



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION IV  
1600 E. LAMAR BLVD  
ARLINGTON, TX 76011-4511

February 12, 2018

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

**SUBJECT: COOPER NUCLEAR STATION – NRC INTEGRATED INSPECTION REPORT  
05000298/2017004**

Dear Mr. Dent:

On December 31, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Cooper Nuclear Station. On January 12, 2018, the NRC inspectors discussed the results of this inspection with you and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented three findings of very low safety significance (Green) in this report. Two of these findings involved violations of NRC requirements. Further, inspectors documented a licensee-identified violation, which was determined to be of very low safety significance, in this report. The NRC is treating these violations as non-cited violations (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 the Regional Administrator, Region IV; the Director, Office of Enforcement; and the NRC resident inspector at the Cooper Nuclear Station.

If you disagree with a cross-cutting aspect assignment or a finding not associated with a regulatory requirement in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region IV; and the NRC resident inspector at the Cooper Nuclear Station.

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

Sincerely,

*/RA/*

Jason Kozal, Branch Chief  
Project Branch C  
Division of Reactor Projects

Docket No. 50-298  
License No. DPR-46

Enclosure:  
Inspection Report 05000298/2017004  
w/ Attachments:  
1. Supplemental Information  
2. Public Radiation Safety Inspection Request for  
Information  
3. NRC Request for Information

COOPER NUCLEAR STATION – NRC INTEGRATED INSPECTION REPORT  
05000298/2017004 – February 12, 2018

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**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION IV**

Docket: 05000298  
License: DPR-46  
Report: 05000298/2017004  
Licensee: Nebraska Public Power District  
Facility: Cooper Nuclear Station  
Location: 72676 648A Ave  
Brownville, NE  
Dates: October 1 through December 31, 2017  
Inspectors: P. Voss, Senior Resident Inspector  
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J. O'Donnell, CHP, Health Physicist  
Approved By: Jason Kozal  
Chief, Project Branch C  
Division of Reactor Projects

Enclosure

## SUMMARY

IR 05000298/2017004; 10/01/2017 – 12/31/2017; Cooper Nuclear Station; Maintenance Risk Assessments and Emergent Work Control, Problem Identification and Resolution, Followup of Events and Notices of Enforcement Discretion.

The inspection activities described in this report were performed between October 1 and December 31, 2017, by the resident inspectors at Cooper Nuclear Station and inspectors from the NRC's Region IV office. Three findings of very low safety significance (Green) are documented in this report. Two of these findings involved violations of NRC requirements. Additionally, NRC inspectors documented in this report one licensee-identified violation of very low safety significance. The significance of inspection findings is indicated by their color (i.e., Green, greater than Green, White, Yellow, or Red), determined using Inspection Manual Chapter 0609, "Significance Determination Process," dated April 29, 2015. Their cross-cutting aspects are determined using Inspection Manual Chapter 0310, "Aspects within the Cross-Cutting Areas," dated December 4, 2014. Violations of NRC requirements are dispositioned in accordance with the NRC Enforcement Policy. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," dated July 2016.

### Cornerstone: Initiating Events

- Green. The inspectors identified a non-cited violation of License Condition 2.F for the licensee's failure to implement a program in accordance with Cooper Nuclear Station License Renewal Commitment NLS2008071-14. Specifically, on September 27, 2017, the licensee failed to implement their metal-enclosed bus inspection program when maintenance personnel did not take corrective action to repair unacceptable visual indications of surface anomalies indicative of insulation degradation on the startup station service transformer X-winding bus. In particular, the licensee restored the bus to service without repairing corona-related insulation degradation, despite experiencing an emergency transformer bus fault a few months earlier due to the same failure mechanism. Corrective actions to restore compliance included the revision of metal-enclosed bus inspection procedures to provide clearer corona-related inspection criteria and an action to modify the startup station service transformer bus insulation to reduce or eliminate factors that led to the corona degradation. The licensee entered this issue into the corrective action program as Condition Reports CR-CNS-2018-00156 and CR-CNS-2017-00223.

The licensee's failure to implement the metal-enclosed bus inspection license renewal program in accordance with License Condition 2.F was a performance deficiency. The performance deficiency was determined to be more than minor, and therefore a finding, because it was associated with the equipment performance attribute of the Initiating Events Cornerstone, and affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown, as well as power, operations. Specifically, the licensee's failure to repair corona-related insulation degradation on the startup station service transformer X-winding bus resulted in an increased likelihood of a loss of offsite power over the course of the bus's 10-year preventive maintenance cycle. Using Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012, the inspectors determined that the finding was of very low safety significance (Green) because it did not involve the complete or partial loss of a support system that contributes to the likelihood of, or causes, an initiating event and did not affect mitigation equipment. The

performance deficiency had a cross-cutting aspect in the area of human performance associated with conservative bias, because the station failed to use decision-making practices that emphasized prudent choices over those that were simply allowable, and failed to ensure proposed actions were determined to be safe in order to proceed rather than unsafe in order to stop when performing startup station service transformer bus inspections [H.14]. (Section 4OA2)

- Green. The inspectors reviewed a self-revealed finding for the licensee's failure to implement Administration Procedure 0.9, "Tagout," Revision 89, during planned maintenance on the main generator carbon dioxide purge line. Specifically, on November 14, 2017, when breaching the main generator carbon dioxide purge line, maintenance personnel discovered that the clearance order did not adequately depressurize the work boundary, resulting in a hydrogen leak and declaration of a Notification of Unusual Event. Corrective actions included installing a housekeeping patch on the breached piping; monitoring for hydrogen in the vicinity of the pipe; and requiring that zero energy checks be performed for all clearance orders in order to ensure the isolation boundary is properly established. The licensee entered this deficiency into the corrective action program as Condition Report CR-CNS-2017-06745.

The licensee's failure to implement Administration Procedure 0.9 was a performance deficiency. The performance deficiency was determined to be more than minor, and therefore a finding, because it was associated with the configuration control attribute of the Initiating Events Cornerstone and adversely affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, the hydrogen leak resulted in a slow depressurization of the main generator, which increased the likelihood of tripping the turbine. Using Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012, the inspectors determined that the finding had very low safety significance (Green) because it did not cause a reactor trip and the loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition. The finding had a cross-cutting aspect in the area of human performance associated with avoid complacency, because the licensee did not recognize and plan for the possibility of mistakes, latent issues, and inherent risk, even while expecting successful outcomes. Specifically, the licensee did not recognize and plan for the inherent risk of performing this maintenance online with only one valve separating the work location from a pressurized source of hydrogen [H.12]. (Section 4OA3)

### **Cornerstone: Barrier Integrity**

- Green. The inspectors identified a non-cited violation of Technical Specification 5.4.1.a, for the licensee's failure to maintain Maintenance Procedure 7.4.32, "Work Over, Near, or In Reactor Vessel, Dryer/Separator Storage Pool, or Spent Fuel Storage Pool," Revision 17, for storage of tri-nuclear vacuums. Specifically, prior to October 23, 2017, the licensee failed to maintain Procedure 7.4.32 with the tri-nuclear vacuum storage restrictions identified in Engineering Evaluation 11-008, "Evaluation of the Placement and Storage of Tri Nuclear Corporation Model UF-600 Underwater Filter Unit and Model UFV-260 Underwater Filter/Vacuum Unit within the Spent Fuel Pool," Revision 0. As a result, a tri-nuclear vacuum was stored in a prohibited location in the spent fuel pool until it tipped over onto a fuel storage rack containing fuel assemblies after being bumped during refuel bridge manipulations. It remained on the fuel rack for approximately 2 days, another prohibited

location, during development of recovery plans. Corrective actions to restore compliance included revisions to the tri-nuclear vacuum retrieval plan to direct hanging the vacuum in an approved location at the spent fuel pool wall, inspection of the impacted fuel assemblies, and revision of Procedure 7.4.32 to include applicable storage requirements. Licensee inspection determined that there was no damage to the impacted fuel assemblies. The licensee entered this deficiency into the corrective action program as Condition Report CR-CNS-2017-06291.

The licensee's failure to maintain Maintenance Procedure 7.4.32 was a performance deficiency. The performance deficiency was more than minor, and therefore a finding, because it was associated with the configuration control attribute of the Barrier Integrity Cornerstone and adversely affected the cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. Specifically, inadequate configuration control resulted in a tri-nuclear vacuum falling onto fuel assemblies that were stored in spent fuel pool storage racks, thereby challenging the spent fuel pool and fuel cladding barriers. Using Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012, the inspectors determined the finding was of very low safety significance (Green) because the issue did not: (1) adversely affect decay heat removal capabilities from the spent fuel pool; (2) result from fuel handling errors, dropped fuel assembly, dropped storage cask, or crane operations over the spent fuel pool that caused mechanical damage to fuel clad AND a detectible release of radionuclides; (3) result in a loss of spent fuel pool water inventory; or (4) affect the spent fuel pool neutron absorber or fuel bundle placement. The finding had a cross-cutting aspect in the area of human performance associated with change management, because the licensee failed to use a systematic process for evaluating and implementing change so that nuclear safety remained the overriding priority. Specifically, the licensee failed to appropriately vet a 2016 procedure change that removed spent fuel pool storage requirements for certain types of tri-nuclear units and failed to ensure that appropriate procedure controls for similar tri-nuclear units existed [H.3]. (Section 1R13)

### **Licensee-Identified Violations**

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

## PLANT STATUS

Cooper Nuclear Station began the inspection period at full power. On November 3, 2017, the licensee performed a down power to 50 percent in order to perform condenser leak repairs, control rod drive work, and reactor recirculation system motor generator set tuning. The licensee restored power to 100 percent on November 6, 2017, where it remained for the remainder of the reporting period, except for minor reductions in power to support scheduled surveillances and rod pattern adjustments.

## REPORT DETAILS

### 1. REACTOR SAFETY

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

#### 1R01 Adverse Weather Protection (71111.01)

##### Readiness for Impending Adverse Weather Conditions

##### a. Inspection Scope

On December 21, 2017, the inspectors completed an inspection of the station's readiness for impending adverse weather conditions. The inspectors reviewed plant design features, the licensee's procedures to respond to cold temperatures, and the licensee's planned implementation of these procedures. The inspectors evaluated operator staffing and accessibility of controls and indications for those systems required to control the plant.

These activities constituted one sample of readiness for impending adverse weather conditions, as defined in Inspection Procedure 71111.01.

##### b. Findings

No findings were identified.

#### 1R04 Equipment Alignment (71111.04)

##### Partial Walk-Down

##### a. Inspection Scope

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

- October 12, 2017, residual heat removal service water train A
- October 27, 2017, residual heat removal service water train B
- December 20, 2017, Division 2 emergency diesel generator jacket water and starting air systems during Division 1 emergency diesel generator unplanned maintenance



The inspectors reviewed the licensee's procedures and system design information to determine the correct lineup for the systems. They visually verified that critical portions of the systems or trains were correctly aligned for the existing plant configuration.

These activities constituted three partial system walk-down samples, as defined in Inspection Procedure 71111.04.

b. Findings

No findings were identified.

**1R05 Fire Protection (71111.05)**

Quarterly Inspection

a. Inspection Scope

The inspectors evaluated the licensee's fire protection program for operational status and material condition. The inspectors focused their inspection on four plant areas important to safety:

- November 13, 2017, residual heat removal service water room/control building basement, Fire Area CB-A, Zone 7A
- November 13, 2017, emergency diesel generator 1 room and turbine building 903 feet, Fire Areas DG-A and TB-A, Zones 14A and 12D
- November 16, 2017, reactor building 903 feet elevation north, Fire Areas RB-FN and RB-CF, Zones 2A-1 and 2A
- November 20, 2017, traversing in-core probe room and reactor building 903 feet elevation south, Fire Areas RB-CF/DI and RB-DI, Zones 2A-3 and 2C

For each area, the inspectors evaluated the fire plan against defined hazards and defense-in-depth features in the licensee's fire protection program. The inspectors evaluated control of transient combustibles and ignition sources, fire detection and suppression systems, manual firefighting equipment and capability, passive fire protection features, and compensatory measures for degraded conditions.

These activities constituted four quarterly inspection samples, as defined in Inspection Procedure 71111.05.

b. Findings

No findings were identified.

## **1R06 Flood Protection Measures (71111.06)**

### a. Inspection Scope

On October 26, 2017, the inspectors completed an inspection of an underground bunker susceptible to flooding. The inspectors selected one underground bunker that contained risk-significant or multiple-train cables whose failure could disable risk-significant equipment:

- Manhole C3

The inspectors observed the material condition of the cables and splices contained in the bunker and looked for evidence of cable degradation due to water intrusion. The inspectors verified that the cables and vaults met design requirements.

These activities constituted completion of one bunker/manhole sample, as defined in Inspection Procedure 71111.06.

### b. Findings

No findings were identified.

## **1R11 Licensed Operator Requalification Program and Licensed Operator Performance (71111.11)**

### .1 Review of Licensed Operator Requalification

#### a. Inspection Scope

On October 17, 2017, the inspectors observed an evaluated simulator scenario performed by an operating crew. The inspectors assessed the performance of the operators and the evaluators' critique of their performance. The inspectors also assessed the modeling and performance of the simulator during the requalification activities.

