UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
245 PEACHTREE CENTER AVENUE NE, SUITE 1200
ATLANTA, GEORGIA 30303-1257

July 22, 2016

Mr. Steven D. Capps
Site Vice President
Duke Energy Carolinas, LLC
McGuire Nuclear Station
MG01VP/12700 Hagers Ferry Road
Huntersville, NC 28078

SUBJECT: MCGUIRE NUCLEAR STATION - NRC INTEGRATED INSPECTION REPORT 05000369/2016002 AND 05000370/2016002

Dear Mr. Capps:

On June 30, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your McGuire Nuclear Station Units 1 and 2. On July 7, 2016, the NRC inspectors discussed the results of this inspection with you and other members of your staff. Inspectors documented the results of this inspection in the enclosed inspection report.

NRC inspectors documented two findings of very low safety significance (Green) in this report. The 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 the NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, U. S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC resident inspector at the McGuire Nuclear Station. Also, 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 Regional Administrator, Region II; and the NRC resident inspector at the McGuire Nuclear Station.

In accordance with Title 10 of the Code of Federal Regulations 2.390, “Public Inspections, Exemptions, Requests for Withholding,” of the NRC's “Rules of Practice,” a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's Agencywide Document Access and Management System (ADAMS).

ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Frank Ehrhardt, Chief
Reactor Projects Branch 1
Division of Reactor Projects

Docket Nos.: 50-369, 50-370
License Nos.: NPF-9, NPF-17

Enclosure: NRC Integrated Inspection Report 05000369/2016002
and 05000370/2016002
w/Attachment - Supplemental Information

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cc: distribution via ListServLetter to Steven D. Capps from Frank Ehrhardt dated July 22, 2016.

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.:	50-369, 50-370
License Nos.:	NPF-9, NPF-17
Report No.:	05000369/2016002, 05000370/2016002
Licensee:	Duke Energy Carolinas, LLC
Facility:	McGuire Nuclear Station, Units 1 and 2
Location:	Huntersville, NC 28078
Dates:	April 1, 2016, through June 30, 2016
Inspectors:	J. Zeiler, Senior Resident Inspector R. Cureton, Resident Inspector P. Capehart, Senior Operations Engineer (Section 1R11.3) C. Dykes, Health Physicist (Sections 2RS1, 2RS3, and 4OA1) W. Loo, Senior Health Physicist (Section 2RS5) M. Meeks, Senior Operations Engineer (Section 1R11.3) A. Nielsen, Senior Health Physicist (Sections 2RS2, 2RS4, and 4OA1) J. Rivera-Ortiz, Reactor Inspector (Section 1R08) S. Shah, Operations Engineer (Qualifying) (Section 1R11.3)
Approved by:	Frank Ehrhardt, Chief Reactor Projects Branch 1 Division of Reactor Projects

Enclosure

SUMMARY

IR05000369/2016002, IR05000370/2016002; 04/01/2016 – 06/30/2016; McGuire Nuclear Station, Units 1 and 2; Inservice Inspection Activities and Refueling and Other Outage Activities.

The report covered a 3-month period of inspection by the resident inspectors and seven regional inspectors. There were two NRC-identified findings documented in this report. The significance of inspection findings are indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process (SDP)," dated April 29, 2015. Cross-cutting aspects are determined using IMC 0310, "Aspects Within The Cross-Cutting Areas," dated December 4, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy dated February 4, 2015. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process, Revision," Revision (Rev.) 5.

Cornerstone: Barrier Integrity

- Green. An NRC-identified Green non-cited violation (NCV) of 10 CFR Part 50.55a, "Codes and Standards," was identified for the licensee's failure to perform general visual examinations of moisture barrier material in the reactor containment leak-chase channel test connections in accordance with the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME BPV Code), Section XI, Subsection IWE. The licensee performed the required examinations in Unit 1 during the March 2016 refueling outage and initiated corrective actions to revise the Containment Inservice Inspection (ISI) Plan. The licensee also planned to perform similar examinations in Unit 2 prior to the end of the first containment ISI period. Additionally, the licensee performed a containment operability determination to justify continuous operation of the Unit 1 and Unit 2 containment based on the results of all visual examinations, extent of condition activities, and the results of containment integrated leak rate tests. The licensee entered this issue into their corrective action program as action request (AR) 02038505.

