquid and gaseous waste discharge permits to assess whether the projected doses to members of the public were accurate.

Inspectors evaluated the isotopes that are included in the source term to assess whether analysis methods were sufficient to satisfy detectability standards. The review included the current Part 61 analyses to ensure hard-to-detect radionuclides are included in the source term.

The inspectors reviewed changes in the licensee's offsite dose calculations to evaluate whether changes were consistent with the ODCM and Regulatory Guide 1.109. Inspectors reviewed meteorological dispersion and deposition factors used in the ODCM and effluent dose calculations to evaluate whether appropriate factors were being used for public dose calculations.

The inspectors reviewed the latest Land Use Census to assess whether changes have been factored into the dose calculations.

For select radioactive waste discharges, the inspectors evaluated whether the calculated doses were within the Title 10 of the *Code of Federal Regulations*, Part 50, Appendix I, and Technical Specification dose criteria.

The inspectors reviewed select records of abnormal radioactive waste discharges to ensure the discharge was monitored by the discharge point effluent monitor. Discharges made with inoperable effluent radiation monitors, or unmonitored leakages were reviewed to ensure that an evaluation was made to account for the source term and projected doses to the public.

These inspection activities constituted one complete sample as defined in IP 71124.06–05.

b. Findings

No findings were identified.

.6 Problem Identification and Resolution

a. Inspection Scope

Inspectors assessed whether problems associated with the effluent monitoring and control program were being identified by the licensee at an appropriate threshold and were properly addressed for resolution. In addition, they evaluated the appropriateness of the corrective actions for a selected sample of problems documented by the licensee involving radiation monitoring and exposure controls.

These inspection activities constituted one complete sample as defined in IP 71124.06–05.

b. Findings

No findings were identified.

4. **OTHER ACTIVITIES**

**Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, Emergency Preparedness, Public Radiation Safety, Occupational Radiation Safety, and Security**

4OA1 Performance Indicator Verification (71151)

.1 Radiological Effluent Technical Specification/Offsite Dose Calculation Manual  
Radiological Effluent Occurrences

a. Inspection Scope

The inspectors sampled licensee submittals for the Radiological Effluent Technical Specification/ODCM radiological effluent occurrences Performance Indicator for the period from the first quarter 2015 through the first quarter 2016. The inspectors used Performance Indicator definitions and guidance contained in the Nuclear Energy Institute Document 99–02, “Regulatory Assessment Performance Indicator Guideline,” Revision 7, dated August 2013, to determine the accuracy of the Performance Indicator Data reported during those periods. The inspectors reviewed the licensee’s issue report database and selected individual reports generated since this indicator was last reviewed to identify any potential occurrences such as unmonitored, uncontrolled, or improperly calculated effluent releases that may have impacted offsite dose. The inspectors reviewed gaseous effluent summary

data and the results of associated offsite dose calculations for selected dates to determine if indicator results were accurately reported. The inspectors also reviewed the licensee's methods for quantifying gaseous and liquid effluents and determining effluent dose. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one Radiological Effluent Technical Specification/ODCM radiological effluent occurrences sample as defined in IP 71151.05.

b. Findings

No findings were identified.

4OA2 Identification and Resolution of Problems (71152)

.1 Routine Review of Items Entered into the Corrective Action Program

a. Inspection Scope

As part of the various baseline inspection procedures discussed in previous sections of this report, the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify they were being entered into the licensee's CAP at an appropriate threshold, that adequate attention was being given to timely corrective actions, and that adverse trends were identified and addressed. Attributes reviewed included: identification of the problem was complete and accurate; timeliness was commensurate with the safety significance; evaluation and disposition of performance issues, generic implications, common causes, contributing factors, root causes, extent-of-condition reviews, and previous occurrences reviews were proper and adequate; and that the classification, prioritization, focus, and timeliness of corrective actions were commensurate with safety and sufficient to prevent recurrence of the issue. Minor issues entered into the licensee's CAP as a result of the inspectors' observations are included in the Attachment to this report.

These routine reviews for the identification and resolution of problems did not constitute any additional inspection samples. Instead, by procedure they were considered an integral part of the inspections performed during the quarter and documented in Section 1 of this report.

b. Findings

No findings were identified.

.2 Daily Corrective Action Program Reviews

a. Inspection Scope

In order to assist with the identification of repetitive equipment failures and specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the licensee's CAP. This review was accomplished through inspection of the station's daily condition report packages.

These daily reviews were performed by procedure as part of the inspectors' daily plant status monitoring activities and, as such, did not constitute any separate inspection samples.

b. Findings

No findings were identified.

.3 Annual Follow-up of Selected Issues: Rupture of Bellows on Unit 2 Right Moisture Separator Reheater

a. Inspection Scope

In July of 2016, a moisture separator reheater (MSR) expansion bellow failed catastrophically resulting in declaration of an Unusual Event. During the initial review of the failure, the inspectors noted that the licensee had previously taken corrective actions to mitigate vibrations induced by MSR internals. Further, the inspectors noted there had been previous instances of leakage from the expansion-bellows portions of the MSR's. Since the licensee completed the root cause for the rupture during the third quarter, the inspectors selected the failure as a Problem Identification & Resolution sample to review previous performance of the CAP in addressing issues with the bellows and to review the current results and actions from the root cause.

