



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

REGION III  
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May 1, 2017

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

SUBJECT: DONALD C. COOK NUCLEAR POWER PLANT, UNITS 1 AND 2—INTEGRATED  
INSPECTION REPORT 05000315/2017001; 05000316/2017001

Dear Mr. Gebbie:

On March 31, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Donald C. Cook Nuclear Power Plant, Units 1 and 2. On April 12, 2017, the NRC inspectors discussed the results of this inspection with yourself and other members of your staff. The enclosed report represents 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 violations are associated with these issues. Because the licensee initiated condition reports to address these issues, these violations are being treated as 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 two licensee-identified violations which were determined to be of very low safety significance in this report. The NRC is treating these violations as NCVs, consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest the violations or significance of these NCVs, 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 assignment 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.

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

Sincerely,

***/RA Karla Stoedter Acting for/***

Kenneth Riemer, Chief  
Branch 2  
Division of Reactor Projects

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

Enclosure:  
IR 05000315/2017001; 05000316/2017001

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Letter to Joel Gebbie from Kenneth Riemer dated May 1, 2017

SUBJECT: DONALD C. COOK NUCLEAR POWER PLANT, UNITS 1 AND 2—INTEGRATED INSPECTION REPORT 05000315/2017001; 05000316/2017001

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

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

Report No: 05000315/2017001; 05000316/2017001

Licensee: Indiana Michigan Power Company

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

Location: Bridgman, MI

Dates: January 1 through March 31, 2017

Inspectors: J. Ellegood, Senior Resident Inspector  
T. Taylor, Resident Inspector  
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M. Holmberg, Senior Reactor Inspector

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

Enclosure

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## SUMMARY

Inspection Report (IR) 05000315/2017001, 05000316/2017001; 01/01/2017 – 03/31/2017;  
Donald C. Cook Nuclear Power Plant, Units 1 & 2; Identification and Resolution of Problems

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. The 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 November 1, 2016. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6.

### Cornerstone: Mitigating Systems

- Green. A self-revealed finding and associated NCV occurred on January 10, 2017, when the licensee caused a loss of a qualified off-site circuit while opening a disconnect on the Unit 2 reserve feed transformer. Regulatory Guide 1.33 requires procedures for operating the onsite and offsite electrical distribution system; however the licensee did not develop a procedure or instruction for operating the electrical distribution system. Licensee personnel opened a disconnect to the Unit 2 reserve auxiliary transformer with the transformer energized but unloaded. This action resulted in trip of an upstream breaker and unplanned Technical Specification entry for the opposite unit. The licensee recovered the offsite circuit for Unit 1. The licensee entered the issue into the corrective action program (CAP) as Action Request (AR) 2017-0346.

The inspectors determined that the failure to develop, implement, and maintain procedures or work instructions for the electrical distribution system was a performance deficiency. The performance deficiency impacted the mitigating system performance objective of ensuring the availability of systems that respond to initiating events. The finding was not greater than green in accordance with IMC 0609, Appendix A, Exhibit 2, dated June 19, 2012, because the answer to all four questions was no. The finding does not include a cross-cutting aspect because the licensee followed guidance for operating the disconnect that existed for the life of the plant and is therefore not reflective of current performance. (Section 4OA2.1)

- Green. A self-revealed finding of very low safety significance with an associated NCV of Title 10 of the *Code of Federal Regulations* (CFR) Part 50, Appendix B, Criterion XV, "Nonconforming Materials, Parts, or Components," occurred when the delivery valve holder (DVH) on a fuel injection pump failed during a run of the 1AB emergency diesel generator (EDG). Each cylinder on an EDG has a fuel injection pump. The DVH is the part of the fuel injection pump where the high pressure fuel line meets the pump discharge. A thru-wall crack developed from a machined portion inside the DVH that had too sharp of a corner. This same phenomenon occurred onsite and caused a leak in 2013 as well. In 2013, the licensee identified the tight radius as an issue and also identified a particular manufacturing lot of DVHs that might have the tight radius. Contrary to their commercial grade dedication (CGD) procedures, the licensee did not

update their CGD plan for these parts to include the radius as a critical characteristic. Further, the licensee relied on informal communications from the commercial grade supplier of the parts to conclude only a certain subset of the suspected lot of DVHs were susceptible to cracking. Finally, several management-approved actions to remove all affected DVHs of the lot were not performed, as there was the belief by some that only certain DVHs were affected. As a result, the licensee installed many DVHs from the suspect lot they thought were acceptable. However, in December 2016, one of the DVHs thought to be acceptable developed a leak during an EDG run. The radius was discovered to be out of tolerance, as were numerous other radii in DVHs across all of the EDGs which were from the suspect manufacturing lot. The licensee declared three of the four onsite EDGs inoperable, replaced DVHs, and commenced a root cause evaluation to address the issue.

The issue was more-than-minor because it adversely affected the Design Control attribute of the Mitigating Systems cornerstone. Specifically, allowing nonconforming parts to be installed on safety-related equipment without proper controls or evaluation adversely affects the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The finding screened as Green because performance testing of representative DVHs and engine analysis demonstrated that the EDGs in the as-found condition would have been able to perform their safety functions for the required lengths of time. The inspectors determined the issue had a cross-cutting aspect in the Problem Identification and Resolution area, specifically, P.2, "Evaluation." Despite identifying a defect on a safety related part due to a failure in 2013, the licensee failed to properly evaluate the condition and ensure all susceptible parts were accounted for. Specifically, the failure to follow station processes for corrective action and CGD resulted in a defective part causing a leak on an EDG. (Section 4OA2.2)

### **Cornerstone: Occupational Radiation Safety**

- Green. A finding of very-low safety significance and an associated NCV of Technical Specification 5.7.1.b was self-revealed for the failure to a make radiation worker aware of the radiation dose rate before entering a high radiation area. The failure to brief the worker resulted in an unplanned electronic dosimeter dose rate alarm. The worker immediately exited the area and reported the event to the radiation protection staff. The licensee entered the event into their CAP as AR 2016-13827.

The inspectors determined that the performance deficiency was more than minor in accordance with IMC 0612, Appendix B, because the finding impacted the program and process attribute of the Occupational Radiation Safety Cornerstone and adversely affected the cornerstone objective of ensuring adequate protection of worker health and safety from exposure to radiation. Specifically, worker entry into a high radiation area without an adequate briefing could lead to unintended dose. The inspectors also identified an example in IMC 0612, Appendix E, which is similar to the performance issue. Therefore, the finding was determined to be of very-low safety significance in accordance with IMC 0609, Appendix C, "Occupational Radiation Safety Significance Determination Process," dated August 19, 2008. The violation was of very-low safety significance (Green) because: (1) it did not involve as-low-as-reasonably-achievable planning or work controls, (2) there was no overexposure, (3) there was no substantial potential for an overexposure, and (4) the ability to assess dose was not compromised. The inspectors concluded that the cause of the finding involved a cross-cutting

component in the human performance area, H.4, in the area of teamwork and communication and coordination across organizational boundaries, specifically between radiation protection staff and the individual. This resulted in the worker proceeding into areas that they were not briefed to enter which contained unknown dose rates. (Section 2RS1.1)

#### **Licensee Identified Violations**

- Violations of very low safety or security significance or Severity Level IV that were identified by the licensee have been reviewed by the NRC. Corrective actions taken or planned by the licensee have been entered into the licensee's CAP. These violations 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 began the inspection period in mode 3 as part of a refueling outage. On January 1, 2017, the licensee commenced a reactor start up and entered mode 1. On January 14, Unit 2 reached 100 percent power and remained at or near 100 percent for the rest of the 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 1 east component cooling water (CCW) during work on west CCW;
- west diesel fire pump during work on east pump; and
- Unit 1 west essential service water (ESW) system during work on east ESW.

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 three 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 1 ESW pump room;
- Unit 2 ESW pump room;
- service water screen house; and
- technical support center battery and uninterrupted power supply room.

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

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 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:

- 4KV switchgear rooms

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.

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 March 1, 2017, the inspectors observed a crew of licensed operators in the plant's simulator during the Annual Operating Exam. 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 regualification program simulator sample as defined in IP 71111.11–05, and satisfied the inspection program requirement for the resident inspectors to observe a portion of an in-progress annual regualification operating test during a training cycle in which it was not observed by the U.S. Nuclear Regulatory Commission (NRC) during the biennial portion of this IP.

b. Findings

No findings were identified.

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

a. Inspection Scope

On January 2, 2017, the inspectors observed post-modification testing of the new main turbine low pressure blades following the Unit 2 refueling outage. The inspectors also observed the synchronization to the grid to conclude the outage, which occurred right before the modification testing. For the test, operators were required to lower main condenser vacuum to satisfy test parameters. This evolution qualified as an Infrequently Performed Test or Evolution, and 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)

.1 Routine Quarterly Evaluations

a. Inspection Scope

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

- Various emergency diesel generator (EDG) start and relay issues.

