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

November 13, 2017

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 05000298/2017003 AND INDEPENDENT SPENT FUEL STORAGE INSTALLATION INSPECTION REPORT 07200066/2017001

Dear Mr. Dent:

On September 30, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Cooper Nuclear Station. On October 19, 2017, the NRC inspectors discussed the results of this inspection with Mr. J. Kalamaja, General Manager Plant Operations, 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. All of these findings involved violations of NRC requirements. 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 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 Nos. 50-298 and 72-066
License No. DPR-46

Enclosure:
Inspection Report 05000298/2017003 and
07200066/2017001
w/ Attachment:
1. Supplemental Information
2. NRC Request for Information

COOPER NUCLEAR STATION – NRC INTEGRATED INSPECTION
REPORT 05000298/2017003 and INDEPENDENT SPENT FUEL STORAGE INSTALLATION
INSPECTION REPORT 07200066/2017001 – November 13, 2017

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REGION IV

Docket:	05000298 and 07200066
License:	DPR-46
Report:	05000298/2017003 and 07200066/2017001
Licensee:	Nebraska Public Power District
Facility:	Cooper Nuclear Station
Location:	72676 648A Ave Brownville, NE
Dates:	July 1 through September 30, 2017
Inspectors:	P. Voss, Senior Resident Inspector C. Henderson, Senior Resident Inspector C. Young, Senior Project Engineer M. Stafford, Resident Inspector C. Jewett, Acting Resident Inspector L. Brookhart, Senior ISFSI Inspector, FCDB E. Simpson, ISFSI Inspector, FCDB
Approved By:	Jason Kozal Chief, Project Branch C Division of Reactor Projects

Enclosure

SUMMARY

IR 05000298/2017003 and 07200066/2017001; 07/01/2017 – 09/30/2017; Cooper Nuclear Station; Operability Determinations and Functionality Assessments, Surveillance Testing, Follow-up of Events and Notices of Enforcement Discretion.

The inspection activities described in this report were performed between July 1 and September 30, 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. All of these findings involved violations of NRC requirements. 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: Mitigating Systems

- Green. The inspectors reviewed a self-revealed, non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to assure that appropriate measures were established for the selection and review for suitability of application of materials, parts, equipment, and processes that were essential to the safety-related functions of a reactor building fan coil unit. Specifically, on March 9, 2016, the licensee installed a new coil for the reactor building northeast quad fan coil unit, but failed to assure the suitability of application of the materials, parts, and equipment associated with the new coil design in that the new component had measurably higher air resistance across the coil than the previous design. As a result, on August 1, 2017, the fan coil unit failed air flow surveillance testing during the next performance of the test, resulting in the fan coil unit being declared inoperable. Corrective actions to restore compliance included cooling coil cleaning activities, implementation of compensatory measures to restore operability, and generation of a work order to replace the degraded cooling coil. The licensee entered this deficiency into the corrective action program as Condition Report CR-CNS-2017-04701.

  The licensee's failure to assure that the newly designed coil installed in the northeast quad fan coil unit was appropriately reviewed for suitability and adequacy was a performance deficiency. The performance deficiency was evaluated using Inspection Manual Chapter 0612, Appendix B, "Issue Screening," dated September 7, 2012, and was associated with the Mitigating Systems Cornerstone. The performance deficiency was more than minor, and therefore a finding, because it was associated with the equipment performance attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the performance deficiency resulted in the northeast quad fan coil unit being declared inoperable. 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: was not a design deficiency where the component maintained operability; did not represent a loss of system and/or function; did not represent an actual loss of function of at least a single train

for longer than its technical specification allowed outage time; and did not result in the loss of a high safety-significant, nontechnical specification train. The finding had a cross-cutting aspect in the area of human performance associated with design margins, because the licensee failed to ensure that the organization operated and maintained equipment within design margins, and failed to ensure that these margins were carefully guarded and changed only through a systematic and rigorous process with special attention placed on maintaining safety-related equipment. Specifically, although the new fan coil unit's air flow immediately degraded from 7950 scfm to 7360 scfm after coil installation in 2016, which significantly degraded the margin to the minimum flow requirements, the licensee did not take action to address the degraded performance until it failed subsequent air flow testing [H.6]. (Section 1R15)

- Green. The inspectors identified a non-cited violation of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," for multiple examples of the licensee's failure to assure that required testing was performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents. Specifically, on July 12, 2017, the inspectors identified that Surveillance Procedure 6.1SGT.501, "Standby Gas Treatment A Carbon Sample, Carbon Adsorber and HEPA Filter In-place Leak Test, and Components Leak Test," Revision 16, failed to account for test instrument uncertainty in the surveillance acceptance criteria. In response to the inspectors' question, the licensee discovered that instrument uncertainty was not accounted for in several standby gas treatment system surveillance procedures, as well as surveillance procedures for the control room emergency filter system; diesel generator ventilation system; control building essential ventilation system; emergency core cooling essential ventilation systems; and several emergency preparedness ventilation systems. Corrective actions to restore compliance included incorporation of instrument uncertainty into procedure changes for the affected surveillance procedures and verification that the new acceptance criteria did not challenge past operability for the affected systems. The licensee entered this issue into the corrective action program as Condition Report CR-CNS-2017-04229.

  The inspectors determined that the licensee's failure to assure surveillance test procedures for safety-related ventilation systems incorporated test instrument uncertainty into acceptance criteria was a performance deficiency. Because the systems involved in this performance deficiency were systems that mitigate the consequences of accidents, the inspectors evaluated the finding under the Mitigating Systems Cornerstone. In accordance with Inspection Manual Chapter 0612, Appendix B, "Issue Screening," dated September 7, 2012, the inspectors determined that the performance deficiency was more than minor, and therefore a finding, because it was a programmatic deficiency which adversely impacted the procedure quality attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the acceptance criteria for the licensee's safety-related ventilation systems did not assure the availability of these systems to respond to accident conditions, as required by the technical specifications. The inspectors assessed the significance of this finding in accordance with Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings at Power," dated June 19, 2012, and determined this finding was of very low safety significance (Green) because it: was not a design deficiency; did not represent a loss of system and/or function; did not represent an actual loss of function of at least a single train for longer than its technical specification allowed outage time; and did not result in the loss of a high safety-significant, nontechnical

specification train. The finding had a cross-cutting aspect in the area of human performance associated with documentation because the licensee failed to ensure that the organization created and maintained complete, accurate, and up-to-date documentation [H.7]. (Section 1R22)

Cornerstone: Barrier Integrity

- Green. The inspectors identified a non-cited violation of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," for the licensee's failure to assure that all testing required to demonstrate that the control room emergency filter system would perform satisfactorily in service was identified and performed in accordance with written test procedures. Specifically, on May 25, 2017, following corrective maintenance to replace bent positioning rods for the A and B discharge dampers for the control room supply fans, the licensee failed to ensure that all testing described in Maintenance Procedure 7.0.5, "CNS Post-Maintenance Testing," Revision 53, was identified and performed, in order to assure that the control room filter system would be able to perform its safety function. As a result, on May 26, 2017, after the licensee restored the system back to service, the in-service B discharge damper was found partially closed, resulting in the supply fan failing to meet minimum flow requirements and the control room emergency filter system being declared inoperable. Corrective actions to restore compliance included replacement of the damper positioning arm, interim actions requiring post-maintenance testing after each repositioning of the dampers, and long term actions to modify the damper control arms to prevent bending and improve position verification methods. The licensee entered this deficiency into the corrective action program as Condition Report CR-CNS-2017-05794.

  The licensee's failure to assure that adequate post-maintenance testing was identified and performed for work on the control room supply fan discharge dampers was a performance deficiency. Using Inspection Manual Chapter 0612, Appendix B, "Issue Screening," dated September 7, 2012, the inspectors determined the performance deficiency was more than minor, and therefore a finding, because it was associated with the structure, system, and component, and barrier performance attribute of the Barrier Integrity Cornerstone and adversely affected the cornerstone objective to provide reasonable assurance that physical design barriers (control room envelope) protect the public from radionuclide releases caused by accidents or events. Specifically, the finding resulted in control room supply fan B failing to meet minimum flow requirements and the control room emergency filter system being declared inoperable. 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 represent a degradation of the barrier function of the control room against smoke or a toxic atmosphere. The finding had a cross-cutting aspect in the area of problem identification and resolution associated with evaluation. Specifically, the licensee failed to ensure that the organization thoroughly evaluated indications of degraded supply fan flow that occurred during testing, and failed to properly assess bent discharge damper positioning rod deficiencies discovered during the maintenance activities, to ensure that resolutions addressed causes and extent of conditions were commensurate with their safety significance [P.2]. (Section 4OA3)

PLANT STATUS

Cooper Nuclear Station began the inspection period at full power, where it remained for the rest 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)

Summer Readiness for Offsite and Alternate AC Power Systems

a. Inspection Scope

On August 24, 2017, the inspectors completed an inspection of the station's off-site and alternate-ac power systems. The inspectors inspected the material condition of these systems, including transformers and other switchyard equipment to verify that plant features and procedures were appropriate for operation and continued availability of off-site and alternate-ac power systems. The inspectors reviewed outstanding work orders and open condition reports for these systems. The inspectors walked down the switchyard to observe the material condition of equipment providing off-site power sources. The inspectors assessed corrective actions for identified degraded conditions and verified that the licensee had considered the degraded conditions in its risk evaluations and had established appropriate compensatory measures.