One attribute reviewed by the inspectors was the documentation of the rupture in the CAP. It was timely, accurate, and complete. The inspectors also noted AR's were promptly generated when additional issues arose during the root cause evaluation which pertained to performance of the MSR's. For instance, several U-bolts that had been added as part of a modification to dampen vibrations began to break. The issues were promptly identified and dispositioned in the CAP. This led to periodic walkdowns by plant staff to validate the condition of the U-bolts and to assess effectiveness of the corrective actions that were implemented to address the U-bolt cracking.

The inspectors also assessed the root cause evaluation. Formal tools, such as event and causal factors charts, why staircases, and support/refute analyses were utilized and supported each other in terms of the determined causes. The inspectors felt the root cause determined by the licensee was appropriate and that the corrective actions were appropriate to address both the root and contributing causes.

The inspectors also reviewed the extent of condition and extent of cause associated with the rupture. Each unit has MSR's, however, only Unit 2 had the expansion bellow design associated with the piping connecting the MSR's to the low pressure turbines. The inspectors reviewed actions taken by the licensee to provide assurance the Unit 2 MSR's would be acceptable for operation until the next refueling outage (which began October 2016). The inspectors reviewed ultrasonic test results, operating experience gathered by the site, and modifications the licensee performed. The inspectors determined the extent of condition and extent of cause reviews were appropriate.

The inspectors reviewed licensee actions to correct the vibrations associated with the earlier failures of portions of the MSR cross over lines. The inspectors noted that these efforts shifted vibrations to other portions of the piping system. Although the licensee recognized continued elevated vibrations on the B expansion bellows, further work to eliminate the elevated vibrations became less of a priority for the station. For instance, although some actions remained open to further investigate the vibrations, the topic had been taken off the 'Top 10' list, which reduced station focus on this issue.

Inspection activities continued into the fourth quarter; therefore, this review does not yet constitute a completed in-depth problem identification and resolution sample as defined in IP 71152–05.

b. Findings

No findings were identified.

4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153)

.1 Unit 2 Reactor Trip and Main Steam Isolation

a. Inspection Scope

The inspectors reviewed the plant's response to a Unit 2 plant trip on July 6, 2016. At 0038, plant operators inserted a manual trip in response to a steam leak in the turbine building. The licensee declared an unusual event (N–7 Unanticipated explosion) because of the steam leak and associated damage to the turbine building. The licensee stabilized the plant in mode 3. Closure of the main steam isolation valves successfully isolated the steam leak. The inspectors arrived on site and verified plant conditions were stabilized and the reactor was in a safe condition. After confirming the licensee continued to satisfy all reactor safety functions, the inspectors observed the area near the steam to validate no consequential damage impacted safety related equipment. At 0207, the licensee exited the unusual event; the inspectors validated plant conditions no longer met the criteria for the unusual event. Documents reviewed are listed in the Attachment to this report.

This event follow-up review constituted one sample as defined in IP 71153–05.

b. Findings

Findings associated with this event are documented in section 4O2A.

.2 Potential Notice of Enforcement Discretion for Faulted Pressurizer Heater Cabling

a. Inspection Scope

On September 27, 2016, one train of pressurizer heaters on Unit 1 became inoperable when a power supply breaker to the heaters inadvertently opened. Initial investigation by the licensee revealed a degraded cable caused the overcurrent condition which resulted in the breaker trip. The plant entered a TS 72 hour LCO action statement. Repairs consisted of removing the old cabling and running new cabling from an upstream 4kV supply breaker to a 600V transformer. When delays were encountered during the work, the licensee determined there was a chance the repair work would go beyond the 72 hour TS allowed outage time. The licensee began to prepare a Notice of Enforcement Discretion (NOED) request to extend the allowed outage time in case the repairs couldn't be completed in 72 hours. The inspectors began their review of the draft NOED in preparation for a possible request by the licensee. Ultimately, the licensee was able to complete the repairs without the need for the NOED. The heater train was declared operable on September 30, at approximately the 69 hour point in the 72 hour window.

This NOED review constituted one sample as defined in IP 71153–05.

b. Findings

No findings were identified.

4OA6 Management Meetings

.1 Exit Meeting Summary

On October 12, 2016, the inspectors presented the inspection results to Mr. J. Gebbie and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

.2 Interim Exit Meetings

Interim exits were conducted for:

- The inspection results for the Radiation Safety Program review with Mr. J. Gebbie, on July 22, 2016; and
- The results of the inservice inspection were discussed with Mr. J. Gebbie and other members of the licensee staff on April 1, 2016.

The inspectors confirmed that none of the potential report input discussed was considered proprietary. Proprietary material received during the inspection was returned to the licensee.

4OA7 Licensee-Identified Violations

The following violation of very low significance (Green) or Severity Level IV was identified by the licensee and is a violation of NRC requirements which meets the criteria of the NRC Enforcement Policy for being dispositioned as an NCV.