These activities constituted completion of one quarterly licensed operator requalification program sample, as defined in Inspection Procedure 71111.11.

#### b. Findings

No findings were identified.

### .2 Review of Licensed Operator Performance

#### a. Inspection Scope

On November 4, 2017, the inspectors observed the performance of on-shift licensed operators in the plant's main control room. At the time of the observations, the plant was in a period of heightened activity and risk due to performance of a down power to 50 percent. The inspectors observed the operators' performance of the following activities:

- control rod manipulations, including the pre-job brief
- reactor protection system surveillance testing, including the pre-job brief
- rod sequence exchange, including the pre-job brief
- control rod drive 10-35 maintenance, including the pre-job brief

In addition, the inspectors assessed the operators' adherence to plant procedures, including the conduct of operations procedure and other operations department policies.

These activities constituted completion of one quarterly licensed operator performance sample, as defined in Inspection Procedure 71111.11.

b. Findings

No findings were identified.

.3 Biennial Review of Regualification Program

a. Inspection Scope

Every year, either an annual review or a biennial review is performed on the licensed operator regualification program. For 2017, the biennial review was completed and the annual review was performed as part of this review.

The licensed operator regualification program involves two training cycles that are conducted over a 2-year period. In the first cycle, the annual cycle, the operators are administered an operating test consisting of job performance measures and simulator scenarios. In the second part of the training cycle, the biennial cycle, operators are administered an operating test and a comprehensive written examination.

During the week of October 2, 2017, the inspectors reviewed both the written examination and operating test quality and observed licensee administration of an annual regualification test while onsite. The operating test observation included job performance measures and scenarios that were used in the current biennial regualification cycle. These observations allowed the inspectors to assess the licensee's effectiveness in conducting the operating test and to determine if feedback of operator performance was being accomplished.

On December 29, 2017, the licensee informed the inspectors of the completed cycle results for both the written examinations and the operating tests:

- 6 of 7 crews passed the simulator scenario portion of the operating test
- 39 of 41 licensed operators passed the simulator scenario portion of the operating test
- 41 of 41 licensed operators passed the job performance measure portion of the operating test
- 39 of 41 licensed operators passed the written examination

The individuals that failed a portion of the examination were remediated, retested, and passed their retake examinations. Three individuals were not examined due to enrollment in initial license training.

The inspectors observed examination security measures in place during administration of the examinations, reviewed medical records of licensed operators for conformance with operator license conditions, and reviewed simulator performance for fidelity with the actual plant and the overall simulator program of maintenance, testing, and discrepancy correction. The inspectors reviewed remedial training and re-examinations for licensed operators who did not pass a requalification examination.

These activities constituted completion of one inspection sample of the biennial licensed operator requalification program, as defined in Inspection Procedure 71111.11.

b. Findings

No findings were identified.

**1R12 Maintenance Effectiveness (71111.12)**

Routine Maintenance Effectiveness

a. Inspection Scope

The inspectors reviewed two instances of degraded performance or condition of safety-significant structures, systems, and components (SSCs):

- December 1, 2017, a(3) periodic assessment
- December 15, 2017, residual heat removal service water system performance

The inspectors reviewed the extent of condition of possible common cause SSC failures and evaluated the adequacy of the licensee's corrective actions. The inspectors reviewed the licensee's work practices to evaluate whether these may have played a role in the degradation of the SSCs. The inspectors assessed the licensee's characterization of the degradation in accordance with 10 CFR 50.65 (the Maintenance Rule), and verified that the licensee was appropriately tracking degraded performance and conditions in accordance with the Maintenance Rule.

These activities constituted completion of two maintenance effectiveness samples, as defined in Inspection Procedure 71111.12.

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors reviewed two risk assessments performed by the licensee prior to changes in plant configuration and the risk management actions taken by the licensee in response to elevated risk:

- October 16, 2017, residual heat removal service water pump C work window
- October 27, 2017, residual heat removal service water pump B work window

The inspectors verified that these risk assessments were performed timely and in accordance with the requirements of 10 CFR 50.65 (the Maintenance Rule) and plant procedures. The inspectors reviewed the accuracy and completeness of the licensee's risk assessments and verified that the licensee implemented appropriate risk management actions based on the results of the assessments.

The inspectors also observed portions of three emergent work activities that had the potential to cause an initiating event, to affect the functional capability of mitigating systems, or to impact barrier integrity:

- October 27, 2017, tri-nuclear vacuum inadvertently bumped onto fuel racks
- November 2, 2017, high pressure coolant injection valve MO-19 failed to close
- November 17, 2017, reactor recirculation system motor generator set B voltage and current oscillations

The inspectors verified that the licensee appropriately developed and followed a work plan for these activities. The inspectors verified that the licensee took precautions to minimize the impact of the work activities on unaffected SSCs.

These activities constituted completion of five maintenance risk assessments and emergent work control inspection samples, as defined in Inspection Procedure 71111.13.

b. Findings

Introduction. The inspectors identified a Green, non-cited violation of Technical Specification 5.4.1.a, for the licensee's failure to maintain Maintenance Procedure 7.4.32, "Work Over, Near, or In Reactor Vessel, Dryer/Separator Storage Pool, or Spent Fuel Storage Pool," Revision 17, for storage of tri-nuclear vacuums. Specifically, prior to October 23, 2017, the licensee failed to maintain Maintenance Procedure 7.4.32 with the tri-nuclear vacuum storage restrictions identified in Engineering Evaluation (EE) 11-008, "Evaluation of the Placement and Storage of Tri Nuclear Corporation Model UF-600 Underwater Filter Unit and Model UFV-260 Underwater Filter/Vacuum Unit within the Spent Fuel Pool," Revision 0.

Description. On October 23, 2017, the licensee was performing activities associated with transferring spent fuel assemblies from the spent fuel pool (SFP) into a dry shielded canister (DSC) in support of an ongoing Dry Fuel Storage campaign. At approximately 11:00 a.m., after unloading a fuel assembly into the canister, the refuel bridge mast inadvertently contacted a tri-nuclear (tri-nuc) vacuum that was staged on a seismic beam next to the DSC within the SFP. The bumped vacuum tipped over and landed on the top of fuel assemblies being stored in an adjacent fuel storage rack.

On October 24, 2017, at the 6:30 a.m. work planning turnover meeting, the inspectors discovered that the tri-nuc had been left resting on the impacted fuel assemblies and had still not yet been retrieved. Despite this, maintenance personnel stated that the

vacuum was in a safe condition. In addition, at that meeting, the inspectors observed maintenance personnel state that they had looked into whether the tri-nuc could be staged somewhere else during the DSC fuel moves, and they had concluded that there was only one engineering-evaluated location for the vacuum that had been approved for seismic reasons, and that the 'approved' location was the seismic beam that it had been sitting on when bumped. Maintenance personnel also stated that they had developed a plan to return the tri-nuc vacuum to its previous location on the beam. Following the meeting, the inspectors challenged maintenance and operations personnel on whether the vacuum was actually in a safe condition. Specifically, the inspectors asked: 1) whether there was only one seismically approved storage location for the vacuum in the SFP, and 2) if that location was the beam, how was the current condition of the vacuum sitting on the fuel assemblies considered a seismically safe condition. The inspectors also challenged the licensee on why an operability evaluation was not performed for the tri-nuc vacuum condition, and questioned operations personnel on whether they had involved engineering personnel when evaluating the condition. The licensee initiated Condition Reports CR-CNS-2017-06294, CR-CNS-2017-06291, and CR-CNS-2017-06353 for these concerns.

In response to these questions, operations personnel contacted design engineering personnel to seek their input on the seismic acceptability of the tri-nuc configuration. Following engineering review, the licensee and inspectors discovered that Engineering Evaluation EE 11-008, "Evaluation of the Placement and Storage of Tri Nuclear Corporation Model UF-600 Underwater Filter Unit and Model UFV-260 Underwater Filter/Vacuum Unit within the Spent Fuel Pool," Revision 0, specifically prohibited tri-nuc storage on either the fuel rack or the seismic beam in question. Specifically, EE 11-008 stated that it was "not acceptable to store the units on Fuel Racks," and it was "not acceptable to store the units on Seismic Beams" due to seismic and tipping concerns. Following discovery of the EE 11-008 restrictions, the licensee revised their tri-nuc recovery plan to direct placement of the tri-nuc in an approved location on the wall of the SFP, and performed tri-nuc recovery accordingly. The licensee performed visual inspections of the impacted fuel and did not identify any damage to the fuel assemblies.

During their review, the inspectors discovered that the EE 11-008 storage restrictions were not contained in Maintenance Procedure 7.4.32, "Work Over, Near, or In Reactor Vessel, Dryer/Separator Storage Pool, or Spent Fuel Storage Pool," Revision 17. Upon review of earlier revisions of the procedure, the inspectors found that tri-nuc demineralizer unit storage requirements had previously been included. Specifically, prior to July 21, 2016, Maintenance Procedure 7.4.32, Revision 14, and earlier revisions included Section 5.6.5, which described, "Approved storage areas for Tri-Nuclear demin units in the spent fuel pool." However, the licensee removed this section during Revision 15 of the procedure stating, "There are currently no Tri-Nuclear demin units in the spent fuel pool and CNS has stopped using them. Therefore, there is no need to discuss their storage." This change was made as a "non-intent change" and did not include an engineering review. The inspectors determined that removal of these tri-nuc demin unit storage requirements from the procedure provided a missed opportunity for the licensee to recognize that storage requirements for similar tri-nuc vacuum units were not contained within the procedure.

Analysis. The licensee's failure to maintain Maintenance Procedure 7.4.32 was a performance deficiency. The performance deficiency was more than minor, and therefore a finding, because it was associated with the configuration control attribute of

the Barrier Integrity Cornerstone and adversely affected the cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. Specifically, inadequate configuration control resulted in a tri-nuc vacuum falling onto fuel assemblies that were stored in SFP storage racks, thereby challenging the SFP and fuel cladding barriers. Using Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012, the inspectors determined the finding was of very low safety significance (Green) because the issue did not: (1) adversely affect decay heat removal capabilities from the SFP; (2) result from fuel handling errors, dropped fuel assembly, dropped storage cask, or crane operations over the SFP that caused mechanical damage to fuel clad AND a detectible release of radionuclides; (3) result in a loss of SFP water inventory; or (4) affect the SFP neutron absorber or fuel bundle placement. The finding had a cross-cutting aspect in the area of human performance associated with change management, because the licensee failed to use a systematic process for evaluating and implementing change so that nuclear safety remained the overriding priority. Specifically, the licensee failed to appropriately scrutinize a 2016 procedure change that removed spent fuel pool storage requirements for certain types of tri-nuc units and failed to ensure that appropriate procedure controls for similar tri-nuc units existed [H.3].

Enforcement. Technical Specification 5.4.1.a, requires, in part, that procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Appendix A of Regulatory Guide 1.33, Revision 2. Section 9.a of Appendix A to Regulatory Guide 1.33, Revision 2, requires, "Procedures for Performing Maintenance." The licensee established Maintenance Procedure 7.4.32, "Work Over, Near, or In Reactor Vessel, Dryer/Separator Storage Pool, or Spent Fuel Storage Pool," Revision 17, to meet the Regulatory Guide 1.33 requirement. Contrary to the above, prior to October 23, 2017, the licensee failed to maintain adequate written procedures covering the applicable procedures recommended in Appendix A of Regulatory Guide 1.33, Revision 2. Specifically, the licensee failed to maintain Maintenance Procedure 7.4.32 with the tri-nuc vacuum storage restrictions identified in EE 11-008, "Evaluation of the Placement and Storage of Tri Nuclear Corporation Model UF-600 Underwater Filter Unit and Model UFV-260 Underwater Filter/Vacuum Unit within the Spent Fuel Pool," Revision 0. As a result, a tri-nuc vacuum was stored in a prohibited location in the SFP until it tipped over onto a fuel storage rack after being bumped during refuel bridge manipulations. It remained on the fuel rack for approximately 2 days, another prohibited location, during development of recovery plans. Corrective actions to restore compliance included revisions to the tri-nuc vacuum retrieval plan to direct hanging the vacuum in an approved location at the SFP wall, inspection of the impacted fuel assemblies, and revision of Maintenance Procedure 7.4.32, to include applicable storage requirements. Because this violation was of very low safety significance (Green) and was entered into the licensee's corrective action program as Condition Report CR-CNS-2017-06291, this violation is being treated as a non-cited violation (NCV) in accordance with Section 2.3.2.a of the NRC Enforcement Policy. (NCV 05000298/2017004-01, "Failure to Maintain Procedure for Storage of Material in the Spent Fuel Pool")

## **1R15 Operability Determinations and Functionality Assessments (71111.15)**

### **a. Inspection Scope**

The inspectors reviewed two operability determinations that the licensee performed for degraded or nonconforming SSCs:

- December 22, 2017, operability determination of the residual heat removal service water room cooler leakage
- November 30, 2017, operability determination of CRD-V-107 (hydraulic control unit 14-27) valve seat leakage

The inspectors reviewed the timeliness and technical adequacy of the licensee's evaluations. Where the licensee determined the degraded SSC to be operable, the inspectors verified that the licensee's compensatory measures were appropriate to provide reasonable assurance of operability. The inspectors verified that the licensee had considered the effect of other degraded conditions on the operability of the degraded SSC.