  The failure to conduct the required visual examination of moisture barrier material in accordance with the ASME BPV Code was a performance deficiency (PD). The PD was of more than minor significance per IMC-0612, Appendix B, "Issue Screening," because the current Containment ISI Plan did not adequately implement the ASME BPV Code requirements for the examination of moisture barriers, and if left uncorrected, it had the potential to lead to a more significant concern. The finding was of very low safety significance (Green) per IMC-0609 because it did not represent an actual open pathway in the physical integrity of the reactor containment and did not involve an actual reduction in function of hydrogen igniters in the reactor containment. The finding had a cross-cutting aspect of resolution in the problem identification and resolution cross-cutting area because the licensee did not take effective corrective actions to implement the ASME BPV code requirements in the Containment ISI Plan when a reasonable opportunity was available through the review of NRC Information Notice (IN) 2014-07. [P.3] (Section 1R08)

- Green: An NRC-identified Green NCV of Technical Specification (TS) 5.4.1.d, "Procedures," was identified for the licensee's failure to adequately implement the commitments in Selective Licensee Commitment (SLC) 16.9.25, "Refueling Operations – Containment Equipment Hatch," which required the containment equipment hatch to be closed during the movement of non-recently irradiated fuel inside containment. Specifically, during reactor vessel fuel reload activities, the inspectors identified that the equipment hatch was left partially open due to the failure to properly tighten the bolts evenly around the hatch resulting in direct communication of the containment atmosphere with the environment. The licensee took immediate corrective action to suspend fuel movements and properly tighten the equipment hatch bolts prior to resuming fuel movements and entered the issue into their corrective action program as ARs 02018605 and 02018701.

  The PD was more than minor because it impacted the configuration control attribute of the barrier integrity cornerstone and affected the cornerstone objective to provide reasonable assurance that containment protects the public from radionuclide releases caused by accidents or events. Additionally, if left uncorrected, the PD would have the potential to lead to a more significant safety concern. Specifically, the radiological barrier functionality of the containment equipment hatch was degraded due to the gap opening which could have allowed direct access of radiological releases from the containment atmosphere to the outside environment during a potential fuel handling accident inside containment. The inspectors screened the finding in accordance with IMC 0609, Appendix G, "Shutdown Operations Significance Determination Process," Attachment 1, "Shutdown Operations Significance Determination Process Phase 1 Initial Screening and Characterization of Findings." Because the finding degraded the ability to close or isolate the containment, it required review using IMC 0609, Appendix H, "Containment Integrity Significance Determination Process." While the containment boundary function was considered degraded, the incident occurred eight days after the beginning of the refueling outage when short lived volatile radioisotopes had decayed sufficiently such that the potential radiological releases to the public would not likely contribute to the large early release frequency (LERF). Based on this, the finding was screened as having very low safety significance (Green). The cause of the PD was directly related to the cross-cutting aspect of procedure adherence in the cross-cutting area of human performance because the licensee failed to follow containment equipment hatch closing procedures which explicitly required performing a visual inspection that the containment equipment hatch was sealed and secured with metal-to-metal contact with the containment hatch flange and had no visual gaps. [H.8] (Section 1R20)

REPORT DETAILS

Summary of Plant Status

Unit 1 was shutdown for a scheduled refueling outage at the beginning of the inspection period. The unit was placed back online April 17, 2016 and was returned to 100 percent rated thermal power (RTP) on April 19. The unit was operated at essentially full power for the remainder of the inspection period.

Unit 2 operated at approximately 100 percent RTP for the entire inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

a. Inspection Scope

.1 Summer Readiness of Offsite and Alternate AC Power System

The licensee did not implement equipment or procedure changes that potentially affect operation or reliability of offsite and alternate AC power systems since the last time the inspectors assessed summer readiness. The inspectors reviewed the material condition of offsite and onsite alternate AC power systems (including switchyard and transformers) by performing a walkdown of the switchyard. The inspectors reviewed outstanding work orders and assessed corrective actions for degraded conditions that impacted plant risk or required compensatory actions. Documents reviewed are listed in the attachment

The inspectors evaluated the following risk-significant system:

- standby shutdown facility

.2 Seasonal Extreme Weather Conditions

The inspectors conducted a detailed review of the station's adverse weather procedures written for extreme high temperatures. The inspectors verified that weather-related equipment deficiencies identified during the previous year had been placed into the work control process and/or corrected before the onset of seasonal extremes. The inspectors evaluated the licensee's implementation of adverse weather preparation procedures and compensatory measures before the onset of seasonal hot weather conditions. Documents reviewed are listed in the attachment.