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 Title 10 of the *Code of Federal Regulations* (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 one quarterly maintenance effectiveness sample as defined in IP 71111.12-05.

b. Findings

No findings were identified.

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

.1 Maintenance Risk Assessments and Emergent Work Control

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:

- ESW maintenance outage;
- sulfuric acid remediation;
- emergent work to repair Unit 2 main turbine leaks and Unit 1 CCW work during the week of January 23, 2017; and
- security uninterrupted power supply outage.

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 four 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:

- leak by of 2–MRV–242, steam stop dump valve;
- review of Unit 1 operability evaluation regarding degraded baffle bolts on Unit 2;
- ESW with flow to auxiliary feedwater (AFW); and
- external corrosion on AFW piping.

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.

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18)

.1 Plant Modifications

a. Inspection Scope

The inspectors reviewed the following modification(s):

- jumper around security automatic bus transfer switch.

The inspectors reviewed the configuration change and verified that a 10 CFR 50.59 safety evaluation screening was not required. The inspectors observed completed work activities to ensure that the modifications were installed as directed and consistent with the design control documents; the modifications operated as expected; post-modification testing adequately demonstrated continued system operability, availability, and reliability; and that operation of the modifications did not impact the operability of any interfacing systems. Lastly, the inspectors discussed the plant modification with operations and engineering 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 temporary modification sample as defined in IP 71111.18-05.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19)

.1 Post-Maintenance Testing

a. Inspection Scope

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

- Unit 2 turbine driven auxiliary feedwater pump ;
- Unit 1 centrifugal charging pump breaker relay calibrations;
- electric fire pump discharge valve and piping replacement;
- 2-IMO-262 charging/safety injection cross-tie valve external preventative maintenance; and
- Unit 1 west ESW system planned maintenance.

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 five post-maintenance testing samples as defined in IP 71111.19-05.

b. Findings

No findings were identified.

1R20 Outage Activities (71111.20)

.1 Refueling Outage Activities

a. Inspection Scope

The inspectors completed inspection requirements outlined in IP 71111.20 for the Unit 2 refueling outage. Inspection Report (IR) 05000315/316-2016004 lists activities reviewed in the fourth quarter of 2016. During this quarter, the inspectors reviewed the outage activities listed below:

- licensee fatigue management, as required by 10 CFR 26, Subpart I; and
- reactor physics testing results.

Documents reviewed are listed in the Attachment to this report.

This inspection, coupled with activities completed in both the third and fourth quarters of 2016, constituted one refueling outage sample as defined in IP 71111.20-05.

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22)

.1 Surveillance Testing

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:

- 1-IHP-4030-102-014A, pressurizer pressure set 2 channel operational test and calibration (routine);
- south spent fuel pool pump testing (in-service test); and
- Unit 2 control rod operability 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 UFSAR, 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 two routine surveillance testing samples, and one in-service test sample as defined in IP 71111.22, Sections–02 and–05.

b. Findings

No findings were identified.

## 2. RADIATION SAFETY

### 2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01)

#### .1 Radiation Worker Performance and Radiation Protection Technician Proficiency (02.07)

##### a. Inspection Scope

The inspectors observed radiation worker performance and assessed their performance with respect to radiation protection work requirements, the level of radiological hazards present, and radiation work permit (RWP) controls.

The inspectors assessed worker awareness of electronic alarming dosimeter set points, stay times, or permissible dose for radiologically significant work as well as expected response to alarms.

The inspectors observed radiation protection technician performance and assessed whether the technicians were aware of the radiological conditions and RWP controls and whether their performance was consistent with training and qualifications for the given radiological hazards.

These inspection activities constituted a partial sample as defined in IP 71124.01–05.

##### b. Findings

Introduction: A self-revealed finding of very-low safety significance (Green) and associated Non-Cited Violation (NCV) of TS 5.7.1.b was identified for failure to brief or to make radiation workers aware of the area radiation dose rates before entering into a high radiation area (HRA). The failure to brief the worker on the changing area postings and the dose rates in the upper containment was within the licensee's ability to foresee and correct and should have been prevented, therefore constituting a performance deficiency. This action resulted in a worker receiving an unplanned electronic dosimeter dose rate alarm.

Description: On December 6, 2016, a contract worker was assigned the task to locate tools for the upcoming demobilization job in the upper containment located at elevation 650 feet in the Donald C. Cook's Auxiliary building. This individual informed the radiation protection (RP) staff that he intended to enter the upper containment; however, the RP staff failed to inform the individual of changing area postings and the dose rates on the upper containment area during the evening shift. Specifically, the upper containment at 650 feet elevation's posting was changed to a HRA because of movements of a baffle bolt repair vacuum and other related equipment from the reactor cavity to a corner floor area of the 650 feet elevation. This equipment posed significant dose rates of 1.6 rem/hr at contact, 280 mrem/hr at 30 cm.

The individual entered the upper containment through turn-styles that were posted HRA and failed to notice the postings. This worker traversed around the reactor cavity 650 feet floor and encountered the equipment that was barricaded with a green board material that was posted as highly contaminated and radioactive particles areas. The individual came within a meter of the equipment on the other side of the barricade and subsequently received a dose rate alarm of 42 mrem/hr with a setpoint of 40 mrem/hr per the RWP No. 162103.

Analysis: The failure to brief or make the worker aware of the HRA condition as stated in the RWP was within the licensee's ability to foresee and correct and should have been prevented, therefore this constituted a performance deficiency. The performance deficiency was determined to be more-than-minor in accordance with Inspection Manual Chapter (IMC) 0612, Appendix B, "Issue Screening," because the performance deficiency impacted the program and process attribute of the Occupational Radiation Safety Cornerstone and adversely affected the cornerstone objective of ensuring adequate protection of worker health and safety from exposure to radiation. Specifically, worker entry into high radiation without the requisite briefing by the RP staff could lead to unintended dose.

The finding was determined to be of very-low safety significance (Green) in accordance with IMC 0609, Appendix C, "Occupational Radiation Safety Significance Determination Process," dated August 19, 2008, because: (1) it did not involve as-low-as-reasonably-achievable planning or work controls, (2) there was no overexposure, (3) there was no substantial potential for an overexposure, and (4) the ability to assess dose was not compromised. This finding was also evaluated in accordance with IMC 0612, Appendix E, for significance. Example 6h was determined to have a similar performance deficiency. Example 6h provided information that this performance deficiency was more-than-minor.

The inspectors concluded that the cause of the finding involved a cross-cutting component in the human performance area in the area of teamwork and communication and coordination across organizational boundaries, specifically between RP staff and the individual. This resulted in the worker proceeding into areas that they were not briefed to enter which contained unknown dose rates. [H.4]

Enforcement: TS 5.7.1 states, in part, that entries into areas that could result an individual receiving a dose equivalent in excess of 100 mrem but less than or equal to 1000 mrem in 1 hour at 30 cm from the radiation source be controlled by issuance of a radiation work permit. The radiation work permit issued required personnel entering a HRA to be briefed on the radiological conditions. This approach implements, TS 5.7.1. b. which requires that dose rate level in the area be known and personnel made knowledgeable of the condition. Contrary to the above, on December 6, 2016, a radiation worker entered into a HRA for which the individual was not informed of the radiological conditions. This resulted in the worker receiving an unplanned dose rate alarm. Upon receiving the dose rate alarm, the individual exited the area and immediately reported to the RP Staff. Because this violation was of very-low safety significance and was entered into the licensee's Corrective Action Program as Action Request 2016-13827, this violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy. **(NCV 05000315/2017001-01; 05000316/2017001-01: Failure to Brief Worker Entry to High Radiation Area Resulting in the Unplanned Dose Rate Alarm)**

2RS8 Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation (71124.08)

.1 Radioactive Material Storage (02.02)

a. Inspection Scope

The inspectors selected areas where containers of radioactive waste are stored, and evaluated whether the containers were labeled in accordance with 10 CFR 20.1904, or controlled in accordance with 10 CFR 20.1905.

The inspectors assessed whether the radioactive material storage areas were controlled and posted in accordance with the requirements of 10 CFR Part 20. For materials stored or used in the controlled or unrestricted areas, the inspectors evaluated whether they were secured against unauthorized removal and controlled in accordance with 10 CFR 20.1801 and 10 CFR 20.1802.

The inspectors evaluated whether the licensee established a process for monitoring the impact of low-level radioactive waste storage that was sufficient to identify potential unmonitored, unplanned releases or nonconformance with waste disposal requirements.

The inspectors evaluated the licensee's program for container inventories and inspections. The inspectors selected containers of stored radioactive material and assessed the containers for signs of swelling, leakage, and deformation.

These inspection activities constituted one complete sample as defined in IP 71124.08-05.

b. Findings

No findings were identified.

.2 Radioactive Waste System Walk-down (02.03)

a. Inspection Scope

The inspectors walked down accessible portions of select radioactive waste processing systems to assess whether the current system configuration and operation agreed with the descriptions in plant and/or vendor manuals.