On November 2, 2017, the inspectors reviewed operator actions taken or planned to compensate for degraded or nonconforming conditions. The inspectors verified that the licensee effectively managed these operator workarounds to prevent adverse effects on the function of mitigating systems and to minimize their impact on the operators' ability to implement abnormal and emergency operating procedures.

These activities constituted completion of three operability review samples, as defined in Inspection Procedure 71111.15.

### **b. Findings**

No findings were identified.

## **1R19 Post-Maintenance Testing (71111.19)**

### **a. Inspection Scope**

The inspectors reviewed four post-maintenance testing activities that affected risk-significant SSCs:

- October 13, 2017, residual heat removal service water pump C
- October 27, 2017, residual heat removal service water pump B
- November 3, 2017, control rod 10-35
- November 5, 2017, reactor recirculation motor generator set B

The inspectors reviewed licensing- and design-basis documents for the SSCs and the maintenance and post-maintenance test procedures. The inspectors observed the performance of the post-maintenance tests to verify that the licensee performed the tests in accordance with approved procedures, satisfied the established acceptance criteria, and restored the operability of the affected SSCs.



These activities constituted completion of four post-maintenance testing inspection samples, as defined in Inspection Procedure 71111.19.

b. Findings

No findings were identified.

**1R22 Surveillance Testing (71111.22)**

a. Inspection Scope

The inspectors observed three risk-significant surveillance tests and reviewed test results to verify that these tests adequately demonstrated that the SSCs were capable of performing their safety functions:

In-service tests:

- October 13, 2017, residual heat removal service water system, Division II

Reactor coolant system leak detection tests:

- December 18, 2017, reactor coolant system unidentified leakage instrumentation testing

Other surveillance tests:

- November 4, 2017, control rod testing

The inspectors verified that these tests met technical specification requirements, that the licensee performed the tests in accordance with their procedures, and that the results of the tests satisfied appropriate acceptance criteria. The inspectors verified that the licensee restored the operability of the affected SSCs following testing.

These activities constituted completion of three surveillance testing inspection samples, as defined in Inspection Procedure 71111.22.

b. Findings

No findings were identified.

**Cornerstone: Emergency Preparedness**

**1EP4 Emergency Action Level and Emergency Plan Changes (71114.04)**

a. Inspection Scope

The inspectors performed an in-office review of Emergency Plan Implementing Procedure 5.7.1, "Emergency Classification," Revision 58, submitted by the licensee on July 18, 2017. This revision added a note describing the safety systems to which emergency action levels applied to seven emergency action levels in the Hazards and Other Conditions Affecting Plant Safety recognition category.

This revision was compared to its previous revision, to the criteria of NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," Revision 1, to Nuclear Energy Institute Report 99-01, "Emergency Action Level Methodology," Revision 5, and to the standards in 10 CFR 50.47(b) to determine if the revision adequately implemented the requirements of 10 CFR 50.54(q)(3) and 50.54(q)(4). The inspector verified that the revisions did not reduce the effectiveness of the emergency plan. This review was not documented in a safety evaluation report and did not constitute approval of licensee-generated changes; therefore, this revision is subject to future inspection.

These activities constituted completion of one emergency action level and emergency plan changes sample, as defined in Inspection Procedure 71114.04.

b. Findings

No findings were identified.

**1EP6 Drill Evaluation (71114.06)**

Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors observed an emergency preparedness drill on October 17, 2017, to verify the adequacy and capability of the licensee's assessment of drill performance. The inspectors reviewed the drill scenario, observed the drill from the technical support center and the simulator, and attended the post-drill critique. The inspectors verified that the licensee's emergency classifications, off-site notifications, and protective action recommendations were appropriate and timely. The inspectors verified that any emergency preparedness weaknesses were appropriately identified by the licensee in the post-drill critique and entered into the corrective action program for resolution.

These activities constituted completion of one emergency preparedness drill observation sample, as defined in Inspection Procedure 71114.06.

b. Findings

No findings were identified.

**2. RADIATION SAFETY**

**Cornerstones: Public Radiation Safety and Occupational Radiation Safety**

**2RS5 Radiation Monitoring Instrumentation (71124.05)**

a. Inspection Scope

The inspectors evaluated the accuracy and operability of the radiation monitoring equipment used by the licensee to monitor areas, materials, and workers to ensure a radiologically safe work environment. This evaluation included equipment used to monitor radiological conditions related to normal plant operations, anticipated operational occurrences, and conditions resulting from postulated accidents. The inspectors

interviewed licensee personnel, walked down various portions of the plant, and reviewed licensee performance associated with radiation monitoring instrumentation, as described below:

- The inspectors performed walk-downs and observations of selected plant radiation monitoring equipment and instrumentation, including portable survey instruments, area radiation monitors, continuous air monitors, personnel contamination monitors, portal monitors, and small article monitors. The inspectors assessed material condition and operability, evaluated positioning of instruments relative to the radiation sources or areas they were intended to monitor, and verified performance of source checks and calibrations.
- The inspectors evaluated the calibration and testing program, including laboratory instrumentation, whole body counters, post-accident monitoring instrumentation, portal monitors, personnel contamination monitors, small article monitors, portable survey instruments, area radiation monitors, electronic dosimetry, air samplers, and continuous air monitors.
- The inspectors assessed problem identification and resolution for radiation monitoring instrumentation. The inspectors reviewed audits, self-assessments, and corrective action program documents to verify problems were being identified and properly addressed for resolution.

These activities constituted completion of the three required samples of radiation monitoring instrumentation, as defined in Inspection Procedure 71124.05.

b. Findings

No findings were identified.

**2RS6 Radioactive Gaseous and Liquid Effluent Treatment (71124.06)**

a. Inspection Scope

The inspectors evaluated whether the licensee maintained gaseous and liquid effluent processing systems and properly mitigated, monitored, and evaluated radiological discharges with respect to public exposure. The inspectors verified that abnormal radioactive gaseous or liquid discharges and conditions, when effluent radiation monitors are out-of-service, were controlled in accordance with the applicable regulatory requirements and licensee procedures. The inspectors verified that the licensee's quality control program ensured radioactive effluent sampling and analysis adequately quantified and evaluated discharges of radioactive materials. The inspectors verified the adequacy of public dose projections resulting from radioactive effluent discharges. The inspectors interviewed licensee personnel and reviewed licensee performance in the following areas:

- During walk-downs and observations of selected portions of the radioactive gaseous and liquid effluent equipment, the inspectors evaluated routine processing and discharge of effluents, including sample collection and analysis. The inspectors observed equipment configuration and flow paths of selected gaseous and liquid discharge system components, effluent monitoring systems,

filtered ventilation system material condition, and significant changes to effluent release points.

- Calibration and testing program for process and effluent monitors, including National Institute of Standards and Technology (NIST) traceability of sources, primary and secondary calibration data, channel calibrations, set-point determination bases, and surveillance test results.
- Sampling and analysis controls used to ensure representative sampling and appropriate compensatory sampling. Reviews included results of the inter-laboratory comparison program.
- Instrumentation and equipment, including effluent flow measuring instruments, air cleaning systems, and post-accident effluent monitoring instruments.
- Dose calculations for effluent releases. The inspectors reviewed a selection of radioactive liquid and gaseous waste discharge permits and abnormal gaseous or liquid tank discharges, and verified the projected doses were accurate. The inspectors also reviewed 10 CFR Part 61 analyses and methods used to determine which isotopes were included in the source term. The inspectors reviewed land use census results, offsite dose calculation manual changes, and significant changes in reported dose values from previous years.
- Problem identification and resolution for radioactive gaseous and liquid effluent treatment. The inspectors reviewed audits, self-assessments, and corrective action program documents to verify problems were being identified and properly addressed for resolution.

These activities constituted completion of the six required samples of the radioactive gaseous and liquid effluent treatment program, as defined in Inspection Procedure 71124.06.

b. Findings

No findings were identified.

**2RS7 Radiological Environmental Monitoring Program (71124.07)**

a. Inspection Scope

The inspectors evaluated whether the licensee's radiological environmental monitoring program quantified the impact of radioactive effluent releases to the environment and sufficiently validated the integrity of the radioactive gaseous and liquid effluent release program. The inspectors also verified that the licensee continued to implement the voluntary Nuclear Energy Institute/Industry Ground Water Protection Initiative. The inspectors reviewed or observed the following items:

- The inspectors observed selected air sampling and dosimeter monitoring stations, sampler station modifications, and the collection and preparation of environmental samples. The inspectors reviewed calibration and maintenance records for selected air samplers, composite water samplers, and environmental sample radiation measurement instrumentation, and inter-laboratory comparison

program results. The inspectors reviewed selected events documented in the annual environmental monitoring report and significant changes made by the licensee to the offsite dose calculation manual as the result of changes to the land census. The inspectors evaluated the operability, calibration, and maintenance of meteorological instruments and assessed the meteorological dispersion and deposition factors. The inspectors verified the licensee had implemented a sampling and monitoring program sufficient to detect leakage from structures, systems, or components with credible mechanism for licensed material to reach ground water and reviewed changes to the licensee's written program for identifying and controlling contaminated spills/leaks to groundwater.

- Groundwater protection initiative implementation, including assessment of groundwater monitoring results, identified leakage or spill events and entries made into 10 CFR 50.75 (g) records, licensee evaluations of the extent of the contamination and the radiological source term, and reports of events associated with spills, leaks, and groundwater monitoring results.
- Problem identification and resolution for the radiological environmental monitoring program. The inspectors reviewed audits, self-assessments, and corrective action program documents to verify problems were being identified and properly addressed for resolution.

These activities constituted completion of the three required samples of the radiological environmental monitoring program, as defined in Inspection Procedure 71124.07.

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors evaluated the effectiveness of the licensee's programs for processing, handling, storage, and transportation of radioactive material. The inspectors interviewed licensee personnel and reviewed the following items:

- Radioactive material storage, including waste storage areas including container labeling/markings and monitoring containers for deformation or signs of waste decomposition.
- Radioactive waste system, including walk-downs of the accessible portions of the radioactive waste processing systems and handling equipment. The inspectors also reviewed or observed changes made to the radioactive waste processing systems, methods for dewatering and waste stabilization, waste stream mixing methodology, and waste processing equipment that was not operational or abandoned in place.
- Waste characterization and classification, including radio-chemical sample analysis results for radioactive waste streams and use of scaling factors and

calculations to account for difficult-to-measure radionuclides, and processes for waste classification including use of scaling factors and 10 CFR Part 61 analyses.

- Shipment preparation, including packaging, surveying, labeling, marking, placarding, vehicle checking, driver instructing, and preparation of the disposal manifests.
- Shipping records for low specific activity (LSA) II, Type A, or Type B radioactive material or radioactive waste shipments.
- Problem identification and resolution for radioactive solid waste processing and radioactive material handling, storage, and transportation. The inspectors reviewed audits, self-assessments, and corrective action program documents to verify problems were being identified and properly addressed for resolution.

These activities constituted completion of the six required samples of the radioactive solid waste processing, and radioactive material handling, storage, and transportation program, as defined in Inspection Procedure 71124.08.

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)**

Mitigating Systems Performance Index: Emergency AC Power Systems (MS06), High Pressure Injection Systems (MS07), Heat Removal Systems (MS08), Residual Heat Removal Systems (MS09), and Cooling Water Systems (MS10)

a. Inspection Scope

The inspectors reviewed the licensee's mitigating system performance index data for the period of October 1, 2016, through September 30, 2017, to verify the accuracy and completeness of the reported data. The inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the reported data.

These activities constituted verification of the mitigating system performance index for emergency ac power systems, high pressure injection systems, heat removal systems, residual heat removal systems, and cooling water support systems, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

**40A2 Problem Identification and Resolution (71152)**

.1 Routine Review

a. Inspection Scope

Throughout the inspection period, the inspectors performed daily reviews of items entered into the licensee's corrective action program and periodically attended the licensee's condition report screening meetings. The inspectors verified that licensee personnel were identifying problems at an appropriate threshold and entering these problems into the corrective action program for resolution. The inspectors verified that the licensee developed and implemented corrective actions commensurate with the significance of the problems identified. The inspectors also reviewed the licensee's problem identification and resolution activities during the performance of the other inspection activities documented in this report.

b. Findings

No findings were identified.

.2 Semiannual Trend Review

a. Inspection Scope

The inspectors reviewed the licensee's corrective action program, performance indicators, system health reports, licensee Excellence Plans, and other documentation to identify trends that might indicate the existence of a more significant safety issue. The inspectors verified that the licensee was taking corrective actions to address identified adverse trends. The inspectors did not review the licensee's progress in addressing an existing cross-cutting theme because none existed.

These activities constituted completion of one semiannual trend review sample, as defined in Inspection Procedure 71152.

b. Observations and Assessments

The inspectors reviewed ongoing trends in the areas of Operations performance, focused especially on configuration control; site-wide risk recognition and mitigation; and other performance gaps in the area of human performance. The inspectors noted that the licensee had initiated actions to address and arrest these trends. However, the inspectors concluded that although some progress had been made, the human performance trends continued to be themes in the licensee's performance.