The licensee identified a finding and NCV of 10 CFR 50.59 for the failure to properly evaluate modifications to the facility. Specifically, Evaluation 2010–0016–00 failed to address each of the changes associated with proposed changes to the UFSAR to incorporate revised analysis to control room and offsite radiological dose consequences for the design bases accident. While preparing a revision to evaluation 2010–0016–00, the preparer noted numerous discrepancies which were documented in AR 2012–14068. Because of the complex nature of the revisions and licensing history of Cook's dose consequence analysis, the licensee determined use of the 50.59 process would not resolve the discrepancies in the current license bases and concluded the appropriate corrective action would be preparation and submittal of a license amendment to fully implement alternate source term as part of the D. C. Cook license. The licensee has submitted the license amendment request and it is now approved. The inspectors determined that the failure of the licensee to demonstrate via the 50.59 process that the change to the licensee could be made without prior NRC approval was a performance deficiency. In accordance with the NRC Enforcement Policy, August 2016, changes made contrary to 10 CFR 50.59 impact the agency's ability to regulate and warrant enforcement. Examples provided in this Enforcement Policy stipulate that an associated SDP finding of very low safety significance would result in a Severity Level IV finding.



The inspectors did not identify any physical changes to the facility based on the changes made to the UFSAR nor any other changes suitable for review in the SDP. Therefore, the inspectors determined there was no associated ROP finding and the issue was a Severity Level IV violation of 50.59. 10 CFR 50.59 requires in part, that a licensee must obtain a license amendment prior to implementing a change if it would result in a departure from a method described in the UFSAR used in establishing the design bases or in the safety analysis. Contrary to this requirement on February 25, 2010, evaluation 2010–0016 accepted changes to the UFSAR that affected methodologies for control room and offsite dose that departed from methods described in the UFSAR. Because the licensee identified this issue in AR 2012–14068 and took corrective actions to submit a license amendment and is Severity Level IV, the inspectors conclude that this issue may be disposed as a licensee identified NCV.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### Licensee

J. Gebbie, Chief Nuclear Officer  
L. Baun, Director Performance Assurance  
H. Ellison, ISI Program Owner  
J. Harner, Environmental Manager  
E. Merchant, Environmental Specialist  
S. Lies, Site Vice President  
M. Scarpello, NRA Manager  
D. Wood, Environmental Manager  
R. Wynegar, NRC Coordinator

#### U.S. Nuclear Regulatory Commission

K. Riemer, Chief, Reactor Projects Branch 2  
N. Shah, Project Engineer  
L. Kozak, Senior Risk Analyst  
D. Swacz, Senior Reactor Inspector

## LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

### Opened

05000315/2016003-01	NCV	Improper Backfill Severs Fire Main (1R05)
05000315/2016003-02	NCV	Charging System Thru-Wall Leak (1R12)
05000316/2016003-03	NCV	Wetting of Safety-Related Battery Charger (1R15)

### Closed

05000315/2016003-01	NCV	Improper Backfill Severs Fire Main (1R05)
05000315/2016003-02	NCV	Charging System Thru-Wall Leak (1R12)
05000316/2016003-03	NCV	Wetting of Safety-Related Battery Charger (1R15)

### Discussed

None

## **LIST OF DOCUMENTS REVIEWED**

The following is a partial list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspector reviewed the documents in their entirety, but rather that selected sections or portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

### **1R04 Equipment Alignment**

- 2-OHP-4021-008-002, Placing Emergency Core Cooling in Standby Readiness, Revision 29
- 2-OHP-4021-009-001, Placing the Containment Spray System in Standby Readiness, Revision 26
- OP-2-5144-60, Flow Diagram Containment Spray Unit N. 2, October 30, 2013

### **1R05 Fire Protection**

- 12-FPP-2270-066-034, Monthly checks of Wet Pipe Sprinkler System Pressure, Revision 6
- AR 2016-10561, Inoperable Outlet Pressure Gauge, September 20, 2016
- AR 2016-1401, Annunciator 201 Drop 89 Did Not Clear as Expected, February 4, 2016
- AR 2016-9138, Unit 2 CDDG Co2 Push Button, August 10, 2016
- DC Cook Nuclear Power Plant, Fire pre-Plans Volume 1, Revision 26
- FBD 316-001-E, Fire in the Fire Pump House, June 22, 2016
- Fire Pre-Plans, Units 1 & 2, Donald C. Cook Nuclear Plant, Volume II, Support Buildings and Yard Areas, Revision 20
- Lesson Plan # FP-E-9500, Fire Drill, Revision 1, July 13, 2016
- OP-12-5152-15, Fire Protection-Water Yard Piping Units 1 and 2, Revision 15
- OP-2-5152K-23, Fire Protection Water System Details – Turbine Building & Screen House Unit 2, July 29, 2016
- PMI-2270, Fire Protection Program, Revision 38
- PMP-2270-FRP-001, Fire Response Plan, Revision 30