The inspectors reviewed administrative and/or physical controls to assess whether equipment which is not in service or abandoned in place would not contribute to an unmonitored release path and/or affect operating systems or be a source of unnecessary personnel exposure. The inspectors assessed whether the licensee reviewed the safety significance of systems and equipment abandoned in place in accordance with 10 CFR 50.59.

The inspectors reviewed the adequacy of changes made to the radioactive waste processing systems since the last inspection. The inspectors evaluated whether changes from what is described in the UFSAR were reviewed and documented in accordance with 10 CFR 50.59 or that changes to vendor equipment were made in accordance with vendor manuals. The inspectors also assessed the impact of these changes on radiation doses to occupational workers and members of the public.

The inspectors selected processes for transferring radioactive waste resin and/or sludge discharges into shipping/disposal containers and assessed whether the waste stream mixing, sampling, and waste concentration averaging were consistent with the process control program, and provided representative samples of the waste product for the purposes of waste classification.

The inspectors evaluated whether tank recirculation procedures provided sufficient mixing.

The inspectors assessed whether the licensee's process control program correctly described the current methods and procedures for dewatering and waste stabilization.

These inspection activities constituted one complete sample as defined in IP 71124.08-05.

b. Findings

No findings were identified.

.3 Waste Characterization and Classification (02.04)

a. Inspection Scope

For select waste streams, the inspectors assessed whether the licensee's radiochemical sample analysis results were sufficient to support radioactive waste characterization as required by 10 CFR Part 61. The inspectors evaluated whether the licensee's use of scaling factors and calculations to account for difficult-to-measure radionuclides was technically sound and based on current 10 CFR Part 61 analysis.

The inspectors evaluated whether changes to plant operational parameters were taken into account to: (1) maintain the validity of the waste stream composition data between the sample analysis update; and (2) assure that waste shipments continued to meet the requirements of 10 CFR Part 61.

The inspectors evaluated whether the licensee had established and maintained an adequate quality assurance program to ensure compliance with the waste classification and characterization requirements of 10 CFR 61.55 and 10 CFR 61.56.

These inspection activities constituted one complete sample as defined in IP 71124.08-05.

b. Findings

No findings were identified.

.4 Shipment Preparation (02.05)

a. Inspection Scope

The inspectors walked down radioactive waste processing systems with the licensee staff and received radioactive material shipment preparation and receipt activities. The inspectors reviewed various shipment packages including the requirements for, surveying, labeling, marking, placarding, vehicle checks, emergency instructions,

disposal manifest, shipping papers provided to the driver, and licensee verification of shipment readiness. The inspectors assessed whether the licensee's training program provided training to personnel responsible for the conduct of radioactive waste processing and radioactive material shipment preparation activities. The inspectors assessed whether shippers were knowledgeable of the shipping regulations and demonstrated adequate skills to accomplish package preparation requirements. The inspectors evaluated whether the licensee was maintaining shipping procedures in accordance with current regulations. The inspectors assessed whether the licensee was meeting the expectations in NRC Bulletin 79-19, "Packaging of Low-Level Radioactive Waste for Transport and Burial," and 49 CFR Part 172, Subpart H, "Training."

The inspectors evaluated whether the requirements for Type B shipment Certificates of Compliance had been met. The inspectors determined whether the user was a registered package user and had an NRC approved quality assurance program. The inspectors assessed whether procedures for cask loading and closure were consistent with vendor procedures.

The inspectors assessed whether non-Type B shipments were made in accordance with the package quality documents.

The inspectors assessed whether the receiving licensee was authorized to receive the shipment packages.

These inspection activities constituted one complete sample as defined in IP 71124.08-05.

b. Findings

No findings were identified.

.5 Shipping Records (02.06)

a. Inspection Scope

The inspectors reviewed select shipments to evaluate whether the shipping documents indicated the proper shipper name; emergency response information and a 24-hour contact telephone number; accurate curie content and volume of material; and appropriate waste classification, transport index, and UN number. The inspectors assessed whether the shipment marking, labeling, and placarding was consistent with the information in the shipping documentation.

These inspection activities constituted one complete sample as defined in IP 71124.08-05.

b. Findings

No findings were identified.

.6 Identification and Resolution of Problems (02.07)

a. Inspection Scope

The inspectors assessed whether problems associated with radioactive waste processing, handling, storage, and transportation were being identified by the licensee at an appropriate threshold, were properly characterized, and were properly addressed for resolution. Additionally, the inspectors evaluated whether the corrective actions were appropriate for a selected sample of problems documented by the licensee that involve radioactive waste processing, handling, storage, and transportation.

These inspection activities constituted one complete sample as defined in IP 71124.08–05.

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**

40A1 Performance Indicator Verification (71151)

.1 Unplanned Scrams per 7000 Critical Hours

a. Inspection Scope

The inspectors sampled licensee submittals for the Unplanned Scrams per 7000 Critical Hours performance indicator (PI) for Units 1 and 2 for the period from the first quarter 2016 through the fourth quarter 2016. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the Nuclear Energy Institute (NEI) Document 99–02, “Regulatory Assessment Performance Indicator Guideline,” Revision 7, dated August 31, 2013, were used. The inspectors reviewed the licensee’s operator narrative logs, issue reports, event reports and NRC Integrated IRs for the period of January 2016 through December 2016 to validate the accuracy of the submittals. The inspectors also reviewed the licensee’s issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two unplanned scrams per 7000 critical hour samples as defined in IP 71151–05.

b. Findings

No findings were identified.

## .2 Unplanned Scrams with Complications

### a. Inspection Scope

The inspectors sampled licensee submittals for the Unplanned Scrams with Complications performance indicator for Units 1 and 2 for the period from the first quarter 2016 through the fourth quarter 2016. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, dated August 31, 2013, were used. The inspectors reviewed the licensee's operator narrative logs, issue reports, event reports and NRC Integrated IRs for the period of January 2016 through December 2016, to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two unplanned scrams with complication samples as defined in IP 71151-05.

### b. Findings

No findings were identified.

## .3 Unplanned Power Changes per 7000 Critical Hours

### a. Inspection Scope

The inspectors sampled licensee submittals for the Unplanned Transients per 7000 Critical Hours performance indicator for Units 1 and 2 for the period from the first quarter 2016 through the fourth quarter 2016. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, dated August 31, 2013, were used. The inspectors reviewed the licensee's operator narrative logs, issue reports, maintenance rule records, event reports and NRC Integrated IRs for the period of January 2016 through December 2016, to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two unplanned transients per 7000 critical hour samples as defined in IP 71151-05.

### b. Findings

No findings were identified.



#### .4 Safety System Functional Failures

##### a. Inspection Scope

The inspectors sampled licensee submittals for the Safety System Functional Failures performance indicator for Unit 1 and Unit 2 for the period from the first quarter of 2016 through the fourth quarter of 2016. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, dated August 31, 2013, and NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 50.73" definitions and guidance, were used. The inspectors reviewed the licensee's operator narrative logs, operability assessments, maintenance rule records, maintenance work orders, issue reports, event reports and NRC Integrated IRs for the period of the first quarter of 2016 through the fourth quarter of 2016 to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two safety system functional failures samples 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 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, adequate attention was being given to timely corrective actions, and adverse trends were identified and addressed. Some minor issues were entered into the licensee's corrective action program as a result of the inspectors' observations; however, they are not discussed in 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.

##### b. Findings

Introduction: A self-revealed finding and associated non-cited violation occurred on January 10, 2017, when the licensee caused a loss of a qualified off-site circuit while opening a disconnect on the unit 2 reserve feed transformer. Regulatory Guide (RG) 1.33 requires procedures for operating the onsite and offsite electrical distribution system; however the licensee did not develop a procedure or instruction for operating the electrical distribution system.

Discussion: The Donald C. Cook onsite electrical distribution system is designed such that one breaker supplies power to both units' reserve auxiliary transformer. Thus, the AB reserve auxiliary transformer (RAT) for each unit comes from the 12-AB breaker and the CD RATs from the 12-CD breaker. Each transformer has local disconnects to isolate power to the RAT. On January 10, 2017, the licensee opened the disconnect for the unit 2 CD RAT. By design, disconnects have no current interrupting capability and in this instance the evolution resulted in opening the upstream breaker that supplies the CD RATs for both units. The operators performed the evolution using a clearance to control repositioning of the disconnect, as permitted by plant procedures. By plant practice, the licensee operates some disconnects while energized as long as there is no load on the disconnect. While the licensee had successfully opened disconnects while energized, weather conditions reduced the resistance of the air resulting in an upstream breaker tripping. Because the breaker provides power to the RATs on both units, Unit 1 entered a Limiting Condition for Operation (LCO) 3.8.1, Condition A. Aside from the one breaker opening, there was no other plant response. The event did slightly damage the disconnect in question.