In particular, during the inspection period, the licensee experienced challenges with a tri-nuclear vacuum cleaner stored in the spent fuel pool; work activities that led to a hydrogen leak and emergency plan Notification of Unusual Event; inspection of startup transformer bus ducts; and deficient light sockets installed in both divisions of diesel generators; among several other lower level issues. The inspectors observed that

during the inspection period, the licensee initiated Condition Report CR-CNS-2017-06873, which documented eight instances over the previous 12 months where a lack of positive control of work activities resulted in unintended plant consequences. The licensee closed this condition report with an action to address the trend under the root cause evaluation contained in Condition Report CR-CNS-2017-06745. The root cause evaluation was being performed to evaluate the licensee's entry into the Notification of Unusual Event, and was still in progress at the end of the inspection period. The inspectors concluded that these ongoing performance challenges illustrated that additional corrective actions were required in the areas of risk recognition and configuration control.

c. Findings

No findings were identified.

.3 Annual Follow-up of Selected Issues

a. Inspection Scope

The inspectors selected one issue for an in-depth follow-up:

- December 22, 2017, startup station service transformer bus license renewal inspection following an emergency station service transformer fault

The inspectors assessed the licensee's problem identification threshold, cause analyses, extent of condition reviews and compensatory actions. The inspectors verified that the licensee appropriately prioritized the planned corrective actions and that these actions were adequate to correct the condition.

These activities constituted completion of one annual follow-up sample, as defined in Inspection Procedure 71152.

b. Findings

Introduction. The inspectors identified a Green, non-cited violation of License Condition 2.F for the licensee's failure to implement a program in accordance with Cooper Nuclear Station (CNS) License Renewal Commitment NLS2008071-14. Specifically, on September 27, 2017, the licensee failed to implement their metal-enclosed bus inspection program when maintenance personnel did not take corrective action to repair unacceptable visual indications of surface anomalies indicative of insulation degradation on the startup station service transformer (SSST) X-winding bus.

Description. During the week of September 25, 2017, the inspectors observed licensee inspections of nonsegregated buses associated with the SSST-X and Y windings. These inspections were performed as part of a 10-year license renewal preventive maintenance (PM) commitment, Commitment NLS2008071-14, since the licensee has entered their license renewal period of extended operation. Maintenance and engineering personnel used Maintenance Procedure 7.3.41, "Examination and High Pot Testing of Non-Segregated Buses and Associated Equipment," Revision 13, to perform these inspection and testing activities. During NRC observation of the inspection, the inspectors noted that there were several locations where corona-related insulation



degradation was present. In particular, in one horizontal section of the X-winding bus bars, there were several spots on the bus insulation where the bus interfaced with a support bar which had indications of corona degradation. This degradation included white conductive corona deposits which had tracked from the top to the bottom of the bus bars, and several ¼-inch to 2-inch diameter black and white spots where the insulation appeared to have degraded. After cleaning the white deposits, maintenance personnel decided not to perform repairs on the degraded insulation and restored the bus duct.

The inspectors challenged maintenance personnel, system engineering personnel, and the outage control center that was controlling the work activities on why they weren't repairing the insulation damage, especially when considering that the site had experienced a phase to phase fault on the emergency transformer bus a few months earlier due to the same failure mechanism. In response to NRC questions, the licensee concluded that the damage was minor based in part on an evaluation performed in 2005, and in part on the fact that high potential testing was successfully performed at the end of the work window. The licensee determined that these factors demonstrated that the bus would remain serviceable until the next scheduled bus inspection, which was scheduled for 2027. As a result, the licensee placed the bus back in service.

The inspectors performed a review of the station's license renewal requirements and commitments for the buses in question. The inspectors determined the following requirements were applicable:

- License Condition 2.F states, in part, "The Updated Safety Analysis Report (USAR) supplement, as revised, describes certain future activities to be completed prior to and/or during the period of extended operation. The licensee shall complete these activities in accordance with Appendix A of NUREG-1944, "Safety Evaluation Report Related to the License Renewal of Cooper Nuclear Station," dated October 2010, as supplemented by letters from the licensee to the NRC dated November 15 and 18, 2010."
- NUREG-1944, Appendix A, "CNS License Renewal Commitments," states, "Implement the Metal-Enclosed Bus (MEB) Inspection Program, USAR Supplement Section A.1.1.22/License Renewal Application Section B.1.22."
- USAR Supplement Section A.1.1.22, License Renewal Application Section B.1.22, and License Renewal Commitment NLS2008071-14 in the CNS USAR describe the MEB Inspection Program and state, in part, "this new program will be implemented consistent with the corresponding program described in NUREG-1801, "Generic Aging Lessons Learned (GALL) Report," Section XI.E4, Metal-Enclosed Bus."
- NUREG-1801, Section XI.E4, "Metal-Enclosed Bus," describes the MEB inspection program, and Section 6, "Acceptance Criteria," states, "MEBs are to be free from unacceptable visual indications of surface anomalies, which suggest that conductor insulation degradation exists. In addition no unacceptable indication of corrosion, cracks, foreign debris, excessive dust buildup or evidence of moisture intrusion is to exist. An unacceptable indication is defined as a noted condition or situation that, if left unmanaged, could lead to a loss of intended function." In addition, Section 7, "Corrective Actions," states, "Further

investigation and evaluation are performed when the acceptance criteria are not met. Corrective actions may include but are not limited to cleaning, drying, increased inspection frequency, replacement, or repair of the affected MEB components.”

Following their assessment, the inspectors engaged senior plant management to discuss their concerns. The inspectors emphasized that the station’s evaluation focused on measures that evaluated and tested the function of the bus in its existing state, but did not predict the timeline and degradation patterns that would be seen in the future, over the course of the 10-year PM cycle. Upon further review, the licensee determined that additional preventive actions were necessary, and the station initiated corrective actions to drive modification of the SSST bus insulation to reduce or eliminate factors that led to the corona degradation. The licensee generated Condition Reports CR-CNS-2017-05802, CR-CNS-2017-05788, CR-CNS-2017-00223, and CR-CNS-2018-00156 to address these concerns.

Analysis. The licensee’s failure to implement the metal-enclosed bus inspection program in accordance with License Condition 2.F was a performance deficiency. The performance deficiency was determined to be more than minor, and therefore a finding, because it was associated with the equipment performance attribute of the Initiating Events Cornerstone, and affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown, as well as, power operations. Specifically, the licensee’s failure to repair corona-related insulation degradation on the SSST X-winding bus resulted in an increased likelihood of a loss of offsite power over the course of the bus’s 10-year preventive maintenance cycle. Using Inspection Manual Chapter 0609, Appendix A, “The Significance Determination Process (SDP) for Findings At-Power,” dated June 19, 2012, the inspectors determined that the finding was of very low safety significance (Green) because it did not involve the complete or partial loss of a support system that contributes to the likelihood of, or causes, an initiating event and did not affect mitigation equipment. The performance deficiency had a cross-cutting aspect in the area of human performance associated with conservative bias, because the station failed to use decision-making practices that emphasized prudent choices over those that were simply allowable, and failed to ensure proposed actions were determined to be safe in order to proceed rather than unsafe in order to stop when performing SSST bus inspections [H.14].

Enforcement. License Condition 2.F states, in part, “The Updated Safety Analysis Report (USAR) supplement, as revised, describes certain future activities to be completed prior to and/or during the period of extended operation. The licensee shall complete these activities in accordance with Appendix A of NUREG-1944, “Safety Evaluation Report Related to the License Renewal of Cooper Nuclear Station,” dated October 2010, as supplemented by letters from the licensee to the NRC dated November 15 and 18, 2010.” The licensee’s USAR supplement and NUREG-1944 state that the program would be implemented consistent with NUREG-1801, “Generic Aging Lessons Learned (GALL) Report,” Revision 1, Section XI.E4, “Metal-Enclosed Bus.” Section XI.E4.6, “Acceptance Criteria,” states, “MEBs are to be free from unacceptable visual indications of surface anomalies, which suggest that conductor insulation degradation exists.” Contrary to the above, between September 25 and September 27, 2017, the licensee did not ensure the SSST MEB was free from unacceptable visual indications of surface anomalies, which suggest that conductor

insulation degradation existed. Specifically, during 10-year MEB preventive maintenance inspection activities, the licensee failed to take corrective action to repair corona-related insulation degradation identified on the SSST-X winding bus bars despite experiencing an emergency transformer bus fault a few months earlier due to the same failure mechanism. Corrective actions to restore compliance included the revision of metal-enclosed bus inspection procedures to provide clearer corona-related inspection criteria and an action to modify the startup transformer bus insulation to reduce or eliminate factors that led to the corona degradation. Because this violation was of very low safety significance (Green) and was entered into the licensee's corrective action program as Condition Reports CR-CNS-2018-00156 and CR-CNS-2017-00223, this violation is being treated as a non-cited violation (NCV) in accordance with Section 2.3.2.a of the NRC Enforcement Policy. (NCV 05000298/2017004-02, "Failure to Correct Startup Transformer Bus Insulation Degradation in Accordance with the License Renewal Program")

#### **40A3 Follow-up of Events and Notices of Enforcement Discretion (71153)**

.1 (Closed) Licensee Event Report (LER) 05000298/2017004-00, "Torus to Drywell Vacuum Breaker Failure to Indicate Full Closed Causes Loss of Safety Function"

a. Inspection Scope

On June 19, 2017, the licensee made a report to the NRC for one of the site's 12 torus to drywell vacuum breakers failing to indicate closed during testing. Specifically, during the licensee's performance of Surveillance Procedure 6.PC.207, "Torus to Drywell Vacuum Breaker Operation," Revision 9, the control switch for vacuum breaker PC-AOV-NRV21 was cycled open, then closed. When the control switch was taken to close, the vacuum breaker failed to indicate closed and indicated in the intermediate position (between full open and closed). As a result, operations personnel declared primary containment and vacuum breaker PC-AOV-NRV21 inoperable and entered Technical Specification (TS) Limiting Condition for Operation (LCO) 3.6.1.1, Condition A, and LCO 3.6.1.8, Condition B. In addition, TS LCO 3.6.1.1, Condition B, was entered shortly thereafter due to vacuum breaker PC-AOV-NRV21 still indicating intermediate. Subsequently, the control switch for vacuum breaker PC-AOV-NRV21 was cycled open, and then closed a second time. At this time, vacuum breaker PC-AOV-NRV21 indicated closed, and operations personnel declared primary containment and vacuum breaker PC-AOV-NRV21 operable at 11:11 p.m. and exited TS LCO 3.6.1.1, Condition A and Condition B, and TS LCO 3.6.1.8, Condition B.

The licensee initiated an apparent cause evaluation to determine the cause of the event. Although the licensee identified several possible causes that could have led to the equipment failure, the licensee could not draw a complete conclusion without locally inspecting the vacuum breaker. Because this activity could only be performed during an outage, the licensee initiated an action to perform troubleshooting during the upcoming refueling outage, which will allow them to more thoroughly assess the cause. The licensee also took corrective action to maintain the vacuum breaker closed and inoperable, an allowable condition, rather than risk future closure failures during testing activities.

The licensee reported this failure under 10 CFR 50.72(b)(3)(v) and 10 CFR 50.73(a)(2)(v)(D) as a condition that could have prevented the fulfillment of the

safety function of structures or systems that are needed to mitigate the consequences of an accident. The inspectors reviewed the event; reviewed station logs and TS requirements; and discussed the events with the licensee.

This licensee event report is closed.

b. Findings

No findings were identified.

.2 Division 1 and Division 2 Emergency Diesel Generators Declared Inoperable Due to Lightbulb Socket Deficiencies

a. Inspection Scope

On December 19, 2017, the licensee declared both emergency diesel generators (DGs) inoperable due to a common issue associated with indicating lights sockets installed in control and auxiliary circuits for both divisions of DGs. The licensee entered TS LCO 3.8.1, Condition B, which required that with one DG inoperable, it needed to be restored in 7 days; and Condition E, which required that with both DGs inoperable, one DG needed to be restored within 2 hours. The control room emergency filtration system was also declared inoperable during this event, because it was a single train safety system that was supported by one of the DGs.

The issue was associated with the licensee's discovery that several lamps of a new model that had been installed in both DG circuits over the past few years may not have been providing sufficient shorting protection in the case of a light bulb shorting failure. The light bulbs being used in the socket had a known failure mechanism associated with the ability to short without human interaction. Although the sockets were supposed to contain internal resistors that were rated to prevent the shorts from adversely impacting their circuits, recent Cooper Nuclear Station operating experience and related socket testing demonstrated that the resistors may not have been sufficient to protect the circuits. The licensee initiated compensatory actions to remove light bulbs from the affected sockets, to remove the shorting hazard, and by December 20, 2017, both DGs had been restored to operable status with these compensatory measures. The licensee reported this failure under 10 CFR 50.72(b)(3)(v)(D) as a condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident.

The resident inspectors responded to the control room upon notification of the DG inoperability. The inspectors walked down the DGs, observed reactive licensee meetings, and reviewed the compensatory measures for adequacy.

b. Findings

No findings were identified.

### .3 Notification of Unusual Event (NOUE) Declared Due to a Hydrogen Leak

#### a. Inspection Scope

On November 14, 2017, maintenance personnel were working on installation of a modification to the main generator carbon dioxide (CO<sub>2</sub>) purge system. Operations personnel had established the clearance order and the maintenance workers had begun cutting into the affected piping. The workers heard sounds of leakage coming from the cut pipe and stopped work to contact the control room. Additionally, the workers used duct tape to attempt to isolate the leakage, which was ineffective. The control room dispatched chemistry personnel to sample the work location in order to determine what was leaking and whether the leakage was active.