The inspectors evaluated the following risk-significant systems/areas:

- Unit 1 and Unit 2 exterior and interior doghouse areas
- Unit 1 and Unit 2 containment ventilation system cooling to auxiliary and fuel building air handling units

1R04 Equipment Alignment (71111.04)

a. Inspection Scope

.1 Partial Walkdown

The inspectors verified that critical portions of the selected systems were correctly aligned by performing partial walkdowns. The inspectors selected systems for assessment because they were a redundant or backup system or train, were important for mitigating risk for the current plant conditions, had been recently realigned, or were a single-train system. The inspectors determined the correct system lineup by reviewing plant procedures and drawings. Documents reviewed are listed in the attachment.

The inspectors selected the following three systems or trains to inspect:

- 1A safety injection (NI) pump while the 1B NI pump was out of service for planned maintenance
- 2B residual heat removal (ND) pump while the 2A ND pump was out of service for planned maintenance
- 2B emergency diesel generator (EDG) while the 2A EDG was out of service for planned maintenance

b. Findings

No findings were identified.

.2 Complete Walkdown

The inspectors verified the alignment of the auxiliary steam (SA) system to the Unit 1 and Unit 2 turbine driven auxiliary feedwater (TDCA) pumps. The inspectors selected these systems for assessment because they are risk-significant mitigating systems. The inspectors determined the correct systems lineup by reviewing plant procedures, drawings, the updated final safety analysis report (UFSAR), and other documents. The inspectors reviewed records related to the systems design, maintenance work requests, and deficiencies. The inspectors verified that the selected systems were correctly aligned by performing complete walkdowns of accessible components.

To verify the licensee was identifying and resolving equipment alignment discrepancies, the inspectors reviewed corrective action documents, including ARs and outstanding work orders. The inspectors also reviewed periodic reports containing information on the status of risk-significant systems, including maintenance rule reports and system health reports. Documents reviewed are listed in the attachment.

b. Findings

No findings were identified.

1R05 Fire Protection (71111.05AQ)

a. Inspection Scope

Quarterly Inspection

The inspectors evaluated the adequacy of selected fire plans by comparing the fire plans to the defined hazards and defense-in-depth features specified in the fire protection program. In evaluating the fire plans, the inspectors assessed the following items:

- control of transient combustibles and ignition sources
- fire detection systems
- fire suppression systems
- manual firefighting equipment and capability
- passive fire protection features
- compensatory measures and fire watches
- issues related to fire protection contained in the licensee's corrective action program

The inspectors toured the following five fire areas to assess material condition and operational status of fire protection equipment. Documents reviewed are listed in the attachment.

- Unit 1 motor generator (M/G) set room (fire area 22)
- Unit 2 M/G set room (fire area 23)
- Unit 2 essential switchgear room 2ETB and auxiliary building 733 elevation electrical penetration room (fire areas 10 and 12)
- Unit 1 lower containment (fire area 32)
- 2A and 2B EDG rooms (fire areas 7 and 8)

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06)

a. Inspection Scope

.1 Internal Flooding

The inspectors reviewed related flood analysis documents and walked down the areas listed below containing risk-significant structures, systems, and components susceptible to flooding. The inspectors verified that plant design features and plant procedures for flood mitigation were consistent with design requirements and internal flooding analysis assumptions. The inspectors also assessed the condition of flood protection barriers and drain systems. In addition, the inspectors verified the licensee was identifying and properly addressing issues using the corrective action program. Documents reviewed are listed in the attachment.

- Unit 1 auxiliary building 695 foot elevation
- Unit 2 auxiliary building 695 foot elevation

1R07 Heat Sink Performance (71111.07)

a. Inspection Scope

Annual Review

The inspectors verified the readiness and availability of the "A" and "B" train Unit 1 component cooling water heat exchangers to perform their design function by observing portions of the performance tests and reviewing the completed test reports conducted during the most recent spring 2016 refueling outage and reviewing test reports from the previous outage. The inspectors verified the licensee used the periodic maintenance method outlined in Heat Exchanger Engineering Support Document, dated July 15, 2014, observed the licensee's heat exchanger cleaning and eddy current testing and reviewed the test results, and discussed the heat exchanger program with the responsible engineer. Additionally, the inspectors verified that the licensee entered any significant heat exchanger performance problems into the corrective action program and that the licensee's corrective actions were appropriate. Documents reviewed are listed in the attachment.

b. Findings

No findings were identified.