### **1R06 Flooding**

- 51-9193521-000, Cook Nuclear Plant Flooding Walkdown Report 2012, Revision 0
- AR 2016 8196, Roof Leak in the Radiation Protection Tech Area, July 13, 2016
- AR 2016-8158, Unit 2 FRV Gallery has Multiple Leaks, July 13, 2016
- AR 2016-8173, Unit 2's 4KV Roof has Multiple Leaks, July 13, 2016
- AR 2016-8191, Auxiliary Building Roof Water Intrusion, July 13, 2016
- AR 2016-8463, Leak Identified Above the N-Train Battery Charger, July 21, 2016
- PS-1-95103-7, Unit 1 CIA 42373 Wiring Diagram
- SD-061206-001, Flooding Evaluation Report, Revision 0

### **1R08 Inservice Inspection Activities**

- 1-2-3835-10, N.S.S.S Support Framing Reactor Vessel Support, Revision 10
- 12-QHP-5050-NDE-001, Liquid Penetrant Examination, Revision 8
- 12-QHP-5050-NDE-002, Magnetic Particle Examination, Revision 6
- 12-QHP-5050-NDE-006, Visual Examination: VT-1, EVT-1, and VT-3, Revision 6
- 12-QHP-5050-NDE-027, Visual Examination for Boric Acid and Condition of Component Surface, Revision 4
- 12-QHP-5070-NDE-002, Visual VT-2 Examinations, Revision 7

- 12-QHP-5070-NDE-005, Visual Examinations: Metallic Containment Pressure Retaining Components and Their Integral Attachments, Revision 4
- 12-QHP-5070-NDE-006, Visual Examinations: Concrete Containment, Revision 5
- AR 2013-12788, Pressure Testing Reactor Vessel Flange Leak-Off Lines, August 30, 2013
- AR 2014-11414, 1-ILA-141-IH Minor, Inactive Boric Acid Leak, September 26, 2014
- AR 2014-11430, 1-RC-136, Inactive Packing Leak, September 27, 2014
- AR 2014-12764, U1C26 Refueling Cavity Leakage, October 16, 2014
- AR 2014-13212, 1-NFP-221-V2, Boric Acid Packing Leakage, October 22, 2014
- AR 2014-13216, 1-NLP-153, Active Leak From Comp. Fitting, October 22, 2014
- AR 2015-10004, Leak from Piping Above 1-CLV-3, August 3, 2015
- AR 2015-16290, Dry Boric Acid On Valve Body 1-CS-3115, December 18, 2015
- AR 2016-0277, Defective Welding Rod, January 7, 2016
- AR 2016-1928, Boric Acid Leakage on 1-QFI-301, February 17, 2016
- ASME Section XI IWE, Report for Unit 1 Metallic Containment for DC COOK, October 19, 2011
- ASME Section XI IWL, Report for Unit 1 Concrete Containment for DC COOK, September 2, 2011
- Donald C. Cook Nuclear Plant, Units 1 and 2, Relief Requests for Limited Coverage Examinations Performed in the Third 10-Year Inspection Interval, April 8, 2011
- Donald C. Cook Nuclear Plant, Units 1 and 2, Request for Alternative from Volumetric/Surface Examination Frequency Requirements of ASME Code Case N-729-1, Request Number ISIR 04-02, January 20, 2015
- EHI-5054-RHI, Reactor Head Inspection Program, Revision 1
- ES-WELD-1501-QCN, ID SNS-1066, October 16, 2014
- ES-WELD-1501-QCN, ID SNS-1254, May 7, 2014
- ES-WELD-1501-QCN, ID SNS-737, May 14, 2014
- Information Notice 2014-02, Failure to Properly Pressure Test Reactor Vessel Flange Leak-off Lines, February 25, 2014
- OP-1-5128-30, Flow Diagram Reactor Coolant Unit No. 1 Sheet 1 of 2, Revision 30
- Safety Evaluation by the Office of Nuclear Reactor Regulation Inservice Inspection Request Nos. ISIR-33 Through ISIR-42, Indiana Michigan Power Company, Donald C. Cook Nuclear Power Plant, Units 1 and 2, Docket Nos 50-315 and 50-316, April 26, 2012
- Safety Evaluation by the Office of Nuclear Reactor Regulation Inservice Inspection Request 04-02, Indiana Michigan Power Company, Donald C. Cook Nuclear Power Plant, Units 1 and 2, Docket Nos 50-315 and 50-316, June 11, 2015
- WO 55300059-01, Perform VT-2, Bare Metal VT of Reactor Vessel Closure Head per Code Case N-729-1
- WO 55427498-01, Perform VT-3 ISI inspection of 1-OME-1-VSD-1, October 1, 2014
- WO 55427498-02, Perform VT-3 ISI inspection of 1-OME-1-VSD-2, October 1, 2014
- WO 55443192-01, Socket Weld Ends of Globe Valve 1-NFP-220-V1, October 8, 2014