At 11:07 a.m., chemistry personnel notified the control room that the leakage source was hydrogen and that the pipe was actively leaking. The station entered Abnormal Procedure 2.4GEN-H2, "Generator or Hydrogen Abnormal," Revision 30, and at 11:18 a.m., declared an NOUE under emergency action level HU3.1, for "toxic, corrosive, asphyxiant, or flammable gases in amounts that have or could affect normal plant operations."

The station evacuated plant personnel from the affected area and began to determine how to isolate the leak. The upstream isolation valve, which is the only isolation valve between the location of the leak and the main generator hydrogen system, was found to be leaking by its seat. Operations personnel attempted to close the valve further, but were unsuccessful. The control room continued to monitor main generator hydrogen pressure and set an action to lower reactor power if pressure fell below a specified value. The site developed plans and installed a housekeeping patch on the leaking pipe, thereby securing the leak. Subsequent hydrogen monitoring and leakage checks proved that the housekeeping patch was holding. The station exited the NOUE at 5:44 p.m. on November 14, 2017.

Upon notification of the event, the resident inspectors responded to the control room to assess plant conditions. The inspectors observed operator actions and attended discussions and planning meetings for securing the hydrogen leak. The inspectors also observed the installation of the housekeeping patch at the leak location.

#### b. Findings

Introduction. The inspectors reviewed a self-revealed, Green finding for the licensee's failure to implement Administration Procedure 0.9, "Tagout," Revision 89, during planned maintenance on the main generator CO<sub>2</sub> purge line. Specifically, on November 14, 2017, when breaching the CO<sub>2</sub> purge line, maintenance personnel discovered that the clearance order did not adequately depressurize the work boundary, resulting in a hydrogen leak and declaration of an NOUE.

Description. On November 13, 2017, Cooper Nuclear Station operators established a clearance order for work associated with removing two valves in the main generator CO<sub>2</sub> purge line. This clearance order involved a single valve isolation of the work boundary from the main generator, pressurized with hydrogen while at power. The associated piping configuration did not contain a method for venting the isolation boundary. The clearance order preparers did not recognize the possibility that hydrogen

could leak through the isolation valve and pressurize the boundary. The preparers were primarily concerned with ensuring that the CO<sub>2</sub> portion of the piping was depressurized, which it was.

The next day, November 14, 2017, maintenance personnel cut into the piping within the isolation boundary and had indication of a leaking gas. The workers stopped their work, took actions to reduce the leak, and contacted the control room. The station determined this leaking gas to be hydrogen and declared an NOUE. The hydrogen was leaking at a rate of approximately 5 psig per day. The licensee was able to secure the leak by installing a housekeeping patch and then exited the NOUE a few hours later.

The licensee determined that the source of hydrogen was the leaking isolation valve separating the work boundary from the main generator hydrogen. Administrative Procedure 0.9, "Tagouts," Revision 89, step 4.17.5, states, "For piping configurations that do not contain drains or vents within the isolation boundary, an alternate means for draining and venting should be employed." The licensee did not employ an alternate means for venting this system, instead only verifying that the CO<sub>2</sub> portion of the system was depressurized, and did not recognize the risk that the upstream isolation valve could leak hydrogen back into the isolation boundary.

The licensee performed a root cause evaluation to determine other contributing factors that lead to this event. The licensee determined that plant personnel did not recognize the risk of performing this work. This work was screened as online work when performing the maintenance in a shutdown condition would have reduced the risk. While shutdown, the main generator is purged of hydrogen, and therefore, the leak would not have occurred. Additionally, this work involved single valve isolation from a pressurized system containing explosive gas, which the clearance order preparers did not recognize. Performing this maintenance with a single valve isolation represented another increase in risk that was not considered.

Analysis. The licensee's failure to implement Administration Procedure 0.9 was a performance deficiency. The performance deficiency was determined to be more than minor, and therefore a finding, because it was associated with the configuration control attribute of the Initiating Events Cornerstone and adversely affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, the hydrogen leak resulted in a slow depressurization of the main generator, which increased the likelihood of tripping the turbine which would cause a reactor scram. Using Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012, the inspectors determined that the finding had very low safety significance (Green) because it did not cause a reactor trip and the loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition. The finding had a cross-cutting aspect in the area of human performance associated with avoid complacency, because the licensee did not recognize and plan for the possibility of mistakes, latent issues, and inherent risk, even while expecting successful outcomes. Specifically, the licensee did not recognize and plan for the inherent risk of performing this maintenance online with only one valve separating the work location from a pressurized source of hydrogen [H.12].

Enforcement. The inspectors did not identify a violation of regulatory requirements associated with this finding. The finding is of very low safety significance and was entered into the licensee's corrective action program as Condition Report CR-CNS-2017-06745. Corrective actions included installing a housekeeping patch on the breached piping; monitoring for hydrogen in the vicinity of the pipe; and requiring that zero energy checks be performed for all clearance orders in order to ensure the isolation boundary is properly established. Because this finding does not involve a violation of a regulatory requirement and was of very low safety significance (Green), it is being documented as a finding. (FIN 05000298/2017004-03, "Inadequate Tagout Process Resulting in a Hydrogen Leak")

These activities constituted completion of three event follow-up samples, as defined in Inspection Procedure 71153.

#### **40A6 Meetings, Including Exit**

##### Exit Meeting Summary

On October 5, 2017, the inspectors briefed Mr. J. Kalamaja, General Manager of Plant Operations, and other members of the licensee's staff of the onsite results of the licensed operator requalification program inspection. On December 29, 2017, the inspectors conducted the exit meeting with Mr. J. Florence, Superintendent, Simulator and Training Support. The licensee representatives acknowledged the findings presented. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

On October 6, 2017, the inspectors presented the radiation safety inspection results to Mr. J. Kalamaja, General Manager of Plant Operations, and other members of the licensee staff. The licensee acknowledged the issues presented. The licensee confirmed that any proprietary information reviewed by the inspectors had been returned or destroyed.

On December 18, 2017, the inspector discussed the in-office inspection of Emergency Plan Implementing Procedure 5.7.1, "Emergency Classification," Revision 58, with Mr. J. Stough, Manager, Emergency Preparedness, and other members of the licensee staff. The licensee acknowledged the issues presented. The licensee confirmed that any proprietary information reviewed by the inspectors had been returned or destroyed.

On January 12, 2018, the inspectors presented the inspection results to Mr. J. Dent Jr., Vice President, Chief Nuclear Officer, and other members of the licensee staff. The licensee acknowledged the issues presented. The licensee confirmed that any proprietary information reviewed by the inspectors had been returned or destroyed.

#### **40A7 Licensee-Identified Violations**

The following licensee-identified violation of NRC requirements was determined to be of very low safety significance and meets the NRC Enforcement Policy criteria for being dispositioned as a non-cited violation:

- As required by 10 CFR 50.54(q), power reactor licensees must follow an emergency plan which meets the requirements of 10 CFR 50.47(b). Planning standard 10 CFR 50.47(b)(4) requires, in part, that a standard emergency action level scheme is in use by the licensee.

Contrary to the above, between December 21, 2010, and July 24, 2017, the licensee failed to ensure that a standard emergency action level scheme was in use. Specifically, on December 21, 2010, the licensee changed Emergency Plan Implementing Procedure (EPIP) 5.7.1, "Classification," and the associated emergency action level scheme, and inadvertently created the potential that the station could not implement Emergency Action Level AU1.2, "Abnormal Rad Release/Rad Effluent – Unusual Event." In particular, the licensee added wording that would drive the classification of an Alert under AA1.2 if the liquid radioactive waste effluent instrumentation were upscale for 15 minutes OR a Notification of an Unusual Event under AU1.2 if the same instrument was upscale for 60 minutes. This change made entry of AU1.2 unfeasible when monitor upscale conditions existed.

The licensee's failure to ensure an emergency action level could be implemented was a performance deficiency. The issue is more than minor, and therefore a finding, because it was associated with the procedure quality attribute of the Emergency Preparedness Cornerstone and adversely affected the cornerstone objective to ensure that the licensee is capable of implementing adequate measures to protect the health and safety of the public in the event of a radiological emergency. Specifically, the issue impacted the licensee's ability to accurately classify an emergency condition when one exists. The issue was evaluated using Inspection Manual Chapter 0609, Appendix B, "Emergency Preparedness Significance Determination Process," dated September 22, 2015, and was determined to be of very low safety significance (Green) because it was a failure to comply with NRC requirements, was not a loss of risk significant planning standard function, was not a degraded risk significant planning standard, and was not a loss of planning standard function. The planning standard function was not degraded because the ineffective emergency action level was for conditions warranting classification as a Notification of Unusual Event. Because this violation was of very low safety significance and was entered into the licensee's corrective action program as Condition Report CR-CNS-2017-04468, this violation is being treated as a non-cited violation in accordance with Section 2.3.2.a of the NRC Enforcement Policy. Licensee-identified violations are not assigned cross-cutting aspects.



## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### **Licensee Personnel**

T. Barker, Manager, Engineering Program and Components  
J. Bebb, Senior Staff Health Physicist  
J. Bednar, Technical Supervisor, Radiation Protection  
D. Buman, Director, Nuclear Safety Assurance  
B. Chapin, Manager, Maintenance  
T. Chard, Manager, Quality Assurance  
J. Dent Jr., Vice President, Chief Nuclear Officer  
L. Dewhirst, Manager, Corrective Action and Assessment  
K. Dia, Director, Engineering  
B. Duncan, Radiological Environmental Technician, Chemistry  
J. Florence, Superintendent, Simulator and Training Support  
T. Forland, Engineer, Licensing  
G. Gardner, Manager, Engineering Design  
J. Kalamaja, General Manager of Plant Operations  
D. Kimball, Director, Nuclear Oversight  
B. Kirkpatrick, Licensing Specialist, Regulatory Affairs  
C. Pelchat, Manager, Nuclear Projects  
S. Rezab, Staff Health Physicist, Radiation Protection  
J. Reimers, Manager, System Engineering  
J. Shaw, Manager, Licensing  
C. Stipp, Corporate Senior Environmental Coordinator  
J. Stough, Manager, Emergency Preparedness  
C. Sunderman, Manager, Radiation Protection  
K. Tanner, Shift Supervisor, Radiation Protection  
P. Tetrick, Manager, Operations  
D. Van Der Kamp, Senior Licensing Specialist  
A. Walters, Supervisor, Chemistry  
B. Williams, Radiological Specialist, Radiation Protection  
F. Zacarola, Environmental Chemist, Chemistry

### **LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**

#### **Opened and Closed**

05000298/2017004-01	NCV	Failure to Maintain Procedure for Storage of Material in the Spent Fuel Pool (Section 1R13)
05000298/2017004-02	NCV	Failure to Correct Startup Transformer Bus Insulation Degradation in Accordance with the License Renewal Program (Section 4OA2)
05000298/2017004-03	FIN	Inadequate Tagout Process Resulting in a Hydrogen Leak (Section 4OA3)

Closed

05000298/2017004-00 LER Torus to Drywell Vacuum Breaker Failure to Indicate Full Closed Causes Loss of Safety Function (Section 4OA3)

**LIST OF DOCUMENTS REVIEWED**

**Section 1R01: Adverse Weather Protection**

Miscellaneous Documents

<u>Title</u>	<u>Date</u>
Site-Wide Communication, "Winterize Yourself"	December 18-21, 2017

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
2.1.14	Seasonal Weather Preparations	29
5.1Weather	Operation During Weather Watches and Warnings	19

Condition Reports (CR-CNS-)

2017-06039	2017-06182	2017-06217
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**Section 1R04: Equipment Alignment**

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision</u>
2006	Control Building Service Water System, Sheet 4	60
2036	Reactor Building Service Water System, Sheet 1	A3
2007	Diesel Gen. Bldg. Service Water, Starting Air, Fuel Oil, Sump System & Roof Drains	N78

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
2.2.70	RHR Service Water Booster Pump System	82
2.2A.DG.DIV2	Standby AC Power System (Diesel Generator) Component Checklist (Div 2)	7
2.2A.RHRSW. DIV1	RHR Service Water Booster Pump System Component Checklist (Div 1)	10
2.2A.RHRSW. DIV2	RHR Service Water Booster Pump System Component Checklist (Div 2)	10

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
2.2B.RHRSW. DIV1	RHR Service Water Booster Pump System Instrument Valve Checklist (Div 1)	0
2.2B.RHRSW. DIV2	RHR Service Water Booster Pump System Instrument Valve Checklist (Div 2)	0

Condition Reports (CR-CNS-)

2015-00218	2017-00278	2017-00914	2017-03241
2017-06270	2017-06304		

Work Orders

5213082	5226885
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**Section 1R05: Fire Protection**

Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
CNS-FP-215	Reactor Building First Floor	05
CNS-FP-224	Control Building Basement Floor	05
CNS-FP-236	Diesel Generator Building	N06
CNS-FP-249	Turbine Building	N06