1R08 Inservice Inspection (ISI) Activities (71111.08)

a. Inspection Scope

Non-Destructive Examination Activities and Welding Activities

From March 28 – April 1, 2016, the inspectors conducted an onsite review of the implementation of the licensee's ISI program for monitoring degradation of the reactor coolant system boundary, risk-significant piping and component boundaries, and containment boundaries in Unit 1.

The inspectors reviewed documentation for the following non-destructive examinations (NDEs) mandated by the ASME BPV Code (Code of Record: 2007 Edition through 2008 Addenda) or McGuire's Risk-Informed ISI Program to evaluate compliance with the applicable requirements, and verify that indications or defects were dispositioned in accordance with the ASME BPV Code, or an NRC-approved alternative requirement. The inspectors also reviewed the qualifications of the NDE personnel performing the examinations to determine whether they were in compliance with the ASME BPV Code requirements.

- ultrasonic examination (UT) of weld 1NC1F3920, reactor coolant system, ASME Class 1
- UT of weld RN1F279, pipe-to-elbow weld, nuclear service water system, ASME Class 3
- UT of weld 1NC1F-1374, pipe-to-nozzle weld, reactor coolant system, ASME Class 1 (Pre-Service Inspection)

- UT of cold leg 1D nozzle 4-1, nozzle to pipe weld, ASME Class 1 (Augmented Exam for Electric Power Research Institute (EPRI) Materials Reliability Program MRP-146)
- liquid penetrant examination of component 1-MCR-NC-762, piping welded attachment, ASME Class 1
- visual examination of reactor vessel bottom-mounted instrument penetrations (Augmented Exam per ASME Code Case N-722-1)

The inspectors reviewed final records for the welding activities listed below to evaluate compliance with procedures and the ASME BPV Code, Section XI and Section IX requirements. Specifically, the inspectors reviewed the work order (WO), repair and replacement plan, weld data sheets, welding procedures, procedure qualification records, welder performance qualification records, and NDE reports.

- Weld Document 142303 (WO 2153228), reactor coolant system, ASME Class 1
- Weld Document 142862 (WO 2097603), service water system, ASME Class 3

The inspectors reviewed the licensee's disposition of the relevant indications listed below, which were identified during volumetric examinations performed in the previous and most recent refueling outages. The inspectors verified that the analytical evaluation of indications for continuous service met the applicable requirements in the ASME BPV Code, Section XI or an NRC-approved alternative.

- circumferential indication in weld 1NC1F-1374, pipe-to-nozzle weld, reactor coolant system, ASME Class 1 (2014 Unit 1 refueling outage)
- circumferential indications in weld 1PZR-1 (M1.B2.11.0001), pressurizer lower head to shell weld, reactor coolant system, ASME Class 1 (2016 Unit 1 refueling outage)

Pressurized Water Reactor Vessel Upper Head Penetration Inspection Activities

The inspectors reviewed the final examination report for the bare metal visual examination of the reactor vessel upper head penetrations (NDE Report VT-16-1166) to determine if the examinations were performed in accordance with the requirements of ASME Code. Additionally, the inspectors reviewed the examination report to determine if the required examination coverage was achieved and if limitations were recorded in accordance with the licensee procedures.

The inspectors reviewed the licensee's calculation for effective degradation years and reinspection years to verify that for the Unit 1 reactor vessel upper head, a volumetric examination of the penetration nozzles was not required during the most recent outage, in accordance with the requirements of ASME Code.

The licensee did not identify any relevant indications that were accepted for continued service. Additionally, the licensee did not perform any welding repairs to the vessel head penetrations since the beginning of the last Unit 1 refueling outage; therefore, no NRC review was completed for these inspection procedure attributes.