The inspectors verified that the licensee's procedures included appropriate measures to monitor and maintain availability and reliability of the off-site and alternate-ac power systems.

These activities constituted one sample of summer readiness of off-site and alternate-ac power systems, 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:

- August 2, 2017, core spray B
- August 22, 2017, core spray A
- September 19, 2017, standby liquid control B

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 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)

.1 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:

- July 7, 2017, electric fire pump room, Fire Area YD, Zone 23A
- July 18, 2017, core spray A, Fire Area RB-A, Zone 1A
- July 18, 2017, core spray B, Fire Area RB-B, Zone 1G
- July 19, 2017, high pressure coolant injection pump room, Fire Area RB-DI, Zone 1E

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.

.2 Annual Inspection

a. Inspection Scope

This evaluation included observation of an announced fire drill for T-932-N carbon filter for AC-T-1A on August 17, 2017.

During this drill, the inspectors evaluated the capability of the fire brigade members, the leadership ability of the brigade leader, the brigade's use of turnout gear and fire-fighting equipment, and the effectiveness of the fire brigade's team operation. The inspectors also reviewed whether the licensee's fire brigade met NRC requirements for training, dedicated size and membership, and equipment.

These activities constituted one annual inspection sample, as defined in Inspection Procedure 71111.05.

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 August 23, 2017, the inspectors observed simulator training for an operating crew. The inspectors assessed the performance of the operators and the evaluators' critique of their performance.

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 August 19, 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 70 percent down-power for rod pattern adjustment and surveillance testing. The inspectors observed the operators' performance of the following activities:

- Control rod manipulations for a down-power and rod pattern adjustment, including the pre-job brief
- Quarterly turbine valve surveillance testing, 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.

1R12 Maintenance Effectiveness (71111.12)

Routine Maintenance Effectiveness

a. Inspection Scope

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

- September 28, 2017, core spray 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 one maintenance effectiveness sample, 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:

- August 2, 2017, core spray A planned maintenance window
- August 8, 2017, Division I service water strainer inspection

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 result of the assessments.

These activities constituted completion of two maintenance risk assessment inspection samples, as defined in Inspection Procedure 71111.13.

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15)

a. Inspection Scope

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

- July 28, 2017, operability determination of the 27X71G degraded voltage time delay relay failure
- July 31, 2017, operability determination of the drywell equipment drain sump discharge isolation valve accumulator failed drop down test
- August 2, 2017, operability determination of the Division I service water isolation valve SW-MOV-36 inservice testing
- August 28, 2017, operability determination of the northeast quad core spray A fan coil unit air flow testing failure
- September 5, 2017, operability determination of the reactor water cleanup motor operated valve 74 seat leakage and potential impacts to thermal power

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.

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

b. Findings

Introduction. The inspectors reviewed a Green, self-revealed, non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to assure that appropriate measures were established for the selection and review for suitability of application of materials, parts, equipment, and processes that were essential to the safety-related functions of a safety-related reactor building fan coil unit (FCU). Specifically, on March 9, 2016, the licensee installed a new coil for the reactor building northeast quad FCU, but failed to assure the suitability of application of the materials, parts, and equipment associated with the new coil design in that the new component had measurably higher air resistance across the coil than the previous design. As a result, after installation of the component in the system, on August 1, 2017, the FCU failed air flow surveillance testing during the next performance of the test, resulting in the FCU being declared inoperable.

Description. On August 1, 2017, during a maintenance window for the reactor core isolation cooling (RCIC) system and the supporting northeast quad FCU, the licensee discovered that the FCU failed on-demand air flow testing that was being performed as part of the work window. Specifically, during air flow surveillance testing for the FCU, the licensee recorded air flow at a rate of 6705 scfm. This was below the surveillance procedure acceptance criterion of 6975 scfm, which was based on a design basis calculation for the minimum air flow required to support operability of the RCIC and core spray (CS) A systems located in the room. The inspectors noted that the cooling coil that appeared to have led to the FCU equipment failure was installed on March 9, 2016, and that it was of a new design and manufacturer, as compared to the previously installed cooling coil.

The licensee developed a troubleshooting plan to assess and repair the cause of the low air flow through the FCU. Troubleshooting activities included an action to clean the air side of the cooling coil with pressurized air, to help determine whether dust or debris accumulation had been the cause. Following the cleaning activities, coil air flow again tested below the design requirements, with data indicating a flow of 6842.5 scfm. The licensee used several additional tests with different instruments to validate this result. Finally, the licensee took action to clean the cooling coil with pressurized water. As a result, the air flow rate was restored to slightly above the minimum requirements, with air flow recorded at 6977.5 scfm. The licensee recognized that the FCU was still vulnerable to failure with the existing coil installed, so they developed compensatory measures to help maintain the operability of the FCU until final corrective action could be taken. Compensatory actions included using engineering judgement to perform a re-evaluation of a new minimum air flow requirement of 6662 scfm for operability purposes, and performance of FCU air flow testing at a 2-month interval to confirm that the FCU maintained the capability to perform its function.

The inspectors reviewed the causal evaluation and operability evaluation associated with the issue, along with the engineering part equivalency evaluation performed for the 2016 cooling coil, the work order that installed the coil, and a history of documented condition reports. The inspectors noted that the licensee's causal evaluation concluded that inadequate parts and a design that was not equivalent to the old coil design were the causes of the equipment failure. More specifically, due to coil design deficiencies, high differential pressure across the air side of the cooling coil and poor coil thermal performance resulted in low FCU air flow and room cooling efficiency during testing. In fact, the inspectors noted that following work on March 9, 2016, to install the new coil, the FCU experienced an immediate and measurable decrease in air flow from where the FCU flow had been trending since 2009. Specifically, after coil replacement, air flow dropped from 7950 scfm on July 8, 2015, to 7360 scfm on March 9, 2016. The inspectors noted that the drop in air flow that came with the new coil provided an opportunity to identify the inadequacy of the new coil, and that the organization had failed to ensure that design margins associated with the function of the FCU were carefully guarded.

The inspectors also noted that the normal preventative maintenance activity to clean, inspect, and test the installed FCU coils occurred at a 3-year frequency. Interviews with engineering personnel revealed that in many cases with the previous coil design, which had been installed since the 1990's, no cleaning was necessary. However, the inspectors noted that in the case of the new coil, the FCU failed on-demand testing after only 1.5 years, with only very light dust accumulation discovered on the coil after the test

failure. The inspectors noted that this early and unexpected air flow failure, when compared to the performance of the previous coil, provided significant evidence to support the licensee's conclusion of the inadequacy of design and lack of suitability of the coil installed in 2016.

During their review, the inspectors noted several weaknesses in the licensee's causal evaluation for this issue. Specifically, the evaluation did not address any causal implications of a condition report (CR-CNS-2016-01204) that was generated on March 3, 2016, six days before the coil was installed in the plant. This condition report had identified that the replacement coil was found damaged. The condition report stated that the coil was found with some structural damage to the coil casing, tubing sheets on each end of the coil were bowed inward, and the associated flanges had minor bends. At the time of the condition report, the licensee determined that the part could be installed with the damage, and that the coil remained fully capable of performing its intended function. However, the inspectors questioned that assessment, when considering the August 2017 equipment failure. The licensee initiated an additional corrective action to further evaluate whether this concern and other factors led to the installation of an unsuitable component.

The inspectors also noted that the engineering part equivalency evaluation, Change Evaluation Document 6005501, concluded that thickness of the fins on the cooling coil being installed in 2016 was the same as the previous coil. These fins are used to transfer heat from the air to the cooling water, and fin thickness could impact air flow across the coil. However, the inspectors observed that the work order that installed the 2016 cooling coil, Work Order (WO) 5039939, Operation 20, directed maintenance personnel to, "Verify that the new coils are identical to the existing except for fin thickness." The inspectors also noted during a walkdown that the new fin design appeared to be corrugated when compared to the previous design of coil (still installed on another reactor building FCU), which had smooth, straight fins. As a result, the inspectors questioned whether the fins were, in fact, different between the two coils. The took additional action to investigate this potential deviation, and this action remained in progress at the end of the inspection period. The inspectors concluded that if a difference existed, it could have contributed to the event, and the deviation could have contributed to the inadequacy of the parts used in the FCU. This potential cause was not identified or discussed in the licensee's causal evaluation.