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
0-BARRIER- CONTROL	Control Building	7
0-BARRIER- MAPS	Barrier Maps	9
0-BARRIER- MISC	Miscellaneous Buildings	5
0-BARRIER- REACTOR	Reactor Building	13

Condition Reports (CR-CNS-)

2017-04392	2017-05900	2017-06100	2017-06882
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## Section 1R06: Flood Protection Measures

### Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision</u>
3190	Underground Duct Banks Plan – Manholes #P/#C3 and #P4/#C4 Outside Diesel Generator Building Location Overview	21

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
3.47.25	Non-EQ Inaccessible Power Cables Program	4

### Condition Reports (CR-CNS-)

2016-02931	2016-03683	2016-03979
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### Work Orders

5105901

## Section 1R11: Licensed Operator Requalification Program and Licensed Operator Performance

### Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
	2017 Annual Operating Test – Week 2	September 25, 2017
	2017 Annual Operating Test – Week 3	October 2, 2017
	2017 Biennial Written Exam	November 13, 2017
	Control Room Objectives and Comments on EP Drill	October 17, 2017
	Emergency Preparedness Drill Scenario Guide	October 17, 2017
	Licensed Operator Medical Records (5)	
	Steady State Performance Test – 100 Percent Power	November 21, 2016
	Transient Performance Test #5: Single Recirc. Pump Trip from 100 Percent Power	March 9, 2017

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
	Transient Performance Test #6: Main Turbine Trip from 20 Percent Power	March 13, 2017
OTP 810	Operations Department Examination Security	21, 22
RMP 30-007	Reactivity Maneuver Plan – Quarterly Downpower	October 31, 2017
TPP 201	CNS Licensed Personnel Requalification Program	69
TQF-201-IM05	Remedial Training Plans (4)	8C2
TQF-OTP-AOEJPM	Annual Operating Exam Job Performance Measure Quality Checklist	April 25, 2016
TQF-OTP-AOESIM	Annual Operating Exam Simulator Set Quality Checklist	April 25, 2016

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
0-CNS-LI-121	Trending and Performance Review Process	January 31, 2017
0-EN-TQ-202	Simulator Configuration Control	May 10, 2017
0-EN-TQ-210	Conduct of Simulator Training	May 17, 2017
0-EN-TQ-212	Conduct of Training and Qualification	July 12, 2017
0-EN-TQ-217	Examination Security	August 23, 2017
2.1.10	Station Power Changes	113
6.CRD.302	CRD Accumulator Operability Test	13
6.CRD.502	CRD Hydraulic Control Unit Accumulator Leakage Test	12
10.4	Control Rod Drive Testing	19
10.4.1	Control Rod Drive Speed Timing (Reactor in Run)	5
10.9	Control Rod Scram Time Evaluation	69

Condition Reports (CR-CNS-)

2016-00020	2016-02317	2016-02744	2016-03562
2016-06081	2016-06356	2016-08436	2017-01768
2017-02280	2017-04383	2017-05890	2017-05900
2017-05936	2017-06361	2017-06547	2017-06550

Condition Reports (CR-CNS-)

2017-06554                      2017-06555

Simulator Deficiency Reports

09-0021                      14-0067                      15-0011                      15-0027                      16-0031  
16-0033                      16-0044                      16-0057                      16-0058                      17-0017

Work Orders

5188696                      5206537                      5218032

**Section 1R12: Maintenance Effectiveness**

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
	Service Water System Health Report	November 17, 2017
LO-2013-0077-042	CNS Maintenance Rule a(3) Periodic Assessment: September 1, 2013 to August 21, 2015	
LO-2015-0119-038	CNS Maintenance Rule a(3) Periodic Assessment: September 1, 2015 to August 21, 2017	
PSA-ES095	Maintenance Rule Inputs from CNS PRA Model of Record	1
SW-F04	Maintenance Rule Function SW-F04 Performance Criteria Basis	3
SW-F12	Maintenance Rule Function SW-F12 Performance Criteria Basis	6
SW-SD7	Maintenance Rule Function SW-SD7 Performance Criteria Basis	3

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
3-EN-DC-207	Maintenance Rule Periodic Assessment	3C1
5.8.22	Primary Containment Venting and Hydrogen Control (Greater Than Combustible Limits)	19

Condition Reports (CR-CNS-)

2016-08905                      2017-00039                      2017-00054                      2017-00532  
2017-01244                      2017-01830                      2017-05993                      2017-05996

Condition Reports (CR-CNS-)

2017-05997                      2017-06671

**Section 1R13: Maintenance Risk Assessments and Emergent Work Control**

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
	Protected Equipment Electronic Tracking Form – HPCI-MO-MO19 Window (Unplanned)	October 18, 2017
11-008	Engineering Evaluation, Evaluation of the Placement and Storage of Tri Nuclear Corporation Model UF-600 Underwater Filter Unit and Model UFV-260 Underwater Filter/Vacuum Unit within the Spent Fuel Pool	0
11-019	Nuclear Safety Capability Assessment – Fire Protection	3
17-05869	Condition Report, Failure Modes and Effects Analysis – RRMG B Field Current and Voltage Oscillations	C
17-05869	ODMI, Operational Decision-Making Issue – RRMG B Generator Voltage Issues	0
17-06179	Condition Report, Failure Modes Analysis – HPCI-MO19 Intermediate	October 19, 2017
776-3	HPCI-MOV-MO19 Valve Diagram	4
1741-SW	Protected Equipment Checklist – SWBP C Maintenance LCO	October 11, 2017
1743-SW	Protected Equipment Checklist – SWBP B Maintenance LCO	October 23, 2017
2044	High Pressure Coolant Injection and Reactor Feed Systems	75
17712-005	Multiple Spurious Operation Expert Panel Results	2
11415058	Notification, Troubleshooting Plan: HPCI-MO-MO19 Indicated Intermediate When the CS was Operated to Close the Valve	0, 1
E501	HPCI Injection Valve, Sheet 34A	1
RMP 30-010	Reactivity Maneuver Plan – Rod Pattern Adjustment due to 10-35 Inop, RRMG B VR Issues	0

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
0-CNS-WM-104	On-Line Schedule Risk Assessment	4

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
0-PROTECT-EQP	Protected Equipment Program	38
2.2.68	Reactor Recirculation System	85
2.2.68.1	Reactor Recirculation System Operations	82
2.4RR	Reactor Recirculation Abnormal	42
6.HPCI.201	HPCI Valve Operability Test (IST)	25
7.0.1.7	Troubleshooting Plant Equipment	0
7.3.30.2	RRMG Set Voltage Regulator Tuning	8
7.4.32	Work Over, Near, or In Reactor Vessel, Dryer/Separator Storage Pool, or Spent Fuel Storage Pool	14, 15, 17

Condition Reports (CR-CNS-)

2010-09159	2017-05869	2017-05993	2017-05996
2017-05997	2017-06002	2017-06179	2017-06267
2017-06291	2017-06294	2017-06307	2017-06329
2017-06340	2017-06353	2017-06356	2017-06547

Notifications

11412142	11412143	11412244	11412245
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Work Orders

5047897	5057931	5101320	5142713	5168655
5172296	5197015	5213082	5215174	5215175

**Section 1R15: Operability Determinations and Functionality Assessments**

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
	CNS Inservice Testing Basis Document	10
2039	Flow Diagram – Control Rod Drive Hydraulic System	62
EE-2013-4	RHR SWBP FCU 50.59 Inadequate for USAR Change LCR 93-10 – CR-CNS-2012-10656	0
LCR 93-0010	Specify a Summer Design Temperature of 131°F for the RHR SWBP Room	February 5, 1993



Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
UCR 98-019	USAR Change Request: SWBP Fan Coil Unit Description Removal	April 28, 1998

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
2.0.12	Operator Challenges	11
2.2.8A	Control Rod Drive Hydraulic System Component Checklist	17
6.CRD.502	CRD Hydraulic Control Unit Accumulator Leakage Test	12
6.MISC.502	ASME Class 1 System Leakage Test	51
10.9	Control Rod Scram Time Evaluation	69

Condition Reports (CR-CNS-)

2017-02276	2017-04965	2017-05647	2017-05795
2017-06120	2017-06196	2017-06241	2017-06550
2017-06554	2017-06555		

Work Orders

5054343	5157028	5206537	5218032
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**Section 1R19: Post-Maintenance Testing**

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
	Procedure Change Request for 6.CRD.301	November 2, 2017
11409589	Notification	
44D209845	Voltage Regulator	N04
44D209846	Static Exciter & Voltage Regulator	N03
730E197BB	Variable Speed Recirc Pump & MG Set	N07
CR-17-04630	Failure Modes and Effects Analysis	October 25, 2017
CR-17-04630	Failure Modes and Effects Analysis	November 3, 2017
ER 2017-035	Engineering Report	

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
GE SIL 320	Recommendations for Mitigation of the Effects of Fuel Channel Bowing	December 1979

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
6.CRD.301	Withdrawn Control Rod Operability IST Test	32
6.1SWBP.101	RHR Service Water Booster Pump Flow Test and Valve Operability Test (Div 1)	30
6.2SWBP.101	RHR Service Water Booster Pump Flow Test and Valve Operability Test (Div 2)	28
7.0.1.7	Troubleshooting Plant Equipment	15
7.3.30.2	RRMG Set Voltage Regulator Tuning	8

Condition Reports (CR-CNS-)

2017-04630	2017-05857	2017-06205	2017-06270
2017-06304	2017-06346	2017-06530	2017-06547
2017-06567	2017-06570	2017-06575	2017-06582
2017-06587			

Work Orders

5057910	5059886	5088114	5100601	5121860
5142713	5172296	5212687	5212190	5213082

**Section 1R22: Surveillance Testing**

Miscellaneous Documents

<u>Title</u>	<u>Date</u>
Procedure Change Request for 6.LOG.601	November 13, 2017

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
6.1SWBP.101	RHR Service Water Booster Pump Flow Test and Valve Operability Test (DIV 1)	30
10.4.1	Control Rod Drive Speed Timing (Reactor in Run)	5

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
10.9	Control Rod Scram Time Evaluation	69
EN-OP-109	Drywell Leakage	2C0

Condition Reports (CR-CNS-)

2017-06557	2017-06560	2017-06561	2017-06562
2017-06563	2017-06564	2017-06565	2017-06566
2017-06568	2017-06569	2017-06599	2017-06675
2017-06736	2017-06932		

Work Orders

5098632	5168655
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**Section 1EP6: Drill Evaluation**

Miscellaneous Documents

<u>Title</u>	<u>Date</u>
Emergency Preparedness Drill Scenario Guide	October 17, 2017

Timeline for 2017 Full Team Drill to be Conducted October 17, 2017

**Section 2RS5: Radiation Monitoring Instrumentation**

Audits and Self-Assessments

<u>Number</u>	<u>Title</u>	<u>Date</u>
2017-0062	Focused Self-Assessment: Radiological Monitoring Instrumentation and Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transport	August 16, 2017

Installed Radiation Instrument Calibration Records

<u>Number</u>	<u>Title</u>	<u>Date</u>
RMA-RA-7	Reactor Building by Southeast Quad, 903'	March 7, 2016
RMA-RM-40B	Containment High Range Area Monitor Channel Calibration	March 25, 2015
RMA-RM-40B	Containment High Range Area Monitor Channel Calibration	November 7, 2016

### Installed Radiation Instrument Calibration Records

<u>Number</u>	<u>Title</u>	<u>Date</u>
RMP-RM-251A/B/C/D	Main Steam Line Process Radiation Monitor Channel Calibration, Source Test and Setpoint Determination	October 16, 2014
RMP-RM-251A/C	Main Steam Line Process Radiation Monitor Channel Calibration, Source Test and Setpoint Determination	November 6, 2016
RMP-RM-452B/D	Reactor Building Ventilation Radiation Monitor Channel Calibration and Functional Test-Source Check	September 13, 2017
Victoreen Model 875	High Range Containment Monitor Victoreen Model 875 Source Calibration Check	October 3, 2016

### Portable Radiation Instrument Calibration Records

<u>Number</u>	<u>Title</u>	<u>Date</u>
1568	RO-20	September 24, 2016
1608	AMS-4	July 18, 2017
6612-103	Telepole	April 10, 2017
312562	Ludlum Model 177	April 20, 2017

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
6.PRM.322	Containment High Range Area Monitor Channel Calibration	20
6.PRM.323	High Range Containment Monitor Victoreen Model 875 Source Calibration Check	7
6.PRM.324	Main Steam Line Process Radiation Monitor Channel Calibration, Source Test, and Setpoint Determination	27
9.ALARA.3	Operation of the Canberra Fastscan Whole Body Counter	16
9.INST.10	Eberline Model PM-7/PM-12 Portal Monitor	9
9.INST.11	Calibration/Verification of NIST Traceable Radioactive Sources	2
9.INST.14	Tennelec Eclipse LB Operation	4
9.INST.53	Ion Chamber Survey Instrument Everline Model RO-20	7
9.INST.57	Friskers	5
9.INST.64	Thermo Electron Corporation Small Articles Monitor SAM	3

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
9.INST.65	Constant Air Monitor Eberline Model AMS-4	8
9.INST.67	Thermo Fisher Personnel Contamination Monitor Model iPCM-12	4
9.INST.68	WR Telepole GM Survey Instrument	2
15.ARM.302	Area Radiation Monitors Calibration and Functional Test	17