Boric Acid Corrosion Control Inspection Activities

The inspectors reviewed the licensee's boric acid corrosion control program (BACCP) activities to determine if the activities were implemented in accordance with the

commitments made in response to NRC Generic Letter 88-05, “Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants,” and applicable industry guidance documents. Specifically, the inspectors performed an onsite records review of procedures, and the results of the licensee’s containment walkdown inspections performed during the most recent refueling outage. The inspectors also interviewed the BACCP owner and conducted an independent walkdown of accessible areas of the Unit 1 reactor building containment pipe chase, to evaluate compliance with licensee’s BACCP requirements. The inspector also verified that degraded or non-conforming conditions, such as boric acid leaks, were properly identified and corrected in accordance with the licensee’s BACCP and the corrective action program.

The inspectors reviewed the corrective action program documents listed below that addressed boric acid indications to verify that engineering evaluations and corrective actions met the applicable program requirements. The inspectors verified that the engineering evaluations properly applied applicable corrosion rates to the affected components; and properly assessed the effects of corrosion induced wastage on structural or pressure boundary integrity in accordance with the licensee procedures. The inspectors verified that corrective actions related to evidence of boric acid leakage were consistent with the requirements of the ASME BPV Code and 10 CFR Part 50, Appendix B, Criterion XVI, “Corrective Action.”

- M-14-10708, Boric Acid Indication on Test “T” Associated with 1-NC-FT-5010
- M-14-10879, Boric Acid Indication on Tube Cap Associated with 1-NC-FT-5080
- M-14-12113, Boric Acid Indication on Pipe Cap Downstream of 1-ND-VA-0077
- M-15-00924, Boric Acid Indication on Threaded Test Connection of 1-ND-FT-5270
- M-15-01449, Boron Accumulation on 1-NC-IV-5992
- M-15-01451, Boric Acid Indication on Pipe Cap Downstream of 1-NC-VA-0113
- M-15-01455, 1-NC-IV-6660 Boron Leakage
- M-15-02245, 1-ND-PS-5050 Packing Gland Leakage

Steam Generator Tube Inspection Activities

The licensee did not perform eddy current examination of the steam generator tubes during the last Unit 1 refueling outage. The inspectors reviewed the licensee’s operational assessment to verify that for the Unit 1 steam generator tubes, no inspection activities were required this refueling outage, in accordance with the requirements of the licensee’s Technical Specifications, and Nuclear Energy Institute 97-06, “Steam Generator Program Guidelines.”

Identification and Resolution of Problems

The inspectors reviewed a sample of ISI-related issues entered into the corrective action program as ARs to determine if the licensee had appropriately described the scope of the problem, and had initiated corrective actions. The review also included the licensee’s consideration and assessment of operating experience events applicable to the plant. The inspectors performed this review to ensure compliance with 10 CFR Part 50, Appendix B, Criterion XVI, “Corrective Action” requirements.

b. Findings

Introduction: An NRC-identified Green NCV of 10 CFR Part 50.55a, "Codes and Standards," was identified for the licensee's failure to perform general visual examinations of moisture barrier material in the reactor containment leak-chase channel test connections in accordance with the ASME BPV Code, Section XI, Subsection IWE.

Description: In May 2014, the NRC issued IN 2014-07, "Degradation of Leak-Chase Channel Systems for Floor Welds of Metal Containment Shell and Concrete Containment Metallic Liner," (ADAMS Accession Number ML14070A114). The IN discussed the applicability of the ASME BPV Code to the the leak-chase channel system. Beginning with the 1998 Edition with the 2000 Addenda, Section XI of the ASME BPV Code, Subsection IWE, Table IWE-2500-1, Category E-A, "Containment Surfaces," Item E1.30, "Moisture Barriers," specifically requires a general visual examination of 100 percent of moisture barriers every inspection period. The general visual examination shall include moisture barrier materials intended to prevent intrusion of moisture against inaccessible areas of the pressure retaining metal containment shell or liner at concrete-to-metal interfaces and at metal-to-metal interfaces which are not seal welded. In September 2004, the NRC approved the use of the 1998 Edition with the 2000 Addenda of the ASME BPV Code for the first and second containment ISI intervals at McGuire Nuclear Station (ADAMS Accession Number ML042740027). The third containment ISI interval began on September 1, 2014, and it would be implemented in accordance with the 2007 Edition with 2008 Addenda of the ASME BPV Code.