Analysis. The licensee's failure to assure that the newly designed coil installed in the northeast quad FCU was appropriately reviewed for suitability and adequacy was a performance deficiency. The performance deficiency was evaluated using Inspection Manual Chapter 0612, Appendix B, "Issue Screening," dated September 7, 2012, and was associated with the Mitigating Systems Cornerstone. The performance deficiency was more than minor, and therefore a finding, because it was associated with the equipment performance attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the performance deficiency resulted in the northeast quad FCU being declared inoperable. 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: was not a design deficiency where the component maintained operability; did not represent a loss of system and/or function; did not represent an actual loss of

function of at least a single train for longer than its technical specification allowed outage time; and did not result in the loss of a high safety-significant, nontechnical specification train. The finding had a cross-cutting aspect in the area of human performance associated with design margins, because the licensee failed to ensure that the organization operated and maintained equipment within design margins, and failed to ensure that these margins were carefully guarded and changed only through a systematic and rigorous process with special attention placed on maintaining safety-related equipment. Specifically, although the new FCU's air flow immediately degraded from 7950 scfm to 7360 scfm after coil installation in 2016, which significantly degraded the margin to the minimum flow requirements, the licensee did not take action to address the degraded performance until it failed subsequent air flow testing [H.6].

Enforcement. As required by 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for those SSCs to which this appendix applies, design control measures shall be established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of the SSCs. Contrary to the above, between March 9, 2016, and August 1, 2017, for an SSC to which the appendix applies, design control measures were not established for the selection and review for suitability of application of materials, parts, equipment, and processes that were essential to the safety-related functions of the SSC. Specifically, the licensee installed a new coil for the reactor building northeast quad FCU, but failed to assure the suitability of application of the materials, parts, and equipment associated with the new coil design, in that the new component had measurably higher air resistance across the coil than the previous design. As a result, after installation of the component in the system, on August 1, 2017, the FCU failed air flow surveillance testing during the next performance of the test, resulting in the FCU being declared inoperable. Corrective actions to restore compliance included cooling coil cleaning activities, implementation of compensatory measures to restore operability, and generation of a work order to replace the degraded cooling coil. 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-2017-04701, 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 05000298/2017003-01, "Failure to Ensure Suitability of Materials for the Reactor Building Northeast Fan Coil Unit")

1R18 Plant Modifications (71111.18)

a. Inspection Scope

On September 29, 2017, the inspectors reviewed a temporary modification to the reactor water cleanup system for a new flow instrument input to the core thermal power calculation.

The inspectors verified that the licensee had installed this temporary modification in accordance with technically adequate design documents. The inspectors verified that this modification did not adversely impact the operability or availability of affected SSCs. The inspectors reviewed design documentation and plant procedures affected by the modification to verify the licensee maintained configuration control.

These activities constituted completion of one sample of temporary modifications, as defined in Inspection Procedure 71111.18.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19)

a. Inspection Scope

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

- July 28, 2017, 27X71G degraded voltage time delay relay
- August 4, 2017, core spray A maintenance window
- August 22, 2017, REC-MO-714MV maintenance
- August 23, 2017, core spray B maintenance window
- September 28, 2017, air operated valve 94 and 95 drywell equipment drain sump containment isolation valve work

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 five 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 nine 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:

- August 2, 2017, core spray A valve inservice surveillance testing

Reactor coolant system leak detection tests:

- September 7, 2017, unidentified leakage testing

Other surveillance tests:

- July 19, 2017, high pressure coolant injection inservice test
- July 27, 2017, recirc flow unit flow biased average power range monitor functional test
- July 31, 2017, Division I 4160 V undervoltage relay testing
- August 7, 2017, emergency diesel generator 1, 31 day inservice test
- August 23, 2017, Division II average power range monitor system channel calibration
- August 25, 2017, main steam line high flow surveillance test
- September 29, 2017, standby gas treatment fan surveillance 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 test satisfied appropriate acceptance criteria. The inspectors verified that the licensee restored the operability of the affected SSCs following testing.

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

b. Findings

Introduction. The inspectors identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," for multiple examples of the licensee's failure to assure that required testing was performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents. Specifically, on July 12, 2017, the inspectors identified that Surveillance Procedure 6.1SGT.501, "Standby Gas Treatment A Carbon Sample, Carbon Adsorber and HEPA Filter In-place Leak Test, and Components Leak Test," Revision 16, failed to account for test instrument uncertainty in the surveillance acceptance criteria. In response to the inspectors' question, the licensee discovered that instrument uncertainty was not accounted for in several standby gas treatment (SGT) system surveillance procedures, as well as surveillance procedures for the control room emergency filter system (CREFS); diesel generator ventilation (DG HVAC) system; control building essential ventilation system; emergency core cooling system (ECCS) essential ventilation; and several emergency preparedness (EP) ventilation systems.

Description. On July 12, 2017, the inspectors noted that the acceptance criteria contained in Surveillance Procedure 6.1SGT.501, "Standby Gas Treatment A Carbon Sample, Carbon Adsorber and HEPA Filter In-place Leak Test, and Components Leak Test," Revision 16, appeared to match the acceptance criteria contained within the technical specifications (TS). TS 5.5.7, "Ventilation Filter Testing Program (VFTP)," specified required flow rates of 1602-1958 cfm for the SGT system, which matched the acceptance criteria in the surveillance procedure. As a result, the inspectors questioned

whether the surveillance procedure acceptance criteria had accounted for the instrument error of the measuring and test equipment (M&TE).

The inspectors referenced numerous NRC findings previously documented throughout the industry, including one at Cooper (NRC Inspection Report 97-10), and NRC Information Notice 98-22, "Deficiencies Identified During NRC Design Inspections," which discussed the need to account for instrument uncertainty in surveillance procedure acceptance criteria. In addition, licensee Procedure 0-PWG-01, "Procedure Writer's Guide," Revision 20, Steps 9.8.4.7 and 9.8.4.8, directed the determination of instrument inaccuracies and incorporation of those inaccuracies into the acceptance criteria. Specifically, as a guideline for the development of acceptance criteria, Step 9.8.4.7, stated, "Determine the instrument accuracy for the devices measuring these operational parameters." Step 9.8.4.8, stated, "Establish the acceptance criteria based on the most conservative operational parameter values and conservative indication due to instrument inaccuracy."

The licensee reviewed the inspectors' questions, and determined that the SGT surveillance procedure acceptance criteria had not accounted for instrument uncertainty. The licensee expanded their review of this question to other ventilation systems to determine where else the condition could exist. As a result of this review, the licensee discovered that 20 ventilation system surveillance procedures, which encompassed 100 percent of the evaluation scope, had failed to account for instrument uncertainty in acceptance criteria limits. The licensee took action to initiate procedure changes accordingly. Affected procedures included:

- CREFS: 6.HV.104 and 6.HV.105
- SGT: 6.1/2.SGT.101; 6.1/2.SGT.401; and 6.1/2.SGT.501
- DG HVAC: 6.1/2.HV.602
- ECCS ventilation: 6.2.HV.601; 6.1.HV.601; 6.HV.601; 6.2.HV.603; and 6.1.HV.603
- Control building essential ventilation: 15.HV.107 and 15.HV.108
- EP ventilation: 15.HV.102; 15.HV.103; and 15.HV.104

The inspectors reviewed the licensee's response to the issue. The inspectors noted that while the review of ventilation procedures appeared to be very thorough, the condition report for the issue had been classified in the corrective action program as a "C-Broke/Fix." As a result, the evaluation made no attempt to identify a cause of the apparent programmatic breakdown that occurred in this case. In addition, the inspectors discovered that the extent of condition review was focused only on ventilation systems, and did not look more broadly at other systems that could be affected. As a result, the licensee gave no consideration to where else beyond ventilation systems this condition could exist in the plant. The inspectors observed that given the large number of surveillance procedures known to be impacted by the condition, the condition should have received a higher classification than a "C-Broke/Fix," to ensure that the issue, cause, and full extent of condition were thoroughly evaluated. As a result of the

violation, the licensee initiated action to perform a “B” level causal evaluation and a more broadly scoped extent of condition review.

Analysis. The inspectors determined that the licensee’s failure to assure surveillance test procedures for safety-related ventilation systems incorporated test instrument uncertainty into acceptance criteria was a performance deficiency. Because the systems involved in this performance deficiency were systems that mitigate the consequences of accidents, the inspectors evaluated the finding under the Mitigating Systems Cornerstone. In accordance with Inspection Manual Chapter 0612, Appendix B, “Issue Screening,” dated September 7, 2012, the inspectors determined that the performance deficiency was more than minor, and therefore a finding, because it was a programmatic deficiency which adversely impacted the procedure quality attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the acceptance criteria for the licensee’s safety-related ventilation systems did not assure the availability of these systems to respond to accident conditions, as required by the technical specifications. The inspectors assessed the significance of this finding in accordance with Inspection Manual Chapter 0609, Appendix A, “The Significance Determination Process (SDP) for Findings at Power,” dated June 19, 2012, and determined this finding was of very low safety significance (Green) because it: was not a design deficiency; did not represent a loss of system and/or function; did not represent an actual loss of function of at least a single train for longer than its technical specification allowed outage time; and did not result in the loss of a high safety-significant, nontechnical specification train. The finding had a cross-cutting aspect in the area of human performance associated with documentation because the licensee failed to ensure that the organization created and maintained complete, accurate, and up-to-date documentation [H.7].