The licensee performed an apparent cause evaluation and determined that operation of the disconnect while the transformer remained energized was the apparent cause of the breaker trip. As a contributing cause, the licensee determined that weather conditions impacted the current draw and subsequent breaker trip. While reviewing the apparent cause evaluation, the inspectors assessed the procedures used for operation of the disconnect as well as the site's electrical distribution. The licensee stated that the plant electrical system was operated using clearances or switching orders. While no procedure exists for operation of electrical distribution system, work instructions, such as clearances, could meet regulatory requirements if developed sufficiently to ensure proper operation.

As part of follow-up, the inspectors searched for standards or vendor information related to operation of disconnects under load. A vendor manual for the disconnect could not be located by the inspectors nor by the licensee. The inspectors did locate an Institute of Electrical and Electronics Engineers (IEEE C37.30.1) standard that addresses operation of air disconnects. While the use of this standard was not required by regulation, it contained information that could have prevented the event had it been used.

Analysis: The inspectors concluded that the failure to develop, implement and maintain procedures for operation of the onsite electrical distribution system was a performance deficiency that warranted a significance determination. The inspectors determined the finding was more than minor in accordance with IMC 0612, Appendix B, because the finding is associated with the mitigating system cornerstone objective to ensure the availability of systems that respond to initiating events and adversely impacted the equipment performance attribute. Specifically, the finding lead to an unplanned LCO entry, electrical transient, and damage to the disconnect. The finding was not greater than green in accordance with IMC 0609, Appendix A Exhibit 2 dated, June 19, 2012, because the answer to all four questions was no. The finding did not include a cross-cutting aspect because the practice of opening disconnects in this manner originated many years ago and is not reflective of current plant performance.

Enforcement: TS 5.4.1, Procedures, requires, in part, that the applicable procedures recommended in RG 1.33, Revision 2, Appendix A, February 1978, be established, implemented, and maintained. RG 1.33 states, in part, that instructions for startup

shutdown and changing modes of operation should be prepared for the onsite and offsite electrical systems. Donald C. Cook's Quality Assurance program requires that work is accomplished and verified using instructions, procedures or other appropriate means that are of a level of detail commensurate with the activity's complexity and importance to safety. Contrary to this requirement, as of January 10, 2017, the licensee had not established, implemented, or maintained procedures (work instructions) for operation of the onsite electrical distribution with the level of detail commensurate with the activity's complexity and importance to safety. Specifically, the instructions did not include details to ensure the disconnect could be successfully operated. As a result, the licensee entered an unplanned LCO entry and caused an electrical plant transient. The licensee documented the issue in action request (AR)–2017–0346. Immediate corrective actions included repairing and restoring the disconnect. This violation is being treated as a NCV, consistent with Section 2.3.2.a of the Enforcement Policy.  
**(NCV 05000316/2017001–02, Improper Disconnect Operation)**

.2 Annual Follow-up of Selected Issues: Failure of a Delivery Valve Holder Resulting in a Fuel Leak on an EDG

a. Inspection Scope

The inspectors selected the following condition reports for in-depth review:

- AR–2016–14625, Crack on 1AB EDG Injection Pump Delivery Valve Holder (DVH)

As appropriate, the inspectors verified the following attributes during their review of the licensee's corrective actions for the above condition report and other related condition reports:

- complete and accurate identification of the problem in a timely manner commensurate with its safety significance and ease of discovery;
- consideration of the extent of condition, generic implications, common cause, and previous occurrences;
- evaluation and disposition of operability/functionality/reportability issues;
- classification and prioritization of the resolution of the problem commensurate with safety significance;
- identification of the root and contributing causes of the problem; and
- identification of corrective actions, which were appropriately focused to correct the problem;
- completion of corrective actions in a timely manner commensurate with the safety significance of the issue;
- effectiveness of corrective actions taken to preclude repetition;
- evaluation of applicability for operating experience and communication of applicable lessons learned to appropriate organizations.

The inspectors discussed the corrective actions and associated evaluations with licensee personnel.

This review constituted one in-depth problem identification and resolution inspection sample as defined in IP 71152.

b. Findings

Introduction: A self-revealed finding of very low safety significance (Green), with an associated NCV of 10 CFR 50 Appendix B, Criterion XV, "Nonconforming Materials, Parts, or Components," occurred when the DVH on a fuel injection pump failed during a run of the 1AB EDG. A failure caused by the same defect occurred in 2013, however, the licensee failed to evaluate and control defective parts per plant procedures.

Description: In January 2013, a DVH cracked during an EDG run resulting in a fuel oil leak. Each cylinder on an EDG has a fuel injection pump. The DVH is the part of the fuel injection pump where the high pressure fuel line meets the pump discharge. In response to the 2013 failure, the licensee identified the cracking was caused by a machined area inside the DVH being cut with too sharp a radius. Given the operational conditions inside the pump and the stress riser caused by the tight radius, cracking from the inside-out could develop over time resulting in fuel leakage. Through their investigation, the licensee identified a particular lot of DVHs that were susceptible to having this tight radius. The pumps were manufactured by a commercial supplier, so the licensee utilized a commercial grade dedication (CGD) plan to justify their use as safety related parts. The licensee's CGD plan did not specify the radius in question as a critical characteristic. Following the 2013 failure, the commercial supplier added the radius as a critical parameter and started performing 100 percent inspections of the radius following manufacture. However, many of the DVHs from the suspect lot had already been received by the site and installed on the EDGs. Despite concerns about the radius, the licensee failed to follow CGD procedures and did not update the CGD plan for the DVH's -which would have prompted a formal review of parts previously accepted. In continued discussions with the commercial-grade supplier, the licensee came to a conclusion that only some of the pumps in the suspect lot were actually susceptible to having the tight radius. Some of the DVHs in the lot were manufactured with a different seating surface for the high pressure line (unrelated to the radius in question). The licensee was told that those DVHs would not have the sharp radius. However, no measurements nor technical data was provided to demonstrate the radius was acceptable.

Later in 2013, while continuing to follow up on the issue, the licensee discovered they had inadvertently installed a DVH from the suspect lot on an EDG. The NRC issued an NCV for this and other weaknesses in the area of nonconforming parts control in IR 2014003. Following the NCV, the licensee took action to update procedures for controlling nonconforming parts in stock. Additionally, the licensee realized that the CGD plan for the 2013 failure had not been updated. The licensee updated the CGD plan to add the radius and several other parameters (recommended by an outside firm who researched the failure) as critical characteristics. However, the licensee again failed to evaluate previously issued parts once the plan changed. The licensee also received another informal assurance from the commercial grade vendor that the certain subset of DVHs in the suspect lot (discussed above) had a good radius. Contrary to these assumptions, on December 13, 2016, a DVH from the suspect lot leaked during an EDG run. The DVH was from the subset thought to be good; however, the measured radius was too sharp, as were most of the other installed DVH radii from the suspect lot that were found installed on the EDGs. The licensee declared three of the four onsite EDGs inoperable and commenced replacement of the suspect DVHs. The failed DVH and several others from the suspect lot were shipped out for performance testing and analysis to confirm the failure mechanism and to evaluate what the performance

capabilities of the EDGs would have been with the suspect DVHs installed. A root cause was performed by the licensee which determined several management-approved actions in response to the 2013 failure had not been completed. Specifically, the complete replacement of all DVHs from the suspect lot on the EDGs with DVHs that had their radius confirmed by measurement was not done. Some site personnel used the informal assurance from the vendor as justification for only replacing some. Further, the CGD process had not been followed when the CGD plan was (2014), or should have been (2013), changed. The process would have required a review of the acceptability of previously issued parts. Had the radii been checked, the pumps assumed to be good would have been recognized as nonconforming.

Analysis: The inspectors determined that the failure of the licensee to review and control safety related parts which do not conform to requirements, as described in 10 CFR 50 Appendix B, Criterion XV, "Nonconforming Materials, Parts, or Components," was a performance deficiency warranting further evaluation in the Significance Determination Process. The issue screened as more-than-minor because it adversely affected the Design Control attribute of the Mitigating Systems cornerstone. Specifically, allowing nonconforming parts to be installed on safety-related equipment without proper controls or evaluation adversely affects the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences.

The finding screened as Green, or very low safety significance, utilizing IMC 0609 Attachment 4, "Initial Characterization of Findings," dated June 19, 2012. Specifically, per Exhibit 2, the finding was determined to be a deficiency affecting the design or qualification of a mitigating system, structure or component where operability was maintained. The inspectors concluded operability was maintained for each of the EDGs with the nonconforming DVHs installed. The inspectors based their conclusions on a review of the performance testing results of the suspect DVHs. This testing was performed by an outside firm for the licensee on a representative sample of removed DVHs with cracking discovered in various stages of progression. Many pumps completed test runs corresponding to expected post-accident EDG run time requirements without failure. Ones that did leak prompted further engine modeling analyses which demonstrated the EDGs could fulfill their safety functions for the required run times.