During the Unit 1 EOC-22 (spring of 2013), Unit 1 EOC-23 (fall of 2014), and Unit 2 EOC-23 (fall of 2015) refueling outages, the licensee performed inspection activities of the leak-chase channel test connections to assess the condition of the moisture barriers that prevent water from entering the test channel and running down to the liner plate where corrosion could occur. These inspection activities were performed, in part, to address operating experience from other sites included in IN 2014-07. The licensee also addressed a non-conforming condition identified in various test connections associated with missing threaded caps and test connections filled with a hard material similar to concrete or grout. The licensee concluded that the non-conforming condition most likely existed since original construction. The licensee also made an attempt to unthread a sample of bronze caps for inspection, but these could not be removed due to concerns with damaging the caps and sleeves. The visual inspections did not identify significant degradation or indications of moisture intrusion into the test connections.

In February and March 2015, the licensee generated ARs 01900484 and 01903101, respectively, to evaluate the NRC's position presented in IN 2014-07. The licensee initiated corrective actions in its corrective action program to perform visual examinations of all leak chase channel test connections and revise the Containment ISI Plan to reflect the ASME BPV Code requirements discussed in IN 2014-07. However, the inspectors determined that the revised Containment Third Interval ISI Plan, dated October 2015, did not incorporate the requirements of the ASME BPV Code addressed in IN 2014-07 for the examination of moisture barriers in leak-chase channel test connections. Specifically, the inspectors identified that the Containment Third Interval ISI Plan document stated that the visual examination of the leak-chase channel system discussed in NRC IN 2014-07 would be treated as elective examinations during the inspection interval until the NRC mandated these examinations through conditions imposed by 10 CFR 50.55a. The Containment ISI Plan directed the visual examinations

to be performed every inspection interval rather than 100 percent every inspection period.

Upon further review, the inspectors determined that the licensee had not performed general visual examinations of 100 percent of the moisture barrier material in leak-chase channel test connections during each period of the first and second containment ISI intervals as required by the 1998 Edition through the latest edition and addenda of the ASME BPV Code. Even though the licensee had previously entered the issue of concern in the corrective action program via operating experience review and performed inspection activities of the leak-chase channel test connections during the Unit 1 EOC-22, Unit 1 EOC-23, and Unit 2 EOC-23 refueling outages, the examinations did not meet the scope and personnel qualification requirements of the ASME BPV Code. The failure to visually examine the test connections in previous ISI periods also contributed to the failure to identify the long standing non-conforming condition of the missing threaded caps earlier, and the failure to monitor potential moisture barrier degradation in the first and second ISI intervals. Furthermore, the inspectors identified that the description of moisture barrier examinations included in the current Containtment ISI Plan as a result of IN 2014-07 did not provide reasonable assurance that programmatic controls were in place to ensure that future visual examinations would be performed in accordance with the ASME BPV Code.

Analysis: The licensee's failure to perform general visual examinations of moisture barrier material in the reactor containment leak-chase channel test connections in accordance with the ASME BPV Code, Section XI, Subsection IWE was a PD. The inspectors determined that this PD was of more than minor significance per IMC-0612, Appendix B, "Issue Screening," dated September 7, 2012, because the current Containment ISI Plan did not adequately implement the ASME BPV Code requirements for the examination of moisture barriers, and if left uncorrected, it had the potential to lead to a more significant concern. Specifically, the Containment ISI Plan directed the licensee to perform the required examinations as "elective" examinations at a frequency less than the ASME BPV Code requirements. This could prevent prompt identification of conditions indicating moisture barrier degradation in the leak-chase channel test connections or degradation of inaccessible portions of the the containment metal liner.

The inspectors used IMC-0609, Attachment 4, "Initial Characterization of Findings," dated June 19, 2012, and determined that the finding was associated with the barrier integrity cornerstone because it involved potential degradation of the reactor containment metal liner. Based on IMC-0609, Appendix A, "The Significance Determination Process (SDP) For Findings At-Power," "Exhibit 3 – Barrier Integrity Screening Questions," dated June 19, 2012, the inspectors determined that the finding was of very low safety significance (Green) because it did not represent an actual open pathway in the physical integrity of the reactor containment and did not involve an actual reduction in function of hydrogen igniters in the reactor containment. The inspectors reviewed this PD for cross-cutting aspects as required by IMC-0310, "Components With Cross-Cutting Aspects.". The finding was determined to be reflective of present licensee performance because in 2015, the licensee did not take effective corrective actions to implement the ASME BPV Code requirements in the Containment ISI Plan when a reasonable opportunity was available through the review of NRC IN 2014-07. Therefore, the finding was assigned a cross-cutting aspect of resolution in the problem identification and resolution cross-cutting area (P.3).