Enforcement. As required by 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," “A test program shall be established to assure that all testing required to demonstrate that structures, systems, and components (SSCs) will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents.” Contrary to the above, prior to July 12, 2017, the licensee’s test program failed to assure that all testing required to demonstrate that SSCs will perform satisfactorily in service was identified and performed in accordance with written test procedures which incorporated the requirements and acceptance limits contained in applicable design documents. Specifically, Surveillance Procedure 6.1SGT.501, “Standby Gas Treatment A Carbon Sample, Carbon Adsorber and HEPA Filter In-place Leak Test, and Components Leak Test,” Revision 16, a procedure affecting quality, failed to account for test instrument uncertainty in the surveillance acceptance criteria. This violation had multiple examples, which impacted surveillance procedures for additional safety-related systems, including SGT; CREFS; DG HVAC; control building essential ventilation; ECCS ventilation; and several EP ventilation systems. Corrective actions to restore compliance included incorporation of instrument uncertainty into procedure changes for the affected surveillance procedures and verification that the new acceptance criteria did not challenge past operability for the affected systems. 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-2017-04229, 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 05000298/2017003-02, “Failure to Account for Instrument Uncertainty in Safety-Related Ventilation Surveillance Procedures”)

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation (71114.06)

Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors observed an emergency preparedness drill on August 15, 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 simulator and Emergency Operations Facility, 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.

4. OTHER ACTIVITIES

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

4OA1 Performance Indicator Verification (71151)

Unplanned Scrams with Complications (IE04)

a. Inspection Scope

The inspectors reviewed the licensee’s basis for including or excluding in this performance indicator each scram that occurred between July 1, 2016, and June 30, 2017. 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 data reported.

These activities constituted verification of the unplanned scrams with complications performance indicator, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152)

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.

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

(Closed) Licensee Event Report (LER) 05000298/2017003-00, "Mispositioned Control Room Emergency Filter System Supply Fan Damper Causes Loss of Safety Function"

a. Inspection Scope

On May 26, 2017, a control room emergency filter system (CREFS) supply fan discharge damper was discovered to be partially closed, limiting air flow to less than the technical specification (TS) required minimum flow. Operations personnel declared CREFS inoperable and entered the associated action for TS 3.7.4, Condition A. Subsequent investigation revealed that the damper positioning rod was correctly positioned; however, the T-handle for the rod had been overtightened causing the rod to bend upward, which resulted in the damper being partially closed rather than in its correct full open position. The positioning rod for HV-AD-AD1021B (the B supply fan discharge damper) was replaced, and CREFS was declared operable on May 27, 2017.

The licensee's causal evaluation determined that the direct cause of the event was that the T-handle for the damper positioning rod for HV-AD-AD1021B was overtightened causing the control arm to bend upward, mispositioning the damper. The apparent cause, or causal factor, identified by the licensee was that the design of the damper positioning rod was susceptible to bending due to overtightening of the T-handles. The licensee's planned corrective actions to prevent recurrence include modification of the design of both CREFS damper positioning rods and the means of securing them in position to prevent bending of the rods.

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, including station logs and TS requirements; walked down the affected components; and discussed the events with the licensee. The inspectors also reviewed the root cause evaluation, extent of condition

and cause reviews, and the corrective actions associated with the event to ensure they were appropriate.

This licensee event report is closed.

b. Findings and Observations

One finding was identified as discussed below. In addition, during a review of the licensee's causal evaluation and a review of the LER for this event, the inspectors identified several weaknesses and inaccuracies. The inspectors noted that the causal evaluation had identified a causal factor linked to the inadequate design of the damper positioning rods. This appeared to be an appropriate causal factor; however, the licensee had not considered several other potential causal factors in their evaluation, including post-maintenance testing and material deficiencies. In addition, the evaluation mistakenly determined that when the positioning rods were discovered bent for a second time during the work window, the rods were replaced. The inspectors also observed that the evaluation did not utilize an equipment failure evaluation to draw its conclusions; rather, it relied solely on the use of a 'why staircase,' and appeared to have some predetermined causal conclusions. During their review of the LER, the inspectors identified that the LER incorrectedly stated that the bent damper positioning rods had been replaced twice during the maintenance window. The licensee had also listed the direct cause of equipment failure as the "Cause" of the event, when this section of the LER should have referenced the identified root cause, apparent cause, or in this case, key causal factor. The licensee documented these concerns in the corrective action program as CR-CNS-2017-06004.

Introduction. The inspectors identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," for the licensee's failure to assure that all testing required to demonstrate that the CREF system would perform satisfactorily in service was identified and performed in accordance with written test procedures. Specifically, on May 25, 2017, following corrective maintenance to replace bent positioning rods for the A and B discharge dampers for the control room supply fans, the licensee failed to ensure that all testing described in Maintenance Procedure 7.0.5, "CNS Post-Maintenance Testing," Revision 53, was identified and performed, in order to assure that the control room filter system would be able to perform its safety function. As a result, on May 26, 2017, after the licensee restored the system back to service, the in-service B discharge damper was found partially closed, resulting in the supply fan failing to meet minimum flow requirements and the CREF system being declared inoperable.

Description. On May 26, 2017, when opening a door to the control room, operations personnel noted that the control room seemed to be at a negative pressure, when it should have been maintained at a positive pressure. Investigation revealed that a CREFS supply fan discharge damper was partially closed. As a result, operations personnel performed CREFS surveillance testing, which revealed that air flow was 802 cfm and was less than the TS required minimum flow of 810 cfm. Operations personnel declared CREFS inoperable, entered the associated TS action, and made an event report to the NRC for a potential loss of safety function for the single train CREF system. Subsequent investigation revealed that the damper positioning rod was correctly positioned; however, the T-handle for the rod had been overtightened causing the rod to bend upward, resulting in the damper being partially closed rather than in its correct full open position.

The inspectors reviewed the event report, the licensee's causal evaluation, related condition reports, test records, log entries, and completed work orders associated with the May 2017 CREFS maintenance window. The inspectors noted that the supply fan discharge damper positioning rods had been installed as part of a 2012 design change to allow operators to adjust damper positions more easily. The positioning rods had presented many challenges to operations personnel since installation, and the rods' susceptibility to bending was a known deficiency. In fact, the May 2017 work window had included a corrective maintenance work order that replaced the originally installed rods, since they had bent over time. The inspectors observed that after replacement of the positioning rods on May 22-23, 2017, maintenance personnel discovered that they were again bent on May 23, 2017, and a condition report (CR) was generated. However, this time the licensee did not take any action to correct the condition.

After additional review, the inspectors determined that appropriate post-maintenance testing (PMT) activities could have allowed discovery of the impacts of the bent rod condition on the operability of CREFS prior to the event. Specifically, the inspectors noted that after work was performed to replace the damper positioning rods under Work Order (WO) 5127355, the only PMTs assigned to the work order were associated with stroking and position verification of the dampers. The inspectors discovered that Procedure 7.0.5, "CNS Post-Maintenance Testing," Revision 54, provided guidelines for general damper maintenance PMTs, which directed damper stroke testing and position verification. However, a note in the section associated with general damper work stated, "If ducting or damper is associated with CREF or SGT, see component matrix for that system." In the CREFS matrix, for repair of valves (dampers), the procedure directed performance of "6.HV.101 (fan and valve operability test), 6.HV.104 (fan capacity test), and 6.HV.105 (envelope pressurization tests)." None of these surveillance tests were performed as the PMT for WO 5127355.

The inspectors discovered that on May 24, 2017, during the work window, the licensee had performed Surveillance Procedure 6.HV.104, "Control Room Emergency Filter System Flow Test, Charcoal and HEPA Filter Leak Test, Filter DP Test, and Charcoal Sample Analysis," Revision 17, as part of a CREFS flow balancing activity (not as a PMT for the damper work). The inspectors discovered that during this activity, the as-found test data revealed a flow of 780.6 cfm against a minimum requirement of 810 cfm. The inspectors concluded that if this test had been performed as a PMT for the damper work, it would have resulted in a failed PMT and an opportunity to identify B damper positioner issues prior to CREFS restoration. However, as the test was only a flow balancing activity, the licensee failed to recognize the significance of the test data, did not generate a condition report, and instead took action to adjust air flow using a system flow balancing damper. While this action restored system air flow above 810 cfm to approximately 840 cfm at the time it was performed, it potentially masked a quickly degrading condition associated with the positioning rod. As a result, the inspectors concluded that the licensee had failed to perform an adequate PMT for WO 5127355.