The inspectors determined the issue had a cross-cutting aspect in the Problem Identification and Resolution area, specifically, P.2, "Evaluation." Despite identifying a defect on a safety related part due to a failure in 2013, the licensee failed to properly evaluate the condition and ensure all susceptible parts were accounted for. Specifically, the failure to follow station processes for corrective action and CGD resulted in a defective part causing a leak on an EDG.

Enforcement: 10 CFR 50, Appendix B, Criterion XV, "Nonconforming Materials, Parts, or Components," requires, in part, that measures shall be established to control materials, parts, or components which do not conform to requirements in order to prevent their inadvertent use or installation. Contrary to these requirements, a DVH from a known suspect lot of parts was installed on an EDG and failed. Several other DVHs from the suspect lot were found installed across all of the EDGs. As a result of a failure from the same cause in 2013, licensee processes should have prevented further use of

the suspect parts. The inspectors determined the NCV existed since approximately May of 2013, when it became clear to the licensee that an issue with the radius existed and a suspect lot of DVHs had been identified. Following emergent work to address the DVH extent-of-condition after the December 16, 2016 failure, the final EDG was restored to operable on December 28, 2016. The licensee replaced suspect parts and performed a root cause evaluation to investigate the failure and what led to the installation of the suspect parts. This violation is being treated as a NCV, consistent with Section 2.3.2 of the Enforcement Policy because it was of very low safety significance and was entered into the licensee's CAP as AR-2016-14625. **(NCV 05000315/2017001-03; 05000316/2017001-03, Failure to Control Nonconforming Delivery Valve Holders on Emergency Diesel Generators)**

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

.1 Loss of Annunciators leads to Unusual Event

a. Inspection Scope

The inspectors reviewed the plant's response to an unusual event entered because of a loss of annunciators. On March 30, at 0255 both servers for the D.C. Cook Unit 1 control room annunciators failed. D.C. Cook has a digital annunciator system driven by two redundant servers. A computer error caused both servers to fail when operators were using a terminal in the control room. At 0310, the licensee declared an unusual event per the site's emergency plan. The inspectors arrived at the site and confirmed the plant was in a safe and stable condition. The event did not create any transient. The licensee maintained cognizance of plant parameters by monitoring the plant process computer and control board indications. At 0817, the licensee recovered the annunciator servers and exited 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

No findings were identified.

.2 (Closed) Licensee Event Report 315/2016-002-00: Rod Position Indication Inoperable Longer than Allowed by Technical Specifications

a. Inspection Scope

On July 15, 2016, the licensee identified a failed rod position indication for rod k14 while performing a routine surveillance. Troubleshooting by the licensee identified a failed Nick's Analog Rod Position Indication (NARPI) module. Following replacement of the module and post maintenance testing, the subject rod position indication functioned properly. As part of the assessment of the condition, the licensee reviewed documents associated with maintenance and testing of this module. Using these records, the licensee determined that the failure occurred when the licensee performed a routine temperature compensation on NARPI. Although performed correctly, the adjustment left the module in a saturated state. The licensee attributed the failure to component degradation on the module. Because the failure occurred on April 30 but was not recognized until July 15, the licensee reported the condition as one prohibited by TSs.

TS 3.1.7, Condition A requires that when rod position indication becomes inoperable, the licensee confirm rod position within 8 hours or reduce thermal power to less than 50 percent. If the licensee does not meet the required action, Condition C requires the licensee to place the plant in mode 3 within 6 hours. Since the licensee was not aware of the failed NARPI, the licensee did not perform the required actions within the completion time. Once the licensee became aware of the condition, the licensee verified rod position and then restored NARPI to an operable status within technical specification completion times.

The inspectors reviewed the licensee's data related to the module failure. Based on information in the corrective action program, the inspectors did not identify a performance deficiency associated with the card failure nor did the inspectors identify a reasonable method to identify the failed NARPI prior to July 15. The inspectors also reviewed the safety impact of the failure. Since the failure impacted only one rod position indication and alternate means exist to verify rod position and full insertion, the safety impact of the failure was negligible. The inspector did identify that the licensee failed to include information generated as part of the failure investigation process in the corrective action program as required by 10 CFR 50, Appendix B, Criterion XVII, and licensee procedures. Documents reviewed are listed in the Attachment to this report. This licensee event report (LER) is closed.

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

b. Findings

No findings were identified.

.3 (Closed) Licensee Event Report 315/2015-004-00: Power Operated Relief Valve Technical Specification 3.4.11 Violation

a. Inspection Scope

As part of a self-assessment, the licensee identified that on several occasions one of the pressurizer power-operated relief valves (PORVs) was rendered inoperable when an associated control air compressor was taken out of service. Both Cook units are designed with two of three PORVs have back up air bottles to support valve operation without control air. The third PORV relies on control air, which would normally be available because it is powered from a diesel backed bus. In 2014, the NRC clarified that the plant license includes dual unit loops during analyzed accidents. This impacted the availability of the plant air compressor as an alternative to the control air compressor since the plant air compressors are powered from non-safety busses. The licensee failed to consider this condition after clarification of the current licensing basis. This oversight resulted in the licensee failing to enter LCO 3.4.11, Condition B and Condition H on three occasions for Unit 1 and four occasions for Unit 2. The licensee determined that there was very low risk associated with the failure to enter the required LCO. The inspectors concur that very low risk was associated with the failure. An associated licensee identified NCV is documented in section 4OA7 of this report. The inspectors did not identify any additional safety issues. This LER is closed.

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

b. Findings

No findings were identified.

.4 (Closed) Licensee Event Report 315/2015-002-02: Technical Specification Violation Due to Inoperable Residual Heat Removal Pump

a. Inspection Scope

On June 14, 2015, the licensee discovered an oil leak on the Unit 1 east residual heat removal pump lower motor bearing oil reservoir. Resultant engineering evaluations by the licensee concluded the pump would not have been operable for the duration of its required mission time given the estimated leak rate. The inspectors disposed the technical issue in IR 2015003 as a licensee identified violation. The inspectors reviewed previous versions of the LER (2015-002-00 and 2015-002-01) and documented a minor violation for not identifying the condition as a loss of safety function in IR 2016001. The inspectors reviewed LER 315/2015-002-02 to ensure the appropriate documentation was added to indicate a loss of safety function. The inspectors concluded the licensee updated the LER appropriately. This LER is closed.

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

b. Findings

No findings were identified.

.5 (Closed) Licensee Event Reports 316/2015-001-00 and 316/2015-001-01: Manual Reactor Trip due to a Secondary Plant Transient

a. Inspection Scope

On April 23, 2015, the licensee manually tripped the Unit 2 reactor shortly following startup when two newly installed steam dump valves failed to the open position. The transient lowered reactor coolant temperature below the value allowed per technical specifications, which necessitated the reactor trip. Evaluation by the licensee concluded the modification process did not identify and document all system vulnerabilities resulting from the new design. Consequently, trapped water in the valves flashed to steam, causing a force which failed the valves open as they were operated as part of plant startup. The inspectors documented a finding of very low safety significance associated with this issue in IR 2015003. A review of the LERs did not identify any further performance deficiencies. These LERs are closed.

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

b. Findings

No findings were identified.



.6 (Closed) Licensee Event Reports 316/2016–001–00 and 316/2016–001–01: Manual Reactor Trip due to Moisture Separator Heater Expansion Joint Failure

a. Inspection Scope

On July 6, 2016, with the reactor on Unit 2 at 100 percent power, an expansion joint on the right Moisture Separator Reheater ruptured causing a steam leak that damaged the adjacent turbine building wall. In response, operators tripped the reactor and isolated the leak by shutting the Main Steam Isolation Valves. The plant entered an Unusual Event due to the rupture but shortly exited the emergency once it was verified the plant was safely shutdown without further complication. The inspectors issued a finding associated with the rupture in IR 2016004. A review of the LERs did not identify any further performance deficiencies. These LERs are closed.

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

b. Findings

No findings were identified.

40A5 Other Activities

.1 (Closed) NRC Temporary Instruction 2515/192, “Inspection of the Licensee’s Interim Compensatory Measures Associated with the Open Phase Condition Design Vulnerabilities in Electric Power Systems”

a. Inspection Scope

The objective of this performance based TI is to verify implementation of interim compensatory measures associated with an open phase condition (OPC) design vulnerability in electric power systems for operating reactors. The inspectors conducted an inspection to determine if the licensee had implemented the following interim compensatory measures. These compensatory measures are to remain in place until permanent automatic detection and protection schemes are installed and declared operable for OPC design vulnerability. The inspectors verified the following:

- The licensee had identified and discussed with plant staff the lessons-learned from the OPC events at the US operating plants including the Byron station OPC event and its consequences. This includes conducting operator training for promptly diagnosing, recognizing consequences, and responding to an OPC event.
- The licensee had updated plant operating procedures to help operators promptly diagnose and respond to OPC events on off-site power sources credited for safe shutdown of the plant.
- The licensee had established and continues to implement periodic walkdown activities to inspect switchyard equipment such as insulators, disconnect switches, and transmission line and transformer connections associated with the offsite power circuits to detect a visible OPC.