Enforcement: Title 10 of the Code of Federal Regulations (CFR) Part 50.55a(b), "Codes and Standards," states in part, that systems and components of boiling and pressurized water-cooled nuclear power reactors must meet the applicable requirements of the ASME BPV Code, subject to the conditions in 10 CFR Part 50.55a(b)(2). The 1998 Edition with the 2000 Addenda of ASME BPV Code, Section XI, Subsection IWE, through the latest edition and addenda incorporated by reference in paragraph 10 CFR 50.55a(a) (i.e. 2007 Edition with 2008 Addenda) require examination of moisture barriers in metal containments. Specifically, Table IWE-2500-1, Category E-A, "Containment Surfaces," Item E1.30, "Moisture Barriers," requires a general visual examination of 100 percent of moisture barriers intended to prevent intrusion of moisture against inaccessible areas of the pressure retaining metal containment shell every inspection period.

Contrary to the above, since the implementation of the 1998 Edition with the 2000 Addenda of the ASME BPV Code for the first and second containment ISI intervals, the licensee failed to perform general visual examinations of 100 percent of moisture barrier material intended to prevent intrusion of moisture through the the leak-chase channel test connections to inaccessible areas of the pressure retaining metal containment shell. In March 2016, the licensee performed a visual examination of all leak-chase test connections during the Unit 1 EOC-24 refueling outage (third ISI interval, second outage of the first ISI period) in accordance with the ASME BPVC, Section XI. The visual examination did not identify significant degradation or indications of moisture intrusion into the test connections. The licensee planned to perform the corresponding examination for Unit 2 within the first period of the third ISI interval and revise the Containment ISI Plan to reflect the applicable ASME BPV Code requirements. The containment integrity was evaluated through the licensee's operability determination process. The justification for continued operation relied on the results of all visual examinations and the satisfactory results of past containment integrated leak rate tests. Because this finding is of very low safety significance and has been entered into the licensee's corrective action program as AR 02038505, this violation is being treated as an NCV, consistent with Section 2.3.2.a of the Enforcement Policy. (NCV 05000369, 370/2016002-01, Failure to Perform General Visual Examinations of Containment Moisture Barriers Associated with Containment Liner Leak Chase Test Connections)

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

a. Inspection Scope

.1 Resident Inspector Quarterly Review of Licensed Operator Requalification

On May 31, 2016, the inspectors observed two evaluated simulator scenarios administered to an operating crew as part of the annual requalification operating test required by 10 CFR 55.59, "Requalification." The simulator scenarios involved the loss of both main feedwater pumps followed by the loss of all auxiliary feedwater event and a feedwater line break inside containment complicated by an anticipated transient without trip (ATWS) event.

The inspectors assessed the following:

- licensed operator performance

- the ability of the licensee to administer the scenario and evaluate the operators
- the quality of the post-scenario critique
- simulator performance

Documents reviewed are listed in the attachment.

.2 Resident Inspector Quarterly Review of Licensed Operator Performance in the Actual Plant/Main Control Room

On April 16, 2016, the inspectors observed licensed operator performance in the main control room during Unit 1 reactor startup and reactor physics testing following the refueling outage.

The inspectors assessed the following:

- use of plant procedures
- control board manipulations
- communications between crew members
- use and interpretation of instruments, indications, and alarms
- use of human error prevention techniques
- documentation of activities
- management and supervision

Documents reviewed are listed in the attachment.

.3 Biennial Licensed Requalification Program Inspection (71111.11B)

The inspectors reviewed the facility operating history and associated documents in preparation for this inspection. During the week of June 20-23, 2016, the inspectors reviewed documentation, interviewed licensee personnel, and observed the administration of operating tests associated with the licensee's operator requalification program. Each of the activities performed by the inspectors was done to assess the effectiveness of the facility licensee in implementing requalification requirements identified in 10 CFR Part 55, "Operators' Licenses." The evaluations were also performed to determine if the licensee effectively implemented operator requalification guidelines established in NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," and Inspection Procedure 71111.11, "Licensed Operator Requalification Program." The inspectors also evaluated the licensee's simulation facility for adequacy for use in operator licensing examinations using ANSI/ANS-3.5-2009, "American National Standard for Nuclear Power Plant Simulators for use in Operator Training and Examination." The inspectors observed three crews during the performance of the operating tests. Documentation reviewed included written examinations, job performance measures (JPMs), simulator scenarios, licensee procedures, on-shift records, simulator modification request records, simulator performance test records, operator feedback records, licensed operator qualification records, remediation plans, watchstanding records, and medical records. The records were inspected using the criteria listed in Inspection Procedure 71111.11. Documents reviewed are listed in the attachment.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12)