Analysis. The licensee's failure to assure that adequate post-maintenance testing was identified and performed for work on the control room supply fan discharge dampers was a performance deficiency. Using Inspection Manual Chapter 0612, Appendix B, "Issue Screening," dated September 7, 2012, the inspectors determined the performance deficiency was more than minor, and therefore a finding, because it was associated with the structure, system, and component (SSC) and barrier performance attribute of the

Barrier Integrity Cornerstone and adversely affected the cornerstone objective to provide reasonable assurance that physical design barriers (control room envelope) protect the public from radionuclide releases caused by accidents or events. Specifically, the finding resulted in control room supply fan B failing to meet minimum flow requirements and the control room emergency filter system being declared inoperable. 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 represent a degradation of the barrier function of the control room against smoke or a toxic atmosphere. The finding had a cross-cutting aspect in the area of problem identification and resolution associated with evaluation. Specifically, the licensee failed to ensure that the organization thoroughly evaluated indications of degraded supply fan flow that occurred during work window testing, and failed to properly assess bent discharge damper positioning rod deficiencies discovered during the maintenance activities, to ensure that resolutions addressed causes and extent of conditions commensurate with their safety significance [P.2].

Enforcement. As required by 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," "A test program shall be established to assure that all testing required to demonstrate that SSCs will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents." Contrary to the above, on May 25, 2017, the licensee's test program failed to assure that all testing required to demonstrate that SSCs will perform satisfactorily in service was identified and performed in accordance with written test procedures which incorporated the requirements and acceptance limits contained in applicable design documents. Specifically, following corrective maintenance to replace bent positioning rods for the A and B discharge dampers for the control room supply fans, the licensee failed to ensure that all testing described in Maintenance Procedure 7.0.5, "CNS Post-Maintenance Testing," Revision 53, was identified and performed, in order to assure that the control room filter system would be able to perform its safety function. As a result, on May 26, 2017, after the licensee restored the system back to service, the in-service B discharge damper was found partially closed, which resulted in the supply fan failing to meet minimum flow requirements and the CREFS being declared inoperable. Corrective actions to restore compliance included replacement of the damper positioning arm, interim actions requiring post-maintenance testing after each repositioning of the dampers, and long term actions to modify the damper control arms to prevent bending and improve position verification methods. 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-2017-05794, 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 05000298/2017003-03, "Loss of Control Room Ventilation Due to Inadequate Post-Maintenance Testing Activities")

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

4OA5 Other Activities

Operation of an Independent Spent Fuel Storage Facility at Operating Plants (60855.1)

a. Inspection Scope

A routine independent spent fuel storage installation (ISFSI) inspection was conducted at the Cooper Nuclear Station (CNS) ISFSI on July 24-27, 2017 by two NRC Region IV Division of Nuclear Material Safety inspectors. The inspectors observed spent fuel assemblies being loaded into a 61-DSC-BTH dry storage canister (DSC) and reviewed the licensee's loading, processing, and heavy load procedures associated with their current dry fuel storage campaign. The inspectors performed a review of the fuel assemblies selected for placement into the first dry fuel storage canister for the current ISFSI campaign, to verify that the licensee was loading fuel in accordance with the Transnuclear, Inc. (TN) Certificate of Compliance (CoC) 1004 technical specification (TS) approved contents. The inspectors reviewed documents including: (1) the DSC loading maps; and (2) the spent fuel assembly qualification information, including decay heat (kW), cooling time (years), average initial U-235 enrichment (%), and nuclear fuel utilization (MWd/MTU).

During the time of the NRC inspection, dry fuel storage processing operations at CNS had been delayed due to problems associated with an AREVA automated welding system (AAWS). The AAWS was instrumental in closure welding of the lid to the DSC once the spent fuel assemblies had been loaded inside. The initial phase of welding takes place prior to vacuum drying of the DSC contents. The final phase of welding takes place after the contents of the DSC have been dried and the cavity has been back-filled with helium. A technician and replacement parts were dispatched from TN headquarters to address the inoperable AAWS. In addition, a replacement automated welder was being shipped from another site for use at CNS. Despite these efforts, the AAWS remained inoperable during the time of the NRC inspection. The fuel assemblies that were loaded into the DSC remained in a safe and analyzed configuration within the spent fuel pool for the duration of the NRC's time onsite. CNS was in the process of loading the first canister (#19 overall) of its current loading campaign at the time of the inspection.

The CNS ISFSI is located roughly 700 feet west-northwest of the CNS reactor building. The ISFSP pad is a 265 by 42 feet expanse of concrete designed to hold 52 horizontal storage modules (HSMs). A concrete approach apron exists along both sides of the ISFSI pad to facilitate the transfer of loaded DSCs into the HSMs. The NRC inspectors verified the radiological conditions of the CNS ISFSI through the review of a recent radiological survey and a walk-down of the ISFSI pad with radiation survey instrumentation. The ISFSI pad was clear of any notable vegetative growth and there were no unexpected combustible or flammable items present on the storage pad. ISFSI operational items were stored in locked containers nearby and along the fence, but off of the pad itself. None of those items presented a fire hazard to the stored spent fuel. The ISFSI was appropriately posted as a radiation area (RA) and a radioactive materials area (RMA). The ISFSI pad contained 30 NUHOMS HSMs. Eighteen of the HSMs were loaded with spent fuel from previous dry fuel storage campaigns. The remaining 12 casks were planned to be loaded during the current dry fuel storage campaign. The concrete of the casks and ISFSI pad were in very good physical condition. ISFSI fence line, pad boundary, and selected HSM inlet vent radiation levels were verified by an

NRC inspectors using two Geiger-Mueller type radiation detectors calibrated to detect gamma exposure rates in micro-roentgens per hour (μR/h). The NRC inspector carried a ThermoFisher Scientific RadEye-G instrument (NRC 46790G, calibration due April 2018) and a Ludlum Model 2401-P (calibration due September 2017). The Ludlum meter was provided by the licensee so that the NRC inspector could comply with site protocols that required hand and foot frisking to detect contamination upon exiting the ISFSI radiologically controlled area (RCA). The measurements taken by the NRC inspector confirmed the measurements recorded on the most recent ISFSI survey. General ISFSI area radiation levels were 16-33 μR/h outside of the posted RA/RMA boundary. As expected, the highest radiation levels were found in close proximity to the HSM inlet vents. A randomly selected HSM inlet screen measured 14.8 mR/h. The licensee had reduced the ambient radiation levels on the ISFSI pad through the use of concrete Jersey barriers that were placed in front of the inlet vents of the loaded HSMs. The areas along the jersey barriers measured 360 μR/h to 2 mR/h. The radiological conditions in and around the ISFSI were as expected. The licensee's application of ALARA was evidenced by the use of the optional Jersey barriers on the ISFSI pad.

The licensee provided the NRC inspectors with area monitoring program records for thermoluminescent dosimeters (TLDs) placed along the inner fence surrounding the ISFSI pad. Those monitoring results show that for 2015 and 2016 an individual situated at or near the ISFSI RCA exclusion area would experience a maximum occupational dose of just under 300 mrem per year. This was below the 10 CFR 20.1502(a)(1) regulatory limit of 500 mrem per year for unmonitored workers. As a result, site workers need not be monitored for occupational dose for work activities performed near to, but outside of the ISFSI posted RA/RMA. The radiation protection program requires that all persons accessing the ISFSI to make an official RCA entry, which requires personnel dosimetry and an electronic dosimeter for real-time dose monitoring.

The CNS Radiological Environmental Monitoring Program (REMP) performs onsite and offsite monitoring for radioactive effluents (gaseous and liquid), airborne particulates, and direct radiation impacts to the local and offsite environments due to operations at the reactor site. CNS's REMP had 32 fixed monitoring locations for direct radiation using TLDs. The TLD monitoring station located near the site boundary in closest proximity to the ISFSI was Station 8, located in the western monitoring sector of the reactor site. 10 CFR 72.104(a)(2) requires that the direct radiation from the ISFSI must not exceed 25 mrem per year to any real individual located beyond the controlled area. The NRC inspectors reviewed the annual REMP Reports for 2015 (Accession No. ML16144A603) and 2016 (Accession No. ML17143A323). The results for TLD Monitoring Station 8 were only slightly elevated when compared to the monitoring results from the same location for the five years prior to the ISFSI being constructed in 2010. The monitoring results from 2015 and 2016 averaged 98.6 mrem per year. The five year average for the same location prior to construction of the ISFSI was 98 mrem per year. The net 0.6 mrem is likely more due to random fluctuations in background than actual direct influence from the ISFSI. The monitoring results show that the ISFSI had a negligible radiological impact at the site boundary. The requirements of 10 CFR 72.104 were being met.

The NRC inspectors reviewed daily HSM temperature surveillance records for the randomly selected weeks of January 17, 2016; August 7, 2016; and April 2, 2017, to ensure that the TN Standardized NUHOMS Modular Storage System CoC 1004 Technical Specification (TS) 1.3.2 surveillance requirements were being met for the

spent fuel stored on the ISFSI pad. The daily temperature surveillance results were all within the TS specified range.