- The licensee had ensured that routine maintenance and testing activities on switchyard components have been implemented and maintained. As part of the maintenance and testing activities, the licensee assessed and managed plant risk in accordance with 10 CFR 50.65(a) (4) requirements.

b. Findings and Observations

No findings of significance were identified. The inspectors verified the criteria were met.

4OA6 Management Meetings

.1 Exit Meeting Summary

On April 12, 2014, 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. S. Lies, Site Vice President, on March 31, 2017.

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 two violations of very low significance (Green) were identified by the licensee and are violations of NRC requirements which meet the criteria of the NRC Enforcement Policy for being dispositioned as NCVs.

- In LER 05000315–2015–004, the licensee identified multiple violations of TS 3.4.11, which requires each PORV and associated block valve to be operable. The licensee identified that on 3 occasions for Unit 1 and 4 for Unit 2 that one PORV was not operable when the supporting control air compressor was out of service. In these 7 cases, the licensee failed to close the associated block valve within 1 hour, as required by Condition B. Further, the licensee also failed to be in mode 3 within 6 hours and in some cases mode 4 as required by Condition H. The licensee failed to meet these requirements as follows:

Unit 1:

- February 27, 2013
- November 8, 2014
- May 6, 2015

Unit 2:

- May 14, 2013
- January 16, 2014

- March 24, 2015
- May 4, 2015

The inspectors evaluated the condition in accordance with IMC 0612, Appendix B and determined the issue was more than minor because it adversely affected the mitigating system cornerstone objective of ensuring the availability of systems that respond to initiating events. The inoperability impacted the equipment performance attribute of availability. Using IMC 0609, Appendix A, Exhibit 2, the inspectors answered all the questions no; therefore, the inspectors determined the finding was of very low safety significance. The licensee documented the issue in AR 2015–11204.

- The inspectors reviewed AR–2017–0503, “VT-2 examination not completed.” The AR documented several cases where the licensee identified that safety related equipment had been returned to service without the necessary American Society of Mechanical Engineers Code required exams or evaluations being done to satisfy post-maintenance test (PMT) requirements. TS 5.4, “Procedures,” requires, in part, that written procedures shall be established, implemented, and maintained covering the applicable procedures recommended in RG 1.33, Revision 2, Appendix A, February 1978. RG 1.33 Section 9 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 or documented instructions appropriate to the circumstances. Contrary to this requirement, safety related valves 2–NCR–252 and 2–CMO–410 were returned to service approximately December 9, 2016 and November 13, 2016, respectively, following maintenance without the required American Society of Mechanical Engineers visual inspections having been planned into the work orders. Once identified, the PMTs were verified complete or acceptable on January 24, 2017 for 2–NCR–252 and January 30, 2017 for 2–CMO–410. The issue was more than minor because it adversely affected the Procedure Quality attribute of the Mitigating Systems cornerstone and was a programmatic issue. The finding screened as a Green NCV because operability was maintained as verified later via the appropriate PMTs. The licensee documented the issue in the aforementioned AR.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### Licensee

J. Gebbie, Chief Nuclear Officer  
J. Baab, Environmental Specialist and Radioactive Waste Shipper  
T. Curtis, Supervisor, Regulatory Affairs - Compliance  
M. McLean, Radiation Support Supervisor  
M. Scarpello, Regulatory Affairs Manager  
D. Wood, Radiation Protection Manager

#### U.S. Nuclear Regulatory Commission

K. Riemer, Chief, Reactor Projects Branch 2  
M. Holmberg, Senior Reactor Engineer  
A. Dietrich, Project Manager

## LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

### Opened

05000315/2017001-01; 05000316/2017001-01	NCV	Failure to Brief Worker Entry to High Radiation Area Resulting in the Unplanned Dose Rate Alarm (2RS1.1)
05000316/2017001-02	NCV	Improper Disconnect Operation (4OA2.1)
05000315/2017001-03; 05000316/2017001-03	NCV	Failure to Control Nonconforming Delivery Valve Holders on Emergency Diesel Generators (4OA2.2)

### Closed

05000315/2017001-01; 05000316/2017001-01	NCV	Failure to Brief Worker Entry to High Radiation Area Resulting in the Unplanned Dose Rate Alarm (2RS1.1)
05000316/2017001-02	NCV	Improper Disconnect Operation (4OA2.1)
05000315/2017001-03; 05000316/2017001-03	NCV	Failure to Control Nonconforming Delivery Valve Holders on Emergency Diesel Generators (4OA2.2)
05000315/2016-002-00	LER	Rod Position Indication Inoperable Longer than Allowed by Technical Specifications (4OA3.1)
05000315/2015-004-00	LER	Power Operated Relief Valve Technical Specification 3.4.11 Violation (4OA3.2)
05000315/2015-002-02	LER	Technical Specification Violation Due to Inoperable Residual Heat Removal Pump (4OA3.3)
05000316/2015-001-00; 05000316/2015-001-01	LER	Manual Reactor Trip Due to a Secondary Plant Transient (4OA3.4)
05000316/2016-001-00; 05000316/2016-001-01	LER	Manual Reactor Trip Due to Moisture Separator Heater Expansion Joint Failure (4OA3.5)
2515/192	TI	Inspection of the Licensee's Interim Compensatory Measures Associated with the Open Phase Condition Design Vulnerabilities in Electric Power Systems (Section 4OA5.1)

### 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 IR.

### 1R04 Equipment Alignment

- 01-OHL-5030-SOM-004, Unit 1 Tours – Unit 1 Turbine Tour, Revision 74
- 02-OHL-5030-SOM-035, Unit 2 Tours – Unit 2 Outside Tour, Revision 30
- 12-IHP-5040-EMP-017, Provide Temporary Power from Livingston Road to Temporary Outage Loads During a Unit 1 or Unit 2 Refueling Outage, Revision 7
- 12-OHP-4021-019-001, Operation of the Essential Service Water System, Revision 62
- 12-OHP-4021-066-001, Fire Protection System (Water) Operation, Revision 42
- AR 2016-14587, Unit 1 Traveling Water Screen Spray Wash Pump Low Discharge Pressure, December 29, 2016
- AR 2016-3144, Traveling Screen Spray Wash Pump 1-PP-TWS-6 Low Pressure Alarm, March 19, 2016
- AR 2017-0467, Unit 1 Traveling Water Screen-4 Spray Wash Pressure Below ESOMS Lower Limit, January 12, 2017
- AR 2017-0935, Flexible Conduit Rubbing Against Motor Operated Valve Rotating Part, January 24, 2017
- AR 2017-0939, Flexible Conduit Jacket Separating from Connector, January 24, 2017
- AR 2017-1220, Proceduralized TMOD Not Logged as Installed, January 31, 2017
- N-12KV-SDAL-1393, NNEP (1q2-TR-SOP-2) Install Livingston Temporary Power, January 30, 2017
- OP-1-5113-101, Flow Diagram Essential Service Water, May 27, 2016
- OP-1-5113-101, Flow Diagram, Essential Service Water, May 27, 2016
- OP-1-5135-42, Flow Diagram Component Cooling Water Pumps and Component Cooling Water Heat Exchangers, December 18, 2013
- Plant Status Report, Tuesday, February 7, 2017

### 1R05 Fire Protection

- AR 2017-3098, Evaluate Fire Doors and Dampers for TSC Inverter Room, March 21, 2017
- Fire Preplans, Revision 28

### 1R06 Flooding

- AR 201701253, Update Flood Information in PRA-FLOOD-002, February 1, 2017
- AR 2017-1384, 2-FMO-241 Did not Pass Proper Flow IAW 2-OHP-4030-256-017R, February 4, 2017
- AR 2017-1576, Jet Impingement Effects on Masonry Walls in EDG Rooms, February 8, 2017
- PRA-Flood-002, Internal Flooding Impact on Plant Power Distribution, Revision 0
- Technical Evaluation 11.72, Fire Water System Piping Internal Inspection Program, Revision 2

### IR11 Licensed Operator Requalification Program

- 2-OHP-4021-050-001, Turbine Generator Normal Startup and Operation, Revision 61
- 2-OHP-4023-ECA-0.0, Loss of All AC Power, Revision 36

- 2-OHP-4023-SUP-002, Restoration of Reserve Power to 4kV Busses, Revision 15
- EC-54708-TP-001, Attachment 2, Unit 2 BVM Testing of RS56R Last Stage Blades at Reduced Vacuum, Revision 1
- PMP-2080-EPP-101, Emergency Classification, Revision 19
- Simulator Exercise Guide RQ-E-ANN-23, Approved February 14, 2017
- Simulator Exercise Guide RQ-E-ANN-30, Approved February 14, 2017
- TRP-2070-TAP-400-LOR, Licensed Operator Requalification Training Annual Operating Test and Biennial Written Examination Implementation, Revision 4