- WO 55454780-01, NQQS, 1-OME-1, Perform VT-2, Bare Metal of RVCH Per N-729-1, March 31, 2016
- WO 55456996, Perform UTULTRASONIC TEST inspection of Pipe to Elbow Weld 1-SI-39-10S, March 29, 2015
- WO 55458232-01, Perform VT-3 ISI Inspection of Pipe Support 1-AC-L-905, April 2, 2016
- WO 55458235-01, Perform MT ISI Inspection of 1-MSIV-MRV-230-S2; March 30, 2016
- WO 55458240-01, Perform VT-3 ISI Inspection of 1-GSI-R-658, March 28, 2016
- WO 55458240-02, Perform VT-3 ISI Inspection of 1-GSI-R-703, March 27, 2016

#### 1R11 Licensed Operator Regualification Program

- RQ-C-4140, Main Turbine and Main Turbine Controls, Revision 0
- RQ-E-4104-U1-A, Period 4104 Unit 1 As-Found Simulator Evaluation – Primary, Simulator Exercise Guide, July 28, 2016
- SOD-08200-001, Balance of Plant Electrical System, Revision 14

#### 1R12 Maintenance Effectiveness

- AR 2016-7800-2, SRA-2905 Issues Found During Operability Determination, July 2, 2016
- AR 2016-9790-1, Glass Filter Housing Shaken Loose on ERS-1400 Radiation Monitor, August 30, 2016
- AR 2015-10679, 2-SRA-2900 Failed Low, August 16, 2015
- AR 2016-10680, Repetitive Longstanding Equipment Issues Performance Gap, September 23, 2016
- AR 2016-7805, More SRA-2900 Issues, July 2, 2016
- AR 2016-8894, 2-SRA-2900 Sample Flow Drifted Low Out of Band, August 3, 2016
- AR 2015-11595, During a Unit 2 Boric Acid Blender Operation, QRV-421, Boric Acid to Bleeder, Failed to Full Demand, September 3, 2015
- AR 2015-4939, The Controller for 2-QRV-421 (2-RU-33) is Failed Giving a Full Open Signal, April 8, 2015
- AR 2015-6576, Operation in Borate Mode Unexpectedly Received Annunciator 209 Drop 39 Boric Acid Flow Deviation Alarm, May 12, 2015
- AR 2015-4994, While Attempting to Close 2-CS0-534 During Valve Cycling, the Valve Ceased to Move in the Closed Direction, April 8, 2015
- AR 2016-4843, The 45 Gallon Per Minute Letdown Orifice Outlet Valve, 1-QRV-160, Failed Closed, April 19, 2016
- AR 2015-6435, 2-QRV-421, Boric Acid to Blender Flow Controller RU-33 Went to Full Demand Open Once the Blend Control Switch was Placed in Open, May 8, 2015
- AR 2016-4487, 1-QRV-111 Will Not Stay Open, April 12, 2016
- AR 2016-7495, Steam in Unit 1 West CCP Room, June 23, 2016
- AR 2015-11595, Unit 2 Blender Boric Acid Controller is Failed to Full Demand, September 3, 2015
- AR 2016-8447, WR for EPDM to Perform Natural Frequency Testing, July 22, 2016
- AR 2011-7092, Weld Leak on Discharge Piping of East Charging Pump, June 14, 2011
- AR 2011-10724, 1-QRV-161 Went Closed Unexpectedly, September 21, 2011
- AR 2014-3270, Unit 1 Pressurizer Level Control Problem, March 8, 2014
- DB-12-CVCS, Design Basis Document for the Chemical and Volume Control System, Revision 7

- WO 55390817, 1-QRV-161 Went Closed Unexpectedly, February 22, 2016
- System Health Report, Unit 1, DVCS – Chemical and Volume Control, Q2-2016
- Maintenance Rule Scoping Document, Chemical Volume Control System, Revision 5
- PMP-2291-PMT-001, Work Management Post Maintenance Testing Matrices, Revision 31
- System Health Report, Unit 2 – CVCS-Chemical and Volume Control, Q2-2016

#### 1R13 Maintenance Risk Assessments and Emergent Work Control

- 1-OHP-4021-050-005, Operation of Main Turbine Lubricating Oil System, Revision 19
- D.C. Cook Plant Status Report, Unit 2, July 14, 2016
- OP-1-5114-146, Flow Diagram Non-Essential Service Water Unit #1, June 1, 2016
- PMP-2291-TRS-001, Troubleshooting, Revision 11
- TS 3.0.4.Risk Assessment Review and Approval Form, July 11, 2016