The inspectors requested documents and records related to the maintenance of the cask handling crane and the annual maintenance of the licensee's special lifting devices. Documents were provided that demonstrated the cask handling crane was inspected within the past year in accordance with the requirements of the American Society of Mechanical Engineers (ASME) B30.2, "Overhead and Gantry Cranes," standards prior to the current dry fuel loading campaign. The annual maintenance as required by American National Standards Institute (ANSI) N14.6 for special lifting devices was completed for the following special lifting devices: the NUHOMS OS197 transfer cask (TC) and the TC lift yoke. The TC is a device used to facilitate the movement of the DSC between the spent fuel pool and final storage within the HSM overpack on the ISFSI pad. The TC lift yoke is an interfacing device that goes between the fuel building crane hook and TC for lifting into and out of the spent fuel pool. Both items had been subjected to visual dimensional testing and nondestructive examination by liquid penetrant in critical areas.

The licensee provided the inspectors with a list of ISFSI and reactor building crane related condition reports (CRs) that were initiated since the last NRC inspection of November 2015. When problems were identified, the licensee documented the problem in the form of a CR which gets placed into the licensee's corrective action program for disposition. Of the list of CRs provided to NRC, seven were selected by the NRC inspectors for further review. The CRs reviewed were well documented and properly categorized based on the safety significance of the issue. The specified corrective actions were assigned to the licensee's appropriate program office. Based on the types of conditions identified, the licensee demonstrated a suitably low threshold for problem identification with regard to the maintenance and operation of both their ISFSI program and the cask handling crane. No NRC safety concerns were identified related to the CRs selected for additional review during the inspection.

An on-site review of the quality assurance (QA) audit and QA surveillance reports related to dry cask storage activities at the CNS ISFSI was performed by the NRC inspectors. The Nebraska Public Power District issued QA Audit 16-05, "Radiological Controls," on August 10, 2016. The scope of the audit included the ISFSI among its areas of evaluation. Within the ISFSI section, four areas were assessed: (1) ISFSI program and licensing requirements; (2) ISFSI design control; (3) ISFSI operation; and (4) ISFSI maintenance. The QA audit found the "ISFSI" program element areas to be effective. There were no deficiencies identified and no ISFSI related condition reports were generated during the performance of the audit. The licensee had not performed any QA surveillances since the last inspection.

The licensee's most current 10 CFR 72.212 Evaluation Report was reviewed to verify that site characteristics were still bounded by the design bases of the two variations of NUHOMS® dry fuel storage systems in use at CNS. Those being the horizontal storage module (HSM) Model 202 HSM and 61BT dry shielded canister (DSC) dry spent fuel storage system used in the first dry fuel storage campaign and the HSM Model H and Type 1 61BTH DSCs used in the second and most current fuel loading campaigns. CNS's 10 CFR 72.212 Evaluation Report at the time of the inspection was the July 14, 2017, Revision 5. Two revisions had been performed to the 72.212 Evaluation Report since the last NRC routine ISFSI inspection and the changes were reviewed

during this inspection. The first revision involved including the addition of the updated ISFSI Fire Hazards Analysis to add the presence of a FLEX storage facility in the owner protected area. The FLEX building had a storage capacity of 600 gallons of diesel fuel. So the ISFSI fire hazards analysis needed to be addressed. The second revision was associated with the adoption of TN CoC 1004, Amendment 13, Revision 1, and the TN UFSAR NUH-003, Revision 15. The associated 10 CFR 72.48 screenings for both 72.212 Evaluation updates were reviewed. The screenings were determined to have been adequate and the changes to the 72.212 Evaluation Report were found to be still bounded by the applicable design bases.

The licensee's 10 CFR 72.48 screenings and evaluations for ISFSI program changes since the last NRC ISFSI inspection were reviewed to determine compliance with regulatory requirements. The majority of the 72.48 screenings were associated with procedure updates related to the licensee's move to TN CoC 1004, Amendment 13, for its current dry fuel storage campaign. CNS had performed over 20 procedure changes in support of the dry fuel storage campaign. Those changes were evaluated using the licensee's Administrative Procedure 0.4, "Procedure Change Process," Revision 65; Entergy Procedure 0-EN-LI-100, "Process Applicability Determination," Revision 18C1; and Entergy Procedure 0-EN-LI-112, "10 CFR 72.48 Evaluations," Revision 9C0. However, no full 72.48 safety evaluations were required for any of the changes that were screened. The licensee had performed one 10 CFR 50.59 screening, but no safety evaluations, for the fuel building cask handling crane since the last inspection. The 72.48 screenings that were reviewed by the NRC inspectors were determined to have been adequately evaluated.

The inspector observed that the licensee had met the licensing requirements for all of the documents and activities reviewed associated with the dry cask storage activities at CNS.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On July 27, 2017, the inspectors presented the CNS ISFSI 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 October 19, 2017, the inspectors presented the inspection results to Mr. J. Kalamaja, General Manager 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.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

T. Barker, Manager, Engineering Program and Components
R. Bates, Coordinator, Dry Fuel Storage
J. Bebb, Senior Staff Health Physicist
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
T. Forland, Engineer, Licensing
G. Gardner, Engineering Design Manager
P. Tetrick, Manager, Operations
J. Kalamaja, General Manager Plant Operations
D. Kimball, Director, Nuclear Oversight
J. Reimers, Manager, System Engineering
J. Shaw, Manager, Licensing
K. Sponholtz, Manager, Reactor Services Program
J. Stough, Manager, Emergency Preparedness
C. Sunderman, Manager, Radiation Protection

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000298/2017003-01	NCV	Failure to Ensure Suitability of Materials for the Reactor Building Northeast Fan Coil Unit (Section 1R15)
05000298/2017003-02	NCV	Failure to Account for Instrument Uncertainty in Safety-Related Ventilation Surveillance Procedures (Section 1R22)
05000298/2017003-03	NCV	Loss of Control Room Ventilation Due to Inadequate Post-Maintenance Testing Activities (Section 4OA3)

Closed

05000298/2017003-00	LER	Mispositioned Control Room Emergency Filter System Supply Fan Damper Causes Loss of Safety Function (Section 4OA3)

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Miscellaneous Documents

Number	Title	Revision
	Interface Operating Agreement Between NPPD Operations Business Unit and NPPD Nuclear Power Group Business Unit	9
98-03-04	System Engineer Desktop Guide Section IV – System Walkdown, Attachment 1 – Switchyard Walkdown Inspection	16
NC43456	Drawing, Cooper 161 kV Substation One-Line Switching Diagram	13

Procedures

Number	Title	Revision
2.1.11.3	Radwaste and Augmented Radwaste Building Data	103
2.2A.SDG	Supplemental Diesel Generator System Component Checklist	3

Condition Reports (CRs)

CR-CNS-2017-05168

Section 1R04: Equipment Alignment

Miscellaneous Documents

Number	Title	Revision/Date
1731-CS	Protected Equipment Checklist – Core Spray A Work Window	August 1, 2017
2045	CNS Flow Diagram Core Spray System, Sheet 1	N58
2045	Standby Liquid Control System Drawing, Sheet 2	N21

Procedures

Number	Title	Revision
0-PROTECT-EQP	Protected Equipment Program	38
2.2.74A	Standby Liquid Control System Component Checklist	11
2.2.74B	Standby Liquid Control System Instrument Valve Checklist	1
2.2.9	Core Spray System	79

Procedures

Number	Title	Revision
2.2A.CS.DIV1	Core Spray Component Checklist (Div 1)	4
2.2A.CS.DIV2	Core Spray Component Checklist (Div 2)	3

Condition Reports (CRs)

CR-CNS-2017-00235	CR-CNS-2017-00462	CR-CNS-2017-01234	CR-CNS-2017-01899
CR-CNS-2017-04575	CR-CNS-2017-04656	CR-CNS-2017-04671	CR-CNS-2017-04672
CR-CNS-2017-04679	CR-CNS-2017-04681	CR-CNS-2017-04686	CR-CNS-2017-04726
CR-CNS-2017-04750	CR-CNS-2017-05353	CR-CNS-2017-05594	CR-CNS-2017-05597

Work Orders

4880303	4999237	5060467	5151840	5176404

Section 1R05: Fire Protection

Miscellaneous Documents

Number	Title	Revision
	Fire Brigade Scenario #73	
11-107	NEDC, Fire Safety Analysis Area YD EPM Report R190-008-Yard	3
CNS-FP-211	Drawing	
CNS-FP-212	Drawing	
CNS-FP-214	Drawing	
FP17-BLDG-DOOR-P4	Fire Impairment	1
TPP 207	Fire Brigade Drills and Critiques	3

Procedures

Number	Title	Revision
0.23	CNS Fire Protection Plan	75
0-Barrier	Barrier Control Process	22
0-Barrier-Maps	Barrier Maps	9
0-Barrier-Misc	Miscellaneous Buildings	5
0-Barrier-Reactor	Reactor Building	12

Condition Reports (CRs)