### Source Calibration Records

<u>Title</u>	<u>Date</u>
Eckert & Ziegler - 2.0 Liter Charcoal in 230G GA-MA Beaker	April 1, 2017
JL Shepherd Model 89 Calibration Verification	December 27, 2016

### Stationary Radiation Instrument Calibration Records

<u>Number</u>	<u>Title</u>	<u>Date</u>
97-5512	Calibration of the Canberra Fastscan Whole Body Counting System	May 24, 2017
1207	Portal Monitor	March 31, 2016
12045	Small Article Monitor 12	June 8, 2017
12065	Personnel Contamination Monitor	August 22, 2017

### Condition Reports (CR-CNS-)

2016-00709	2016-01902	2016-02913	2016-03127
2016-04304	2016-04974	2016-04982	2016-05789
2017-01087	2017-01163	2017-01853	2017-03548
2017-03886	2017-04044		

## **Section 2RS6: Radioactive Gaseous and Liquid Effluent Treatment**

### Audits and Self-Assessments

<u>Number</u>	<u>Title</u>	<u>Date</u>
2016-0012-001	Snapshot Assessment, ARERR Supplement	August 3, 2016
2017-0006-007	Reg Guide 4.25 Eval, License Material to Groundwater	

### Audits and Self-Assessments

<u>Number</u>	<u>Title</u>	<u>Date</u>
2017-0030-002	Snapshot-Assessment 2018 ARERR	May 4, 2017
2017-0062	Pre-NRC Assessment Completed Report	August 16, 2017
24229	GEL Labs NUPIC Audit, Rad Effluents Vendor	November 3, 2016
WT-WTHQN-201 5-00728WT	Teledyne Environmental Services	September 19, 2016

### Effluent Monitor Calibration Records

<u>Number</u>	<u>Title</u>	<u>Date</u>
6.PRM.306	Liquid Effluent Flow Monitor Channel Calibration	August 25, 2017
6.PRM.310	ERP Kaman Monitor Channel Calibration	December 2, 2016
6.PRM.313	Reactor Building Kaman Monitor Channel Calibration	August 18, 2016
6.PRM.315	Turbine Building Kaman Monitor Channel Calibration	May 23, 2016
6.PRM.331	SW Radiation Monitor –A Calibration Check and Instrument Channel Test	March 7, 2017
6.PRM.332	SW Radiation Monitor –B Calibration Check and Instrument Channel Test	May 18, 2017
6.2PRM.308	Liquid Radwaste Effluent Channel Calibration	May 1, 2017

### Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Date</u>
	CNS System Health Report	July 2016– July 2017
	Results of Radiochemistry Cross-Check Program	April 28, 2017
	Results of Radiochemistry Cross-Check Program	June 15, 2017
	Off-site Dose Assessment Manual for Gaseous and Liquid Effluents	August 27, 2014
2015	Radioactive Effluent Release Report January 1, 2015, through December 31, 2015	May 2, 2016

## Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Date</u>
2016	Radioactive Effluent Release Report January 1, 2016, through December 31, 2016	May 1, 2017

## Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
6.HV.1 04	Control Room Emergency Fan Charcoal and HEPA Filter Leak Test, Fan Capacity Test, and Charcoal Sampling	17
6.PRM.306	Liquid Effluent Flow Monitor Channel Calibration	7
6.PRM.309	ERP Kaman Monitor Channel Functional Test	13
6.PRM.310	ERP Kaman Monitor Channel Calibration	27
6.PRM.313	Reactor Building Kaman Monitor Channel Calibration	17
6.PRM.315	Turbine Building Kaman Monitor Channel Calibration	27
6.PRM.331	SW Radiation Monitor –A Calibration Check and Instrument Channel Test	13
6.PRM.332	SW Radiation Monitor –B Calibration Check and Instrument Channel Test	14
6.1SGT.501	SGT A Carbon Sample, Carbon Absorber And HEPA Filter In-Place Leak Test, And Components Leak Test (Div 1)	14
6.2PRM.305	Off-Gas Radiation Monitor Channel Calibration	18
6.2PRM.308	Liquid Radwaste Effluent Channel Calibration	14
6.2SGT.501	SGT B Carbon Sample, Carbon Absorber And HEPA Filter In-Place Leak Test, And Components Leak Test (Div 2)	17
8.8.4	Off-Gas Grab Samples Isotopic Analysis	25
8.8.11	Liquid Radioactive Waste Discharge Authorization	32
8.8.15	Noble Gas and Tritium Sample Collection for Effluent Monitors and Drywell Air Monitor	9
8.8.ERP	Particulate and Iodine Sample Collection for ERP Effluent	12
8.8.MPF	Particulate and Iodine Sample Collection for MPF Effluent	7
8.8.RW	Particulate and Iodine Sample Collection for Radwaste Building Effluent	9
8.8.TB	Particulate and Iodine Sample Collection for Turbine Building Effluent	9
CP 8.11.1	EFFECTS Program	19

Standby Gas Treatment System Filter Leak Tests

<u>Number</u>	<u>Title</u>	<u>Date</u>
5028538	SGT B Carbon Sample, Carbon Absorber And HEPA Filter In-Place Leak Test, And Components Leak Test (Div 2)	May 19, 2016
5078036	Control Room Emergency Filter System Flow Test, Charcoal and HEPA Filter Leak Test, Filter DP Test, and Charcoal Sample Analysis	May 22, 2017
5080852	SGT A Carbon Sample, Carbon Absorber And HEPA Filter In-Place Leak Test, And Components Leak Test (Div 1)	June 5, 2017

Condition Reports (CR-CNS-)

2015-04950	2015-05044	2015-05073	2015-07122
2016-03818	2016-04474	2016-04959	2016-05165
2016-06045	2016-08687	2017-00015	2017-02675
2017-04091	2017-04919	2017-05096	2017-05334
2017-05924			

**Section 2RS7: Radiological Environmental Monitoring Program**

Audits and Self-Assessments

<u>Number</u>	<u>Title</u>	<u>Date</u>
	CNS 2017 Environmental Assessment	July 20, 2017
	Groundwater Protection Program Self-Assessment	August 15, 2007
2014-0034-006	Self-Assessment of REMP and Meteorological Program Assessment	September 29, 2014

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Date</u>
	10 CFR 72.212 Evaluation Report, Section 9	April 4, 2014
	Nebraska Public Power District Annual ODAM Environmental Monitoring Requirements	July 28, 2015
	NPPD CNS New MET Tower 2017	May 23, 2017
	Offsite Dose Assessment Manual (ODAM) for Gaseous and Liquid Effluents	August 27, 2014
2014	Annual Land Use Census, ODAM D4.1	June 28, 2015



Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Date</u>
2015	Annual Land Use Census, ODAM D4.1	June 27, 2016
2015	Cooper Nuclear Station Radiological Environmental Monitoring Program Annual Report	May 2016
2015	NPPD Cooper Nuclear Station Radioactive Effluent Release Report	May 2, 2016
2016	Annual Land Use Census, ODAM D4.1	June 24, 2017
2016	Cooper Nuclear Station Radiological Environmental Monitoring Program Annual Report	May 2017
2016	NPPD Cooper Nuclear Station Radioactive Effluent Release Report	May 1, 2017
Chapter II	NPPD Cooper Nuclear Station Updated Safety Analysis Report (USAR), "Station Site and Environs"	August 25, 2016
PM 5115597	Perform Functional Check of 100-Meter Met Tower Instruments	April 17, 2017

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
8.ENV.1	CNS Radiological Environmental Monitoring Program Administration	3
8.ENV.2	Sampling Manual for the CNS Radiological Environmental Monitoring Program (REMP)	3
8.ENV.3	Action Levels for Environmental Samples	2
8.ENV.4	CNS Environmental Air Pump Calibration and Maintenance	0
8.ENV.5	Annual Review of Broadleaf Vegetation Sample Locations Procedure	0
8.ENV.6	Annual CNS Land Use Census	0
8.ENV.7	CNS Temporary LLRW Storage Facility Sampling Program	0
8.ENV.8	Administering the CNS Meteorological Program (CNS MET)	3

Condition Reports (CR-CNS-)

2016-00151	2016-01310	2016-01482	2016-02337
2016-04333	2016-05165	2016-08687	2017-05334

**Section 2RS8: Radioactive Solid Waste Processing, and Radioactive Material Handling, Storage, and Transportation**

Audits and Self-Assessments

<u>Number</u>	<u>Title</u>	<u>Date</u>
16-05	QA Audit, "Radiological Controls"	August 10, 2016
LO 2015-0055-009	Snapshot Self-Assessment: Annual Review of Part 37 Security Plan	October 15, 2015
WT 2013-0083-025	Snapshot Self-Assessment: Hittman Security Plan Assessment	September 8, 2015

Container Surveys

<u>Number</u>	<u>Title</u>	<u>Date</u>
300695-2206	Survey and Inspection Data Sheet	August 31, 2017
300705	Survey and Inspection Data Sheet	August 31, 2017

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Date</u>
	Onsite Radioactive Material Storage Areas	August 7, 2017
	Offsite Radioactive Material Storage Inventory	August 1, 2017
2015	Radioactive Material Shipment Log	
2016	Radioactive Material Shipment Log	
2017	Radioactive Material Shipment Log	
NLS016028	Annual Radioactive Effluent Release Report Submittal Letter – Attachment: Summary of Changes to the Process Control Program	May 2, 2016

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
0.PCP.1	Process Control Program (PCP)	0
2.5.4.4	NUPAC Dewatering System	14
9.RADOP.14	Off-Site Radioactive Material Storage	5
9.RW.1	Radioactive Shipments	36

## Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
9.RW.2	Condensate Waste Resins, Spent Resins, RWCU Resins, and Waste Sludge Classification and Listing	11
9.RW.3	Dry Radioactive Waste Classification/Listing and Radioactive Material Shipments	4
9.RW.6	Control of On-Site Dry Active Waste Storage	4
9.RW.7	Waste Stream Sampling	17
9.RW.9	Filling Containers with Waste/Radioactive Material	17

## Radioactive Material and Waste Shipments

<u>Number</u>	<u>Title</u>	<u>Date</u>
16-01F	Type A Shipment – 10 Gallon Drum	March 10, 2016
16-01J	Type A Shipment – 30 Gallon Drum	April 11, 2016
16-11E	LSA-II Shipment – CRDM Boxes	November 1, 2016
17-09	Type B Shipment – 8-120B Cask of RWCU Resin	May 1, 2017
17-12	Type A Shipment – 8-120 Cask with TriNuke Filters	June 6, 2017
17-22	LSA-II Shipment – 14-210H Cask with Condensate Resin	October 3, 2017

## Condition Reports (CR-CNS-)

2015-06546	2016-03411	2016-06486	2017-02414
2017-03063	2017-03285	2017-05394	

## **Section 40A1: Performance Indicator Verification**

### Miscellaneous Documents

#### Title

CNS MSPI Deviation Reports: October 1, 2016 – September 30, 2017

CNS Station Logs: October 1, 2016 – September 30, 2017

MSPI System Documentation and Data Review Forms: October 1, 2016 – September 20, 2017

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
0-EN-LI-114	Performance Indicator Process	5C2
EN-FAP-OM-005	Nuclear Performance Indicator Program	0C0

**Section 40A2: Problem Identification and Resolution**

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
EPIP 5.7.1	Emergency Classification	43, 58, 59
EPIP 5.7.1	CNS Emergency Action Level Matrix, Attachment 4	15, 16
NLS2008071-14	CNS Commitment, Metal-Enclosed Bus Inspection Program	January 18, 2014
NUREG-1801	Generic Aging Lessons Learned (GALL) Report	1

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
7.3.41	Examination and High Pot Testing of Non-Segregated Buses and Associated Equipment	13

Condition Reports (CR-CNS-)

2010-07974	2017-00223	2017-03425	2017-04126
2017-04468	2017-05788	2017-05802	2017-06196
2017-06745	2017-06873	2017-07023	2017-07345

Work Orders

5069489	5178820
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**Section 40A3: Follow-up of Events and Notices of Enforcement Discretion**

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
	General Electric LOCA Analysis with Vacuum Breaker Open – Verified GEH Final Report	April 12, 2012
94-035	NEDC, USAR Cases E & F Containment Analysis	4
2016	Low Pressure CO2 System, Sheet 4A	2
3059	EE-PNL-DG1 125VDC Load & Fuse Schedule, Sheet 11	11

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
3059	EE-PNL-DG2 125VDC Load & Fuse Schedule, Sheet 12	12
EPIPEALHOT	CNS EAL Wall Chart Hot	15
ER-2017-033	PC=NRV21 Automatic Closure From Intermediate Position for Loss of Coolant Accident	0
G5-262-743	Emergency Diesel Generator #1 Electrical Schematic, Sheet 1	26
G5-262-743	Emergency Diesel Generator #2 Electrical Schematic, Sheet 1	20
NPP-61852	Failure Analysis of a Lamp Assembly	November 27, 2017
PAD 121981	Process Applicability Determination – Caution Order: DG-1-DG-SW-DG2(43CM) Green Ind.	0
PAD 121982	Process Applicability Determination – Caution Order: DG-1-DG #1 Bulb Control	0

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
0.9	Tagout	89
2.4GEN-H2	Generator or Hydrogen Abnormal	30
5.7.1	Emergency Classification	58
6.PC.207	Torus to Drywell Vacuum Breaker Operation	9

Condition Reports (CR-CNS-)

2017-03721	2017-05434	2017-05456	2017-06219
2017-06741	2017-06742	2017-06745	2017-06751
2017-06873	2017-07078	2017-07200	2017-07513

Work Orders

5042563	5057355	5180985	5226885
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**The following items are requested for the  
Public Radiation Safety Inspection  
at Cooper Nuclear Station  
October 2 through 6  
Integrated Report 2017004**

Inspection areas are listed in the attachments below.