#### 1R15 Operability Determinations and Functional Assessments

- 12-AEP-MQH316031T-0, Component Cooling Water Heat Exchanger Tube Layout Units 1 & 2 Sheet 1, Revision 0
- 12-EHP-5043-SCD-001, Safety Classifications Determinations, Revision 17
- 1-EHP-4030-128-230, Unit 1 Control Room Tracer Gas Test, Revision 6
- 2-AEP-MONT-QH31603-1-T, SH 1, Component Cooling Water East Heat Exchanger 2-HE-15E Tube Sheet Layout, Revision 0
- AR 00125367, 2CD Fuel Injection Pump Seizure, April 19, 2006
- AR 2016-4732, 3R Fuel Pump Froze Up on 1CD Diesel, April 17, 2016
- AR 2016-5424, Unit 1 PPC Bank D Control Rod Insertion Limit Calculation is Wrong, April 27, 2016
- AR 2016-6847, Diverter Installed on Unit 2 'N' Train Battery Outside of process, June 3, 2016
- AR 2016-6957, NOP/NOT Secondary Impacts, June 7, 2016
- AR 2016-7367, 2-BC-B Found Soaked with Water, June 21, 2016
- AR 2016-7856, Possible Incorrect Control Card Configuration, July 5, 2016
- AR 2016-8003, Unit 1 CD Emergency Diesel Generator Seized Fuel Injection Pump Failure Analysis, July 8, 2016
- AR 2016-8995, Leak in Unit 2 East Component Cooling Water Heat Exchanger, August 4, 2016
- AR 2016-8995-1, Perform ODE on the Unit 2 East Component Cooling Water Heat Exchanger Leak, August 8, 2016
- AR 2016-9198, NRC Concerns with Initial Response to AR 2016-8003
- ASME Code Case N-705, Evaluation Criteria for Temporary Acceptance of Degradation in Moderate Energy Class 2 or 3 Vessels and Tanks, Section XI, Division 1
- ASME Code Section XI, Sections IWA, IWB, and IWD, 2004 Edition
- ASME Code Section III, Section ND, 2004 Edition
- Calibration Certificate # 3190248876, September 22, 2009
- Certified M&TE Issue Slip, Industrial Scientific iTX Multigas Monitor
- Commercial Grade Item Dedication Evaluation #00011651, Emergency Diesel Generator (EDG) Diesel Fuel Injection Pumps (DFIP), Revision 0
- Drawing # 12-5410, Auxiliary Building Drainage Pipint in Floor, Elevation 650', Revision 17
- Drawing # 12-DR-471, Turbine Room, Revision 1
- GT 2016-5697, Roof Leak near 2-DR-AUX432, May 5, 2016
- Inservice Inspection (ISI) Program Plan D.C. Cook Nuclear Plant Units 1 & 2, Fourth Interval
- MLW-Worthington Limited, Exchanger Specification Sheet, Order No. 31760, Component Cooling AEM, September 5, 1972

- MLW-Worthington Limited, Units 1 & 2 Component Cooling Water Heat Exchangers, July 29, 1969
- NUREG-0302, Remarks Presented (Questions/Answers Discussed) at Public Regional Meetings to Discuss Regulations (10 CFR Part 21) for Reporting of Defects and Noncompliance, Revision 1
- PMP-5020-LCD-001, Control of Leak Collection Devices, Revision 9
- PMP-7030-OPR-001, Operability Determination, Revision 30
- PMP-7030-OPR-001, Operability Determinations, Revision 29
- Regulatory Guide 1.26, Quality Group Classifications and Standards for Water, Steam, and Radioactive Waste Containing Components of Nuclear Power Plants, Revision 3
- WO 55352831, Unit 1 Control Room Tracer Gas, August 9, 2010

#### 1R18 Temporary and Permanent Modifications

- SS-SE-2010-00116-00, UFSAR Change to Incorporate Updated Radiological Dose Accident Analysis, Revision 0
- AR-2012014068, Implementation Issues with EC-50495 and UCR-1964
- EC-50495, Offsite and Control Room Dose Accident Analysis Project, Revision 0

#### 1R19 Post-Maintenance Testing

- 12-IHP-5021-EMP-013, ITE K-600S Circuit Breaker Maintenance, Revision 15
- 12-IHP-5021-EMP-015, ITE Power Shield Trip Device Test, Revision 10
- 1-OHP-4021-002-007, Pressurizer Pressure and Level Control Operation, Revision 18
- 1-OHP-4030-102-040, Pressurizer Heater Capacity Test, Revision 0
- AR 2015-10782, Sheave on 1-HV-AFP-WAC had Walked Off Shaft, August 18, 2018
- AR 2015-8311, Unit 1 WDAFP Room Cooler has Thrown a Belt, June 24, 2015
- AR 2016-10502, Sheave Possibly Loose, September 19, 2016
- AR 2016-3268, 1-HV-AFP-WAC Not Cooling Equipment, March 26, 2016
- AR 2016-8021, Excessive PMT Requirements Prescribed by WOT, July 9, 2016
- AR-WOER 20015840, The Required Fittings for the New Hoses Need to be Identified, July 7, 2016
- DB-12-FW, Main Feedwater System Design Basis Document, Revision 4
- Drawing OP-1-12002-71, Main Auxiliary One-Line Diagram Bus C and D Engineered Safety System (Train A)
- EC-0000055199, 2-HV-AFP-WAC Fan Sheave Second Set Screw, Revision 0
- GT-2016-8022, Add Implications of Lifting Leads in 2-OHP-4030, July 9, 2016
- ISP-00917, Relay Settings Changes for CRDMG Set 2S and 2N ACB SSTs for Replacement Motors, Revision 0
- OP-12-5120G-1, Flow Diagram Standard Symbols Control Air System Unit #1 & #2, November 18, 2009
- OP-2-4120JJ-11, Control Air System Turbine Building Tapoffs Unit #2, April 16, 2015
- WO 55463503-01, 2-21A1, Clean/Inspect/Test
- WO 55477262-04, 2-FRV-220; IST Stroke Valve for Operability
- WO 55489020-00, MTH; 2-HV-AFP-WAC; Repair Room Cooler per EC-55199, September 22, 2016
- WO 55489828-01, MTH; 2-HV-AFP-WAC; Investigate Sheave Moving on Shaft, September 20, 2016
- WO 55489828-02, Replace Degraded Set Screws
- WO 55489828-04, MTH; 2-HV-AFP-WAC; 24-48 Hour Belt Run/PMT, September 22, 2016
- WO 55490149, Pressurizer Heater Breaker Tripped on Overcurrent