CR-CNS-2017-02872

Work Orders

5190782

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

Miscellaneous Documents

Number	Title	Revision
SKL05151313	OPS Earthquake, Fuel Damage, Entry Into EOP 5A, 6A, and 7A, Emergency Depressurization	00

Procedures

Number	Title	Revision
6.MS.201	Main Steam Isolation Valves Operability Test (IST)	23
15.TG.301	Main Turbine Lube Oil Pumps Functional Test	8
6.RPS.302	Main Turbine Stop Valve Closure and Steam Valve Functional Test	56

Condition Reports (CRs)

CR-CNS-2017-05046 CR-CNS-2017-05050 CR-CNS-2017-05051

Section 1R12: Maintenance Effectiveness

Miscellaneous Documents

Number	Title	Revision
2045	Drawing, Flow Diagram Core Spray System, Sheet 1	N58
CS-PF01A	Maintenance Rule Function CS-PF01A Performance Criteria Basis	3
CS-PF01B	Maintenance Rule Function CS-PF01B Performance Criteria Basis	3
CS-SD1	Maintenance Rule Function CS-SD1 Performance Criteria Basis	3

Procedures

Number	Title	Revision
3-EN-DC-203	Maintenance Rule Program	3C1
3-EN-DC-204	Maintenance Rule Scope and Basis	3C1
3-EN-DC-205	Maintenance Rule Monitoring	5C1
3-EN-DC-206	Maintenance Rule (A)(1) Process	3C2
3-EN-DC-207	Maintenance Rule Periodic Assessment	3C1

Condition Reports (CRs)

CR-CNS-2016-01341	CR-CNS-2016-04073	CR-CNS-2016-05939	CR-CNS-2016-06248
CR-CNS-2016-06251	CR-CNS-2016-07134	CR-CNS-2017-00235	CR-CNS-2017-00517
CR-CNS-2017-00520	CR-CNS-2017-01132	CR-CNS-2017-01750	CR-CNS-2017-01899
CR-CNS-2017-02243	CR-CNS-2017-05093		

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Miscellaneous Documents

Number	Title	Revision/Date
2.2.71	Protected Equpment List – SW Loop A Strainer Work	June 26, 2017
1731-CS	Protected Equipment Checklist – Core Spray A Work Window	August 1, 2017
2045	Flow Diagram Core Spray System, Sheet 1	N58

Procedures

Number	Title	Revision
0-CNS-WM-102	Work Implementation and Closeout	4
0-CNS-WM-104	On-Line Schedule Risk Assessment	4
0-CNS-WM-104A	On-line Fire Risk Management Actions	3
0-EN-WM-107	Post Maintenance Testing	5C0
0-PROTECT-EQP	Protected Equipment Program	38
2.2.9	Core Spray System	79

Condition Reports (CRs)

CR-CNS-2017-04679	CR-CNS-2017-04681	CR-CNS-2017-04685	CR-CNS-2017-05340
CR-CNS-2017-05341	CR-CNS-2017-05353	CR-CNS-2017-05427	

Work Orders

4880303	4999237	5060467	5066266	5107875
5121512	5151840	5176404		

Section 1R15: Operability Determinations and Functionality Assessments

Miscellaneous Documents

Number	Title	Revision/Date
	Quad and HPCI Fan Coil Unit Engineering Trend Data	September 12, 2017
	Reactor Building Quad Fan Coil Unit Air Flow Trend Data	September 19, 2017
6.1.HV.604	Air Flow Test of Fan Coil Unit FC-R-1F (Div 1)	March 9, 2016
949-3	3 Inch 150 Pound Gate Valve Drawing	0
2010	Instrument Air Reactor Building Drawing, Sheet 2	97
2028	Reactor Building & Drywell Equipment Drain System Drawing	52
6005501	Change Evaluation Document, HV-COIL-(FC-R-1E) Replacement Coil Material Change	February 7, 2002
FMEA-CR-2017-04451	Failure Modes and Effects Analysis for 27X7 Long Delay Relay	3
MB-200-080	Nuclear Containment Cooling Coil	1

Procedures

Number	Title	Revision
0.40	Work Control Program	91
2.2.18	4160V Buses	214
2.2.66	Reactor Water Cleanup	109
2.3_9-3-1	Panel 9-3-1 Annunciator 1	37
6.DWLD.308	Drywell Sump Isolation AOV Accumulator Functional Test	11
6.SW.202	Service Water Power Operated Valve Operability Test	21

Procedures

Number	Title	Revision
6.1HV.601	Air Flow Test of Fan Coil Unit FC-R-1F (Div 1)	8
6.2EE.302	4160 V Bus 1G Undervoltage Relay and Relay Timer Functional Test	35
0-CNS-WM-105	Planning	19

Condition Reports (CRs)

CR-CNS-2016-01204	CR-CNS-2016-03231	CR-CNS-2016-05603	CR-CNS-2017-02834
CR-CNS-2017-04030	CR-CNS-2017-04349	CR-CNS-2017-04358	CR-CNS-2017-04361
CR-CNS-2017-04388	CR-CNS-2017-04451	CR-CNS-2017-04509	CR-CNS-2017-04656
CR-CNS-2017-04679	CR-CNS-2017-04681	CR-CNS-2017-04701	CR-CNS-2017-04726
CR-CNS-2017-04743	CR-CNS-2017-05618	CR-CNS-2017-05646	

Work Orders

4624197	5039939	5150833	5176406

Section 1R18: Plant Modifications

Miscellaneous Documents

Number	Title	Revision
2042	Reactor Water Clean Up System Flow Diagram, Sheet 1	35
2042	Reactor Water Clean Up System Flow Diagram, Sheet 2	15
5196944	TCC, Temporary Configuration Change – RWCU Flow to PMIS	0

Condition Reports (CRs)

CR-CNS-2017-04030	CR-CNS-2017-04177	CR-CNS-2017-04179	CR-CNS-2017-05455

Work Orders

5196942	5196944

Section 1R19: Post-Maintenance Testing

Miscellaneous Documents

Number	Title	Revision
	CNS Inservice Testing Program Basis Document	10

Miscellaneous Documents

Number	Title	Revision
02-025	NEDC, Component Level Design Basis Review for RW-AOV-AO82 and AO83	0
02-028	NEDC, Component Level Design Basis Review for RW-AOV-AO94 and AO95	0
88-072	NEDC, PW-1 & FDR-1 Accumulator Reliability and Capacity Evaluation	1
2028	P&ID Reactor Building & Drywell Equipment Drain Sump	53
2045	Flow Diagram Core Spray System, Sheet 1	N58
FMEA-CR-2017-04451	Failure Modes and Effects Analysis for 27X7 Long Delay Relay	3
IST-RAL	Inservice Testing Reference/Acceptance Limits Data File	246

Procedures

Number	Title	Revision
0-PROTECT-EQP	Protected Equipment Program	38
2.2.9	Core Spray System	79
2.2.18	4160 V Buses	214
2.2.27	Equipment, Floor, and Chemical Drain System	57
3.9	ASME OM Code Testing of Pumps and Valves	29
5.2Air	Loss of Instrument Air	21
6.DWLD.308	Drywell Sump Isolation AOV Accumulator Functional Test	11
6.MISC.401	Position Indicator Inservice Testing (IST)	17
6.PC.201	Primary Containment Isolation Power Operated Valve Operability and Closure Timing Test (IST)	37
6.PC.517	Radwaste (RW) Local Leak Rate Test	13
6.REC.201	REC Motor Operated Valve Operability Test (IST)	27
6.1CS.101	Core Spray Test Mode Surveillance Operation (IST)(Div 1)	30
6.1HV.601	Air Flow Test of Fan Coil Unit FC-R-1F (Div 1)	8
6.2CS.101	Core Spray Test Mode Surveillance Operation (IST)(Div 2)	27
6.2CS.201	CS Motor Operated Valve Operability Test (IST)(Div 2)	21
6.2EE.302	4160 V Bus 1G Undervoltage Relay and Relay Timer Functional Test	35

Procedures

Number	Title	Revision
7.0.5	CNS Post-Maintenance Testing	53
7.3.17.3	Replacing 4160 V Breakers	19

Condition Reports (CRs)

CR-CNS-2016-01967	CR-CNS-2017-04349	CR-CNS-2017-04358	CR-CNS-2017-04361
CR-CNS-2017-04388	CR-CNS-2017-04451	CR-CNS-2017-04509	CR-CNS-2017-04656
CR-CNS-2017-04668	CR-CNS-2017-05093		

Work Orders

4145595	4880303	4999237	5060467	5090814
5090931	5145591	5145594	5151018	5151019
5151840	5176404			

Section 1R22: Surveillance Testing

Miscellaneous Documents

Number	Title	Revision/Date
	Cycle 30 Drywell Unidentified Leakage Trend Data	September 9, 2017
	Cycle 30 Iodine and Particulate Data	September 9, 2017
	Primary Containment Sample Results Trend Data	September 13, 2017
	System Surveillance Date Trend Data	September 9, 2017
17-030	Engineering Change, Average Bulk Drywell Temperature Determination Using Five-Point Methodology	0
94-273	NEDC, Minimum Required Air Flow for SGT Decay	2
11314514	Unidentified Leakage Trend Routine Troubleshooting Plan Notification	2