Please provide the requested information on or before **September 12, 2017**.

Please submit this information using the same lettering system as below. For example, all contacts and phone numbers for Inspection Procedure 71124.01 should be in a file/folder titled "1- A," applicable organization charts in file/folder "1- B," etc.

If information is placed on *ims.certrec.com*, please ensure the inspection exit date entered is at least 30 days later than the onsite inspection dates, so the inspectors will have access to the information while writing the report.

In addition to the corrective action document lists provided for each inspection procedure listed below, please provide updated lists of corrective action documents at the entrance meeting. The dates for these lists should range from the end dates of the original lists to the day of the entrance meeting.

If more than one inspection procedure is to be conducted and the information requests appear to be redundant, there is no need to provide duplicate copies. Enter a note explaining in which file the information can be found.

If you have any questions or comments, please contact Louis Carson at (817) 200-1221 or [Louis.Carson@nrc.gov](mailto:Louis.Carson@nrc.gov).

**PAPERWORK REDUCTION ACT STATEMENT**

This letter does not contain new or amended information collection requirements subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). Existing information collection requirements were approved by the Office of Management and Budget, control number 3150-0011.

**5. Radiation Monitoring Instrumentation (71124.05)**

Date of Last Inspection: **August 24, 2015**

- A. List of contacts and telephone numbers for the following areas:
1. Effluent monitor calibration
  2. Radiation protection instrument calibration
  3. Installed instrument calibrations
  4. Count room and Laboratory instrument calibrations
- B. Applicable organization charts
- C. Copies of audits, self-assessments, vendor or NUPIC audits for contractor support and LERs, written since date of last inspection, related to:
1. Area radiation monitors, continuous air monitors, criticality monitors, portable survey instruments, electronic dosimeters, teledosimetry, personnel contamination monitors, or whole body counters
  2. Installed radiation monitors
- D. Procedure index for:
1. Calibration, use and operation of continuous air monitors, criticality monitors, portable survey instruments, temporary area radiation monitors, electronic dosimeters, teledosimetry, personnel contamination monitors, and whole body counters.
  2. Calibration of installed radiation monitors
- E. Please provide specific procedures related to the following areas noted below. Additional Specific Procedures will be requested by number after the inspector reviews the procedure indexes.
1. Calibration of portable radiation detection instruments (for portable ion chambers)
  2. Whole body counter calibration
  3. Laboratory instrumentation quality control
- F. A summary list of corrective action documents (including corporate and sub-tiered systems) written since date of last inspection, related to the following programs:
1. Area radiation monitors, continuous air monitors, criticality monitors, portable survey instruments, electronic dosimeters, teledosimetry, personnel contamination monitors, whole body counters,
  2. Installed radiation monitors,
  3. Effluent radiation monitors
  4. Count room radiation instruments
- NOTE: The lists should indicate the significance level of each issue and the search criteria used. Please provide in document formats which are "searchable" so that the inspector can perform word searches.
- G. Offsite dose calculation manual, technical requirements manual, or licensee controlled specifications, which lists the effluent monitors and calibration requirements.
- H. Current calibration data for the whole body counter's.

- I. Primary to secondary source calibration correlation for effluent monitors.
  - J. A list of the point of discharge effluent monitors with the two most recent calibration dates and the work order numbers associated with the calibrations.
  - K. Radiation Monitoring System health report for the previous 12 months
- 6. Radioactive Gaseous And Liquid Effluent Treatment (71124.06)**  
Date of Last Inspection: **August 24, 2015**
- A. List of contacts and telephone numbers for the following areas:
    - 1. Radiological effluent control
    - 2. Engineered safety feature air cleaning systems
  - B. Applicable organization charts
  - C. Audits, self-assessments, vendor or NUPIC audits of contractor support, and LERs written since date of last inspection, related to:
    - 1. Radioactive effluents
    - 2. Engineered Safety Feature Air cleaning systems
  - D. Procedure indexes for the following areas
    - 1. Radioactive effluents
    - 2. Engineered Safety Feature Air cleaning systems
  - E. Please provide specific procedures related to the following areas noted below. Additional Specific Procedures will be requested by number after the inspector reviews the procedure indexes.
    - 1. Sampling of radioactive effluents
    - 2. Sample analysis
    - 3. Generating radioactive effluent release permits
    - 4. Laboratory instrumentation quality control
    - 5. In-place testing of HEPA filters and charcoal absorbers
    - 6. New or applicable procedures for effluent programs (e.g., including ground water monitoring programs)
  - F. List of corrective action documents (including corporate and sub-tiered systems) written since date of last inspection, associated with:
    - 1. Radioactive effluents
    - 2. Effluent radiation monitors
    - 3. Engineered Safety Feature Air cleaning systems

NOTE: The lists should indicate the significance level of each issue and the search criteria used. Please provide in document formats which are “searchable” so that the inspector can perform word searches.
  - G. 2015 and 2016 Annual Radioactive Effluent Release Report, or the two most recent reports.
  - H. Current Copy of the Offsite Dose Calculation Manual
  - I. Copy of the 2015 and 2016 inter-laboratory comparison results for laboratory quality control performance of effluent sample analysis, or the two most recent results.



- J. Effluent sampling schedule for the week of the inspection
- K. New entries into 10 CFR 50.75(g) files since date of last inspection
- L. Operations department (or other responsible dept.) log records for effluent monitors removed from service or out of service
- M. Listing or log of liquid and gaseous release permits since date of last inspection
- N. A list of the technical specification-required air cleaning systems with the two most recent surveillance test dates of in-place filter testing (of HEPA filters and charcoal absorbers) and laboratory testing (of charcoal efficiency) and the work order numbers associated with the surveillances
- O. System Health Report for radiation monitoring instrumentation. Also, please provide a specific list of all effluent radiation monitors that were considered inoperable for 7 days or more since the last inspection. If applicable, please provide the relative Special Report and condition report(s).
- P. A list of all radiation monitors that are considered §50.65/Maintenance Rule equipment.
- Q. A list of all significant changes made to the Gaseous and Liquid Effluent Process Monitoring System since the last inspection. If applicable, please provide the corresponding UFSAR section in which this change was documented.
- R. A list of any occurrences in which a non-radioactive system was contaminated by a radioactive system. Please include any relative condition report(s).

**7. Radiological Environmental Monitoring Program (71124.07)**

Date of Last Inspection: **August 24, 2015**

- A. List of contacts and telephone numbers for the following areas:
  - 1. Radiological environmental monitoring
  - 2. Meteorological monitoring
- B. Applicable organization charts
- C. Audits, self-assessments, vendor or NUPIC audits of contractor support, and LERs written since date of last inspection, related to:
  - 1. Radiological environmental monitoring program (including contractor environmental laboratory audits, if used to perform environmental program functions)
  - 2. Environmental TLD processing facility
  - 3. Meteorological monitoring program
- D. Procedure index for the following areas:
  - 1. Radiological environmental monitoring program
  - 2. Meteorological monitoring program
- E. Please provide specific procedures related to the following areas noted below. Additional Specific Procedures will be requested by number after the inspector reviews the procedure indexes.
  - 1. Environmental Program Description
  - 2. Sampling, collection and preparation of environmental samples
  - 3. Sample analysis (if applicable)
  - 4. Laboratory instrumentation quality control

5. Procedures associated with the Offsite Dose Calculation Manual
  6. Appropriate QA Audit and program procedures, and/or sections of the station's QA manual (which pertain to the REMP)
- F. A summary list of corrective action documents (including corporate and sub-tiered systems) written since date of last inspection, related to the following programs:
1. Radiological environmental monitoring
  2. Meteorological monitoring
- NOTE: The lists should indicate the significance level of each issue and the search criteria used. Please provide in document formats which are "searchable" so that the inspector can perform word searches.
- G. Wind Rose data and evaluations used for establishing environmental sampling locations
- H. Copies of the 2 most recent calibration packages for the meteorological tower instruments
- I. Copy of the 2015 and 2016 Annual Radiological Environmental Operating Report and Land Use Census, and current revision of the Offsite Dose Calculation Manual, or the two most recent reports.
- J. Copy of the environmental laboratory's inter-laboratory comparison program results for 2015 and 2016, or the two most recent results, if not included in the annual radiological environmental operating report
- K. Data from the environmental laboratory documenting the analytical detection sensitivities for the various environmental sample media (i.e., air, water, soil, vegetation, and milk)
- L. Quality Assurance audits (e.g., NUPIC) for contracted services
- M. Current NEI Groundwater Initiative Plan and status
- N. Technical requirements manual or licensee controlled specifications, which lists the meteorological instruments calibration requirements
- O. A list of Regulatory Guides and/or NUREGs that you are currently committed to relative to the Radiological Environmental Monitoring Program. Please include the revision and/or date for the committed item and where this can be located in your current licensing basis/UFSAR.
- P. If applicable, per NEI 07-07, provide any reports that document any spills/leaks to groundwater since the last inspection

**8. Radioactive Solid Waste Processing, and Radioactive Material Handling, Storage, and Transportation (71124.08)**

Date of Last Inspection: **August 24, 2015**

- A. List of contacts and telephone numbers for the following areas:
1. Solid Radioactive waste processing
  2. Transportation of radioactive material/waste
- B. Applicable organization charts (and list of personnel involved in solid radwaste processing, transferring, and transportation of radioactive waste/materials)
- C. Copies of audits, department self-assessments, and LERs written since date of last

inspection related to:

1. Solid radioactive waste management
  2. Radioactive material/waste transportation program
- D. Procedure index for the following areas:
1. Solid radioactive waste management
  2. Radioactive material/waste transportation
- E. Please provide specific procedures related to the following areas noted below. Additional Specific Procedures will be requested by number after the inspector reviews the procedure indexes.
1. Process control program
  2. Solid and liquid radioactive waste processing
  3. Radioactive material/waste shipping
  4. Methodology used for waste concentration averaging, if applicable
  5. Waste stream sampling and analysis
- F. A summary list of corrective action documents (including corporate and sub-tiered systems) written since date of last inspection related to:
1. Solid radioactive waste
  2. Transportation of radioactive material/waste
- NOTE: The lists should indicate the significance level of each issue and the search criteria used. Please provide in document formats which are “searchable” so that the inspector can perform word searches.
- G. Copies of training lesson plans for 49CFR172 subpart H, for radwaste processing, packaging, and shipping.
- H. A summary of radioactive material and radioactive waste shipments made from date of last inspection to present
- I. Waste stream sample analyses results and resulting scaling factors for 2015 and 2016, or the two most recent results.
- J. Waste classification reports if performed by vendors (such as for irradiated hardware)
- K. A listing of all on-site radwaste storage facilities. Please include a summary *or* listing of the items stored in each facility, including the *total* amount of radioactivity and the *highest* general area dose rate.

Although it is not necessary to compile the following information, the inspector will also review:

- L. Training and qualifications records of personnel responsible for the conduct of radioactive waste processing, package preparation, and shipping.

## **NRC Request for Information**

**System:** Residual Heat Removal Service Water (RHRSW) System, Division 1 and 2

**CD Date Requested by:** October 1, 2017

**Date Range of Document Request:** September 30, 2015 - Current

### **Please provide the following documents:**

1. Copies of all root and apparent cause evaluations performed on this system.
2. Summary list of all condition reports written on this system, sorted by CR classification
3. List of all surveillances performed on this system, sortable by component if possible.
4. Provide copies of the three most recently completed IST pump surveillances for both divisions of RHRSW
5. List of all corrective maintenance work orders, with description of work, performed on this system
6. Provide a list of control room deficiencies associated with this system
7. Copies of ODMI's, OWA/OWB's, prompt operability evaluations, and standing orders associated with this system
8. Summarized list of all Maintenance Rule equipment issues evaluated for the system, (including their conclusions), copies of each MRule evaluation for the system, and the MRule Basis Document(s) for the system
9. List of all work orders, with description of work, planned for this system within the next year
10. Provide a list and description of overdue PM's, deferred PM's, and PM change requests for this system
11. Provide copies of maintenance rule functional failure assessments—regardless of the result—performed on these systems. Include CR number for each item on the list.
12. System design calculations for RHRSW heat exchanger capabilities
13. Provide fire impairments associated with this system
14. Provide copies of any QA audits or self-assessments associated with this system
15. Copies of Pump vendor manuals, drawings (P&ID's), and system training manuals
16. System health reports and system engineering logs for this system

17. List and description of temporary modifications; completed ECs (September 30, 2015 - Current); and planned ECs (within the next year) associated with this system
18. Schedule of activities (Fragnet) for the planned AOT for RHRSW pump C and RHRSW pump B scheduled for the work weeks of 1741 and 1743 respectively.