#### 1R12 Maintenance Effectiveness

- AR-2011-9437, AFI ER 2.1, Critical Component and Subcomponent Failures, August 18, 2011
- AR-2015-9123, AB EDG Start Signals Sent While Tagged Out, July 14, 2015
- AR-2016-10396, Certified Calibration Standard Out of Tolerance STD-123, September 15, 2016
- AR-2016-1616, EDG2CD Slow to 120V indicated in CR During Fast Speed Start, February 9, 2016
- AR-2016-3470, Failure of T11A Load Shed During 217B, March 26, 2016
- AR-2016-3668, Certified Calibration Standard out of Tolerance STD-101, March 29, 2016
- AR-2016-3890, DG1AB Failure to Start, April 1, 2016
- AR-2016-3907, 1-101-T11A11 will not Close to Energize A Bus from DG1AB, April 2, 2016
- AR-2016-4400, Loss of Indication During 2AB EDG Surveillance, March 31, 2015
- AR-2017-3215, Inadequate Maintenance Rule Evaluation, March 24, 2017
- NUMARC 93-01, Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants, Revision 2
- VTD-GENE-1297, General Electric Service Advice Letters and Other Specific Documentation for HFA Relays
- VTD-GENE-1299, General Electric Service Advice Letters and Other Specific Documentation for HGA Relays

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

- 12-OHP-2110-BKM-001, Control of Operations Department Unit 12 Breaker Cleaning Maps, Revision 21
- AR 2016-13326, Security UPS Failed to Transfer Properly, November 18, 2016
- N-CCW-CCWW-1603, West Component Cooling Water Pump, January 23, 2017
- N-CCW-SDAL-1640, West Component Cooling Water Heat Exchanger 1-HE-15W Essential Service Water Inlet Valve, January 23, 2017
- OP-1-5113-101, Flow Diagram Essential Service Water, May 27, 2016
- OP-1-5135-42, Flow Diagram CCW Pumps and CCW Heat Exchangers, December 18, 2013
- Plant Status Report March 2 and 3, 2017
- Plant Status Report, February 7, 2017
- Plant Status Report, Monday, January 23, 2017
- PMP-4030-001-001, Impact of Safety Related Ventilation on the Operability of Technical Specification Equipment, Revision 24
- Safety data Sheet, Sulfuric Acid, Sigma-Aldrich, Version 5.14
- WOER-20017756, Engineering Instructions to Identify a Repair Plan for the Steam Leak on the Outer Shell of 2-OME-76
- WOER-20017769, Weld Evaluation, Non Unit 2 High Pressure Turbine 2-OME-76

## 1R15 Operability Determinations and Functional Assessments

- 12-QHP-5050-NDE-008, Ultrasonic Examination Using Longitudinal Wave (Straight Beam), Revision 5
- AR 2016-13865-2, Degraded Auxiliary Feedwater Piping Found in the Unit 2 Essential Service Water Pipe Tunnel, November 10, 2016
- AR 2016-9073, Potential Baffle-Former Bolt Degradation; August 9, 2016
- AR 2017-0154, 2-MRV-242 has a 2' Steam Plume Coming from its Discharge, January 4, 2017
- DIT-B-02834-02, 1-OHP-4030-156-017CS MDAFP & TDAFP Check Valve Test and 2-OHP-4030-2560017CS MDAFP & TDAFP Check Valve Test; 01(2)-OHP-STP-017T Turbine driven Auxiliary Feedwater System Test, January 19, 2005
- DIT-B-03702-00, The Minimum Required Pipe Wall Thickness Value Based on Axial Loading for Select Unit 1 NESW Piping Segments Shown in Table 1, November 16, 2016
- MRP Letter 2016-022, Transmittal of NEI-03-08 "Needed" Interim Guidance Regarding Baffle Former Bolt Inspections for Tier 1 Plants as Defined in Westinghouse NSAL 16-01, July 27, 2016
- WE Letter - NSAL-16-1, Baffle-Former Bolts, Revision 1
- WE LTR-PL-16-49, Donald C. Cook Unit 1 Engineering Evaluations Supporting Extent of Condition Review, December 2, 2016
- WE LTR-PL-16-52, Operability Assessment for Postulated Primary Side Loose Parts From Degraded Reactor Internals Baffle Plate Edge Bolts at D.C. Cook Unit 2, December 1, 2016
- WE LTR-RIAM-16-75, Responses to NRC Questions Received on D.C. Cook Units 1 and 2 Operability Determination Evaluation (AR 2016-9073), October 20, 2016
- WE LTR-RIAM-16-84, D.C. Cook Unit 2 Baffle Bolting Replacement Pattern Summary Letter, December 7, 2016
- WE LTR-RIAM-16-85, Subject: Assessment Summary for Replacement Bolt Failures at D.C. Cook Unit 2, November 29, 2016
- WE LTR-RIAM-16-88, DC Cook Unit 2 Baffle-Edge Bolt Study, December 2, 2016
- WE LTR-RIAM-16-90, DC. Cook Unit 2 Barrel-Former Bolt Evaluation for Normal Loads, December 2, 2016
- WE LTR-RIAM-16-96, Description of Events Leading to Baffle-Former Bolt Degradation at D.C. Cook Unit 2, December 2, 2016

## 1R18 Plant Modifications

- 12-OHP-4021-082-031, Security UPS Operations, Revision 12
- 55492635-02, Bypass ABT-Temporary Configuration Change
- PMI-5041, Temporary Configuration Changes, Revision 2

## 1R19 Post-Maintenance Testing

- 12-IHP-5021-IMP-001, Lead Lifting/Landing and Electrical Jumper/Fuse Installation and Removal, Revision 14
- 12-IHP-5021-IMP-001, Lead Lifting/Landing and Electrical Jumper/Fuse Installation and Removal, Revision 14
- 12-IHP-5030-001, Limitorque Valve Operator Preventive Maintenance, Revision 31
- 12-IHP-IMP-073, Time Delay Relay Calibration, Revision 13
- 12-OHP-4030-066-121MD, Electric Fire Pump Operability Test, Revision 16
- 2-OHP-4030-208-053B, ECCS Valve Operability Test – Train B, Revision 27
- 2-OHP-4030-256-017R, Auxiliary Feedwater Pump Response Time, Revision 8



- AR 2016-0997, Discrepant Condition Evaluation 2015-16339 Not Supported, January 26, 2016
- AR 2017-1007, Relay Post-Maintenance Test not Planned IAW PMP-2291-PMT-001, January 26, 2017
- AR 2017-2705, Discrepancies in AR 2017-1007-1 Spread Sheet After Closure, March 8, 2017
- ESOMS Log Entries Report, February 1 through February 2, 2017
- GT 2017-1013, Change 12-IHP-6030-IMP-073, January 26, 2017
- GT 2017-1778, 12-IHP-6030-IMP-073 Enhancement, February 15, 2017
- GT 2017-1779, 12-IHP-6030-RLY-022 Enhancement, February 15, 2017
- I-OHP-4030-119-022W, West Essential Service Water system Test, Revision 32
- Online Work Schedule, Week of February 13, 2017
- OP-12-5152T-14, Flow Diagram Fire Protection-Water Piping in Pump House, March 19, 2009
- OP-1-5113-101, Flow Diagram Essential Service Water, May 27, 2016
- OP-1-5120GG-11, Control Air System Turbine Building Tapoffs Unit #1, October 13, 2014
- OP-1-5120NN-8, Control Air System Turbine Building Tapoffs Unit #1, November 18, 2009
- OP-1-98273-55, Chemical & Volume Control System Reactor Coolant Charging Elementary Diagram, June 28, 2016
- OP-2-5129-54, Flow Diagram CVCS-Reactor Letdown and Charging, Unit No. 2, April 7, 2015
- OP-2-5142-54, Flow Diagram Emergency Core Cooling (SIS), December 19, 2016
- PMP-2291-PMT-001, Work Management Post Maintenance Testing Matrices, Revision 31
- VTD-JAMS-0007, Neles-Jamesbury Installation, Maintenance & Operating Instructions for Quadra-Powr II Spring-Diaphragm Actuators, Revision 3
- WO 55229065-01, 1-SI-X-T11A5, Perform Pickup and Dropout Testing
- WO 5527340-1, 2-IMO-362-ACT, Perform MOV Preventive Maintenance
- WO 55360863-01, Air Hose Visual and Physical Manipulation Inspection
- WO 55360863-05, Post Maintenance Leak Test
- WO 55477556, Breaker 1-T11A8, Overcurrent Relays Post-Maintenance Test, January 26, 2017
- WO 55477758, 1-62-SIS-T11A8, January 26, 2017
- WO 55478617, CPS: 2-IMO-362, APC Clearance to Prevent Flow
- WO 55487031-01, 1-WRV-777-ACT, Refurbish Actuator
- WO 55495831-03, Ops: 12-ZRV-402 Operability Test and Post-Maintenance Testing Support
- WO 55495831-17, Remove Spool Piece for Inspection
- WOER 00867605, First Time PM Review of 1-62-SIS-TA8, 5a p.m. Calibration and P.M.T
- Work Week Schedule, Week of February 20, 2017