### 1R20 Outage Activities

- 12-EHP-6040-PER-370, Estimation of Critical Position, Revision 12
- 2-OHP-4021-001-002, Reactor Start-Up, Revision 58
- 2-OHP-4021-001-006, Power Escalation, Revision 59
- OP-2-5105A-52, Flow Diagram, Main Steam Unit No 2, Sheet 2 of 4, June 1, 2015

### 1R22 Surveillance Testing

- 1-EHP-4030-128-230, Unit 1 Control Room Tracer Gas Test, Revision 4
- 2-EHP-4030-128-230, Unit 1 Control Room Tar 2016-10461, Racer Gas Test, Revision 5
- AR 2016-10461, Tracer Gas Testing, September 16, 2016
- AR-2016-10589, Floor Drain Vent Path Between Units' CRE's, September 21, 2016

### 1EP6 Drill Evaluation

- 12-OHP-4022-001-010, Severe Weather, Revision 18
- 2016 Off Year Exercise Evaluation Report, August 31, 2016
- 2016 Off Year Exercise Scenario Manual, July 26, 2016
- Briefing Summary for ERO Training Drill Conducted on July 26, 2016
- Briefing Summary for ERO Training Drill Conducted September 13, 2016
- PMP-2080-EPP-100, Emergency Response, Revision 33
- Scenario Manual, September 13, 2016 Drill.

### 2RS6 Radioactive Gaseous and Liquid Effluent Treatment

- 12-OHP-4021-006-004, Transferring Distillate from Monitor Tanks: Revision 63, Data were Reviewed from Liquid Permit Releases dated March 18 - July 13, 2016
- 12-OHP-4021-023-002, Release of Radioactive Waste Gas Decay Tanks, Revision 32
- 12-THP-4030-RPC-814, Eberline Radiation Monitoring System Liquid Channel Calibration, Revision 1
- 12-THP-4030-RPC-815, Eberline Radiation Monitoring System Particulate and Low Range Noble Gas Calibration, Revision 4, Review of Reference ICN Sources
- 12-THP-6010-RPC-810, Eberline Radiation Monitoring System Channel Restoration, Unit-1 Vent Effluent Radiation Monitor (SPING), September 3, 2014
- 12-THP-6020-CHM-322, Vent Stack Gaseous Sampling, Revision 14
- 2-EHP-4030-228-228B, 2-HV-AES-2, Engineered Safety Feature Ventilation Surveillance, Revision No. 22, Calibration Date of the HEPA and Charcoal System, January 16, 2015
- AR-2015-13722, During Gas Sampling of SPING 2-SRA-2800, Gas Sample Flow goes Abnormally High during Grab Sampling Using Gas Merinelli, this was not an Expected Response, October 22, 2015
- AR-2015-3454, Condition Adverse to Quality, Mid-Range Noble Gas Detector Alert Alarm did not Clear After a Source Check was Performed per Procedure, March 16, 2015
- AR-2015-6008, Abnormal Alert Alarm on East CCW Liquid Radiation Monitor due to Spurious Alarm Signal, April 28, 2015
- AR-2015-7906, 2-VFR-2510, Unit Vent Effluent Monitor Failed Low due to Flow Sensor Transmitter Failure and the Effluent Vent Flowrate was Declared In-operational and the Unit-2 Vent Exhaust Flowrate was Estimated Once every Four Hours per Procedures, June 14, 2015
- AR-2015-8253, During Performance of 12-IHP-4030-013-008. Westinghouse Area and Liquid Process Rad Monitoring System Channel (Containment Spray Heat exchanger) High Voltage Calibration was Identified to be Out of Tolerance due to HV Drifting, June 23, 2015