Procedures

Number	Title	Revision
3.9	ASME OM Code Testing of Pumps and Valves	29
6.HPCI.103	HPCI IST and 92 Day Test Mode	53

Procedures

Number	Title	Revision
6.1CS.101	Core Spray Test Mode Surveillance Operation (IST)(Div 1)	30
6.1DG.101	Diesel Generator 31 Day Operability Test (IST)(Div 1)	88
6.1EE.302	4160 Bus 1F Undervoltage Relay and Relay Timer Functional Test (Div 1)	40
6.1SGT.401	SGT A Fan Capacity Test, SGT B Cooling Flow Test and Check Valve IST (Div 1)	19
6.1SGT.501	SGT A Carbon Sample, Carbon Absorber, and HEPA Filter In-place Leak Test, and Components Leak Test (Div 1)	16
6.2APRM.305	APRM System (Flow Bias and Startup) Channel Calibration (Div 2)	42
6.2PCIS.703	PCIS Main Steam Line High Flow Channel Functional Test (Div 2)	4
6.2RR.301	Reactor Recirculation Flow Unit Channel Functional Test	31
15.RR.302	Core Flow Determination	13
CNS-LI-118	Cause Evaluation Process	0

Condition Reports (CRs)

CR-CNS-2017-03305	CR-CNS-2017-04229	CR-CNS-2017-04344	CR-CNS-2017-04391
CR-CNS-2017-04668	CR-CNS-2017-04743	CR-CNS-2017-04772	CR-CNS-2017-04788
CR-CNS-2017-04790	CR-CNS-2017-04792	CR-CNS-2017-04794	CR-CNS-2017-04841
CR-CNS-2017-04845	CR-CNS-2017-05426	CR-CNS-2017-05553	CR-CNS-2017-05665
CR-CNS-2017-05816			

Work Orders

5092964 5092965

Section 1EP6: Drill Evaluation

Procedures

Number	Title	Revision
5.7.1	EPIP, Emergency Classification	58
5.7.6	EPIP, Notification	70
5.7.21	EPIP, Maintaining Emergency Preparedness – Emergency Exercises, Drills, Tests, and Evaluations	55

Procedures

Number	Title	Revision
5.8	Emergency Operating Procedures	41

Section 4OA3: Follow-up of Events and Notices of Enforcement Discretion

Miscellaneous Documents

Number	Title	Revision/Date
2017-011	Standing Order, CREFS Supply Fan Damper Post-Adjustment Testing	June 1, 2017
2017-034	Engineering Request, Degraded CREFS Airflow in Emergency Pressurization Mode	0
6032260	Change Evaluation Document, CREFS Supply Fan Damper Operator Modification	January 1, 2013
CNS-HV-52	Supply Fan Damper (AD-1021A9B) Locking Device	1

Procedures

Number	Title	Revision
2.2.84	HVAC Main Control Room and Cable Spreading Room	54
6.HV.104	Control Room Emergency Filter System Flow Test, Charcoal and HEPA Filter Leak Test, Filter DP Test, and Charcoal Sample Analysis	17
6.HV.105	Control Room Envelope Pressurization and CREFS Flow Test	17
6.HV.303	Control Room HV Isolation AOV Accumulator Functional Test	9
7.0.5	CNS Post-Maintenance Testing	54

Condition Reports (CRs)

CR-CNS-2010-01680	CR-CNS-2016-05782	CR-CNS-2016-08302	CR-CNS-2017-03096
CR-CNS-2017-03102	CR-CNS-2017-03130	CR-CNS-2017-03182	CR-CNS-2017-03186
CR-CNS-2017-03187	CR-CNS-2017-03886	CR-CNS-2017-04144	CR-CNS-2017-04254
CR-CNS-2017-05794	CR-CNS-2017-05799		

Work Orders

4310659	5078036	5127355	5127356	5155854

Section 4OA5: Other Activities

Miscellaneous Documents

Number	Title	Revision/Date
	Area Monitoring Program TLD Results	
	CNS ISFSI 10 CFR 72.212 Report	July 14, 2017
	Cooper 2011 Sipping Campaign Final Report	August 2, 2011
	Emergency Plan for Cooper Nuclear Station	69
	Vacuum Sipping Final Report Cooper Nuclear Station June 2015	August 3, 2015
0.4	(several completed) Attachments -5 and -10, Procedure Change Request	numerous
6.Log.601	Daily Surveillance Log – Modes 1, 2, and 3	119
6.Log.601	Daily Surveillance Log – Modes 1, 2, and 3	122
6.Log.601	Daily Surveillance Log – Modes 1, 2, and 3	125
6.Log.601	Daily Surveillance Log – Modes 1, 2, and 3	127
10.36A	(several completed) Fuel Selection-61BTH Configuration 3 Procedures and Associated Attachments	4
10.36B	(several competed) Fuel Selection-61BTH Configuration 4 Procedures and Associated Attachments	5
2013-173	AREVA Certificate of Conformance	4
2017-060	Radiological Work Permit	0
94010-T-003	Load Test Procedure for OS197H Transfer Cask Lifting Yoke 110 Ton Capacity	1
CNS-1704-0015	ISFSI Radiological Survey Map	
CNS RP-49	Radiological Job Plan/Map	0
EE 09-011	Dry Cask Storage Licensing Basis Implementation	5
NUH-06-105M	OS197 TC Certification Maintenance Procedure	9
NUH-06-113.51	Equipment Use Certificate (OS197 Transfer Cask)	February 6, 2017
NUH-06-113.52	Equipment Use Certificate (TC Lifting Yoke)	May 11, 2017
QAD2016-0024	QA Audit 16-05, Radiological Controls	0

Procedures

Number	Title	Revision
0.29.9	ISFSI License Basis Document Maintenance	1
0.4	Procedure Change Process	65
0-CNS-DC-211	Dry Fuel Storage Management	0
0-CNS-LI-102	Corrective Action Process	7
0-EN-LI-100	Process Applicability Determination	18C1
0-EN-LI-101	10 CFR 50.59 Evaluations	9C3
0-EN-LI-112	10 CFR 72.48 Evaluations	9C0
3.3SAFE	Safety Assessment	21
3-EN-DC-115	Engineering Change Process	15C9
6.MISC.601	Reactor Building Crane Inspection or Lift and Hold Operability Test for Cask Handling Operations	11
10.36.1	Fuel Loading/Unloading of a Dry Shielded Canister	10
10.37	Dry Shielded Canister Loading	12
10.38	Dry Shielded Canister Sealing	19
10.39	Dry Shielded Canister Transport from Reactor Building to ISFSI	15
10.40	Dry Shielded Canister Transfer from Transfer Cask to HSM	10
10.41	Dry Shielded Canister Inspection and Pre-Operational Testing	4
10.42	Transfer Trailer Inspection and Pre-Operational Testing	3
10.43	Transfer Cask Offloading and Inspection	4
10.44	Ancillary Equipment Inspections	3
10.55	ISFSI Personnel Qualification Program	
SPM 9.1	General Welding Procedure	4
SPM 9.1a	Welding Procedure Specification and Qualification	3
SPM 9.1b	Welding Performance Qualification	5
SPM 9.1c	Filler Metal Control	4
SPM 9.2	NUHOMS 61BTH Type 1 or Type 2 DSC Closure	8
TN P8-P8-GT1	Welding Procedure Specification	
TN P8-P8-GT2	Welding Procedure Specification	

Condition Reports (CRs)

CR-CNS-2016-06655	CR-CNS-2017-00489	CR-CNS-2017-00824	CR-CNS-2017-01533
CR-CNS-2017-03060	CR-CNS-2017-03781	CR-CNS-2017-03801	CR-CNS-2017-04486
CR-CNS-2017-04495	CR-CNS-2017-04504	CR-CNS-2017-04507	CR-CNS-2017-04562

Work Orders

5145723

NRC Request for Information

System: Core Spray (CS) System, Trains A & B

CD Date Requested by: July 1, 2017

Date Range of Document Request: June 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 Train A and B pump IST surveillances
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, and standing orders associated with this system
8. List of all work orders, with description of work, planned for this system within the next year
9. Provide a list and description of overdue PM's, deferred PM's, and PM change requests for this system
10. 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.
11. System design calculations for core injection capabilities
12. Provide fire impairments associated with this system
13. Copies of Pump vendor manuals, drawings (P&ID's), and system training manuals
14. System health reports and system engineering logs for this system
15. List and description of temporary modifications; completed ECs (June 30, 2015 - Current); and planned ECs (within the next year) associated with this system
16. Schedule of activities (Fragnet) for the planned AOT for CS Trains A and B scheduled for the weeks of July 31, 2017 and August 14, 2017