#### 1R20 Outage Activities

- AR-2016-11905, Working Hour Violations, October 18, 2016
- AR-2016-11907, Working Hour Violations, October 18, 2016
- PMP-2060-FFD-001, Fitness for Duty Program, Revision 14
- Various Timesheets for Covered and Non-Covered workers
- Summary of Reactor Physics Testing Results, Post-U2C23 Outage

#### 1R22 Surveillance Testing

- 12-OHP-4030-018-130S, South Spent Fuel Pit Pump Surveillance Test, Revision 13
- 1-IHP-4030-102-014A, Pressurizer Pressure Set 2 Channel Operational test and Calibration, Revision 12
- 2-OHP-4030-212-015, Full Length Control Rod Operability Test, Revision 13

## 2RS1 Radiological Hazard Assessment and Exposure Controls

- 12-THP-6010-RPP-104, Personnel Dosimetry Use Varying Radiation Fields, Revision No. 16
- 12-THP-6010-RPP-400, Radiological Protection Job Coverage, Revision 23
- AR-2016-13827, Dose Rate Alarm in Unit-2 Upper Containment, December 6, 2016
- Baffle Bolt Demobilization Area 1 Picture and Map, February 2, 2017
- Incident Investigation Findings by D.C. Cook RP Department, December 5, 2016
- PMP-4010-HUR-001, Human Performance Clock Reset Program, Human Performance Culpability Assessment, Revision 14
- PMP-6010-RPP-003, High, Locked High, and Very High Radiation Area Access, Revision 27
- RWP-162103, Unit-2 Refueling Floor Task No. 2, Revision 1
- RWP-162105, Unit-2 C23 Reactor Baffle Bolting Inspection, Revision 0
- Survey Map SW VSDS-M-20161206-4, Baffle Bolt Repair Project, December 6, 2016
- Survey Map SW VSDS-M-20161208-2, VSDS Standard Map Survey Report, of Baffle Bolts Westinghouse Vacuum System, December 6, 2016
- Unit-2 Upper Containment 650' elevation Map Overview of the Area the day of the Dose Rate Alarm, December 6, 2016

## 2RS8 Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation

- 12-THP-6010-RPP-901, Resin Transfer to Qualified Shipping Container, Revision 12
- 12-THP-6010-RPP-903, Activity Determination and Waste Classification, Revision 7
- 12-THP-6010-RPP-904, High Integrity Containers, Revision 6
- 12-THP-6010-RPP-906, Processing Wet Radioactive Wastes, Revision 3
- 12-THP-6010-RPP-909, Filter Packaging, Revision 4
- 12-THP-6010-RPP-911, Cask Handling for Radioactive Shipments, Revision 6
- 12THP-6010-RPP-913, Scaling Factor Determination, Revision 5
- 12-THP-6010-RPP-915, Setup and Operation of Energy Solutions Self Engaging Dewatering System Fillhead, Revision 7
- 12-THP-6010-TPP-902, Dewatering of High Integrity Containers, Revision 5
- AR-2016-0642, At the Crane Bay 609' Performance Assurance Audit Team Observed that Radwaste Sealand Shipping Container was Found Unlocked, January 13, 2016
- AR-2016-0834, Audit Team Observed that there was no Continuous Air Sampler Installed Inside the Radioactive Material Building, January 21, 2016
- AR-2016-8066, Streamlining of the Material Accountability Program, Currently there were Several Documents and Difficult to Piece Together, July 11, 2016
- AR-2016-8863, RP Survey Missed Procedural Steps for Alpha Contaminations on Empty Containers, August 2, 2016
- AR-2017-1889, Licensee Identified Violation Associated Under Classified Shipment of a Package going to a Waste Processor from Class C to Class A Stable, was Identified and Reported, February 16, 2017
- D.C. Cook Plant 2014 10 CFR61 Scaling Factor Report, DW James Consulting LLC
- D.C. Cook Plant 2015 10 CFR61 Scaling Factor Report, DW James Consulting LLC
- DCC15-081, Spent Resin Shipped to Bear Creek, UN3321: LSAIL, RQ, RAM, LSAIL, August 26, 2015
- DCC16-003, Dry Active Waste (DAW) in a Metal Box to Unitech Services, Oakridge TN, UN3321, RAM, LSAIL, January 25, 2017
- DCC16-067, Spent Resin to Erwin Resin Solution LLC, UN3321, LSAIL, RQ, RAM, LSAIL, August 25, 2016

- DCC16-074, Type B Shipment to Alaron Nuclear Services, UN2916 Type B(U) Package, Fissile Excepted Shielded Shipping Cask Type A Quantities, September 15, 2016
- DCC16-104, Two Pactec Bags in Shipping Cask, Class AU, UN3321, RAM, LSAll, November 29, 2016
- DCC16-107, Two Pactec Bags in Shipping Cask, RAM, UN3321, SAll, December 12, 2016
- DCC16-111, Surface Contaminated Objects (SCO) of Two Sealands to Westing House, UN2913, RAM, SCOII, December 19, 2016
- DCC16-112, Five Boxes to Westing House, UN2913, RAM, SCOII, December 16, 2016
- EC-0000054228, Fast Track Modification for the Removal of Components Associated with Spent Resin and Evaporator Bottoms at Drumming Station, these are Abandoned Equipment, these are Abandoned Equipment that Needs to be Removed per Engineering Configuration Change
- Energy Solution Certificate of Compliance for Radioactive Material Packaging Model Type 8-120B Cask
- PCP-900, Radioactive Waste Process Control Program
- PMP-6010-RPP-301, Control of Material in a Restricted Area, Revision 30
- PMP-6-10-PCP-900, Radioactive Waste Process Control Program, Revision 13

#### 40A1 Performance Indicator Verification

- AEP-NRC-2016-86, D. C. Cook Monthly Operating
- AR 2016-7865, Unit 2 Right MSR Expansion Joint Failure, July 6, 2016
- AR 2016-8468, Unit 2 Power Reduction due to Grid Conditions, July 21, 2016
- LER 05000316-2016-001-01, Manual Reactor Trip Due to Moisture Separator Heater Expansion Joint Failure, Revision 1
- Report, October 8, 2016
- Selected Logs 1 January 2016 thru 31 December 2016

#### 40A2 Identification and Resolution of Problems

- 12-EHP-5043-CDG-001, Commercial Grade Dedication, Revision 14
- AR 2014-4794, Commercial Grad Dedication Aspects AR 2013-1347, April 15, 2014
- AR 2016-14625, Crack on 1AB Emergency Diesel Generator (EDG) Injection Pump Delivery Valve Holder (DVH), December 21, 2016
- AR 2017-1993, WR for EDG Fuel Injection Pump Replacement, February 17, 2017
- AR 2017-3128, Missed Requirement in CDG-001, March 22, 2017
- AR-2013-16004, 1-AB EDG Fuel Injection Pump 3F, October 21, 2013
- AR-2014-7605, Nonconforming Material and Equipment Segregation, June 26, 2014
- NRC Inspection Report Violation NCV 05000315/2014003-01, 05000316/2014003-01, Failure to Control Nonconforming Delivery Valve Holders on EDGs, August 11, 2014
- PMP-7030-CAP-002, Condition Action and Closure, Revision 26

#### 40A3 Follow-Up of Events and Notices of Enforcement Discretion

- AR 2016-8248, Failed Surveillance 1-OHP-4030-112-015 Due to Rod K-14, July 15, 2016
- AR 2017-11204, NRV-151 Operability with Dual Unit Loop, August 26, 2015
- AR 2017-1275, NRC Identified Issue with FIP Documentation, February 1, 2017
- LER 05000315-2015-002-02, Technical Specification Violation Due to Inoperable Residual Heat Removal Pump
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## LIST OF ACRONYMS USED

ADAMS	Agencywide Document Access Management System
AFW	Auxiliary Feedwater
AR	Action Request
CAP	Corrective Action Program
CCW	Component Cooling Water
CFR	<i>Code of Federal Regulations</i>
CGD	Commercial Grade Dedication
DVH	Delivery Valve Holder
EDG	Emergency Diesel Generator
ESW	Essential Service Water
HRA	High Radiation Area
IEEE	Institute of Electrical and Electronics Engineers
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Inspection Report
LCO	Limiting Condition for Operation
LER	Licensee Event Report
NARPI	Nick's Analog Rod Position Indication
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
OPC	Open Phase Condition
PARS	Publicly Available Records System
PI	Performance Indicator
PM	Post-Maintenance
PMT	Post-Maintenance Test
PORV	Power Operated Relief Valve
RAT	Reserve Auxiliary Transformer
RG	Regulatory Guide
RP	Radiation Protection
RWP	Radiation Work Permit
SSC	Structures, Systems, and Components
TI	Temporary Instruction
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
WO	Work Order