- AR-2015-8760, 2-VFR-2510 and 2-VFR-315. Unit-2 Vent Flowrate and Unit-2 Vent Stack Effluent Flow, Both Failed Simultaneously and Unexpectedly, July 7, 2015
- Calibration Data from 1-VRS-1500, Unit-1 Aux Bldg Vent Effluent Radiation Monitor, 1-VRA-1501, Particulate Filter Beta Radiation Detector, September 9, 2015
- Calibration Data from Eberline Radiation Monitoring System Iodine Channel Calibration, September 3, 2014
- Calibration Data from Eberline Radiation Monitoring System Particulate and Low Range Noble Gas Calibration, September 4, 2015
- Calibration Data from Eberline Radiation Monitoring System Particulate and Low Range Noble Gas Calibration, September 2, 2014
- D.C. Cook Nuclear Plant Annual Radiological Environmental Operating Report 2015
- D.C. Cook Nuclear Plant Unit-1 and 2 2015 Annual Radioactive Effluent Release Report
- Eberline Radiation Monitoring System Channel Restoration, Particulate and Low Range Noble Gas Channel Calibration, September 9, 2015
- Eberline Radiation Monitoring System Channel Restoration, Unit-2 Ventilation Effluent Radiation Monitor (SPING), VRS-2500 Noble Gas Chamber Low Range Gamma Radiation Detector, June 25, 2015
- Gas Decay Tank Release Permit, Permits were Reviewed, January 9, 2016, February 21, 2016, March 21, 2016, and May 15, 2016
- PMP-6010-OSD-001, Off-Site Dose Calculation Manual, Revision 25

#### 4OA1 Performance Indicator Verification

- PMP-7110-PIP-001, Reactor Oversight Program Performance Indicators and Monthly Operating Report Data, RETS/ODCM Radiological Effluent Occurrences, Revision 15
- Reviewed Data, First Quarter 2015 through First Quarter 2016

#### 4OA2 Problem Identification and Resolution

- AR 2016-10115, U2 B Crossover Expansion Joint U-Bolts Broken, September 7, 2016
- AR 2016-8388, Loose Jam Nuts on the Bravo Right and Left MSR Cross-over, July 20, 2016
- AR 2012-2126-1, 2-XJ-113,6 (Right MSR 2OME-80R Reheat Steam to Low Pressure Turbine 'B' Outlet Elbow Expansion Joint) Broken Tie Rod, February 16, 2012
- AR 2012-14230, Steam Leak from 2-XI-113-11, November 11, 2012
- WOER 20002067, Eng Review to Weld Procedure for Installation of New Expansion Joint for 2-XJ-113-6
- AR 2016-10261, Unit 2 B Left MSR Expansion Joint Assembly U-Bolt Broken, September 12, 2016
- AR 2016-7865-21, Lessons Learned Communication
- FCN-54011-004, During Reinstallation of the New Tie-Rods for the Bellows 2-XJ-113-11 and 2-XJ-113-16 Located on the Left MSR B Train, it was Found that the Tie-Rods did not Align with the U-Bolts for the Tie-Back Support as Shown on Drawing 2-AMS-R4009-F054011, Revision 0
- AR 2014-1571, 2-XJ-113-6 Some Vibration/Shaking Not Exhibited by Other Two, February 1, 2014
- EC-0000054011, Install Permanent Solution for Dampening the Vibrations occurring in the Left and Right 'B' Crossover Piping from the Low Pressure Turbine 2-OME-78 to 2-OME-80 L/R MSRs, Revision 0
- AR 2014-6630, Steam Leak on Right MSR to Low Pressure Turbine "B" Expansion Joint, June 2, 2014
- GT 2014-11060, US LP-B Crossover Expansion Joints, September 19, 2014

- FCN-54011-001, Document and Evaluate the Vibration Readings for WOT 55456289-09/19 and Provide Any Necessary Recommendations, Revision 0
- AR 2016-7865, US MSR Crossover Expansion Joint Failure, July 6, 2016
- EC 0000051875, Replace Pressure Balance Bellows 2-XJ-113-6, Revision 0
- FCN-54011-003, To Document the Acceptance of the Vibration Reading Results for the Crossover Piping Provided to Structural Engineering After the Implementation of EC-54011 and Associated FCNs, Revision 0

#### 4OA3 Follow-Up of Events and Notices of Enforcement Discretion

- WO 55490149, Pressurizer Feeder Breaker 1-T11D9 Tripped on Overcurrent
- Plant Work Schedules, Week of September 26, 2016

## LIST OF ACRONYMS USED

ADAMS	Agencywide Document Access Management System
AFW	Auxiliary Feedwater
AR	Action Request
ASME	American Society of Mechanical Engineers
BMV	Bare Metal Visual
CAP	Corrective Action Program
CCP	Coolant Charging Pump
CFR	Code of Federal Regulations
ECCS	Emergency Core Cooling System
EDG	Emergency Diesel Generator
ESW	Essential Service Water
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Inspection Report
ISI	Inservice Inspection
MSR	Moisture Separator Reheater
NCV	Non-Cited Violation
NDE	Non-Destructive Examination
NFPA	National Fire Protection Association
NRC	U.S. Nuclear Regulatory Commission
ODCM	Offsite Dose Calculation Manual
PARS	Publicly Available Records System
RCS	Reactor Coolant System
SRA	Senior Reactor Analyst
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
VT	Visual Examination
WO	Work Order

J. Gebbie

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Sincerely,

/RA/

Kenneth Riemer, Chief  
Branch 2  
Division of Reactor Projects

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