a. Inspection Scope

The inspectors assessed the licensee's treatment of the two issues listed below to verify the licensee appropriately addressed equipment problems within the scope of the maintenance rule (10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants"). The inspectors reviewed procedures and records to evaluate the licensee's identification, assessment, and characterization of the problems as well as their corrective actions for returning the equipment to a satisfactory condition. Documents reviewed are listed in the attachment.

- AR 02013590, Investigate/repair Unit 1 standby makeup pump containment isolation check valve partially stuck open
- AR 02035066, B control area chill water (YC) system chiller tripped based on heating, ventilation, and air-conditioning indications and control room temperatures

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors reviewed the five maintenance activities listed below to verify that the licensee assessed and managed plant risk as required by 10 CFR 50.65(a)(4) and licensee procedures. The inspectors assessed the adequacy of the licensee's risk assessments and implementation of risk management actions. The inspectors also verified that the licensee was identifying and resolving problems with assessing and managing maintenance-related risk using the corrective action program. Additionally, for maintenance resulting from unforeseen situations, the inspectors assessed the effectiveness of the licensee's planning and control of emergent work activities. Documents reviewed are listed in the attachment.

- Yellow risk on Unit 1 for planned maintenance on the 1B EDG
- Risk assessment for emergent 1A chemical and volume control (NV) system pump maintenance
- Yellow risk on Unit 1 for reactor coolant system (RCS) lowered level inventory conditions following fuel reload and reactor vessel head installation
- Yellow risk on Unit 2 during complex plan associated with the 2A EDG
- Green risk on Unit 1 and Unit 2 during critical plan replacement of all battery cells associated with the "A" channel vital battery EVCA

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15)

a. Inspection Scope

.1 Operability and Functionality Review

The inspectors selected the six operability determinations or functionality evaluations listed below for review based on the risk-significance of the associated components and systems. The inspectors reviewed the technical adequacy of the determinations to ensure that technical specification operability was properly justified and the components or systems remained capable of performing their design functions. To verify whether components or systems were operable, the inspectors compared the operability and design criteria in the appropriate sections of the technical specification and updated final safety analysis report to the licensee's evaluations. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled. Additionally, the inspectors reviewed a sample of corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with operability evaluations. Documents reviewed are listed in the attachment.

- AR 02036960, 1A cold leg accumulator level slowly increasing due to check valve 1NI-59 leakage
- AR 02038995, B YC chiller low suction pressure
- AR 02015108, Evaluation of potential impact from metallic debris left in reactor vessel prior to core refueling
- ARs 02020403 and 02020734, Unit 1 pressurizer power-operated relief valve (PORV) block valve 1NC-33A breaker tripping during valve operation
- AR 02023762, 2A main step-up transformer increase in dissolved combustible gas generation
- AR 02032731, Through wall leakage in nuclear service water (RN) system cooling water return piping from 1B EDG

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18)

a. Inspection Scope

The inspectors verified that the plant modification listed below did not affect the safety functions of important safety systems. The inspectors confirmed the modification did not degrade the design bases, licensing bases, and performance capability of risk significant structures, systems and components. The inspectors also verified modifications performed during plant configurations involving increased risk did not place the plant in an unsafe condition. Additionally, the inspectors evaluated whether system operability

and availability, configuration control, post-installation test activities, and changes to documents, such as drawings, procedures, and operator training materials, complied with licensee standards and NRC requirements. In addition, the inspectors reviewed a sample of related corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with modifications. Documents reviewed are listed in the attachment.

- EC-403809, Temporary modification to open sliding links to remove short circuit in the control circuitry of Unit 1 pressurizer PORV block valve 1NC-33A

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19)

a. Inspection Scope

The inspectors either observed post-maintenance testing or reviewed the test results for the six maintenance activities listed below to verify the work performed was completed correctly and the test activities were adequate to verify system operability and functional capability.

- 2A EDG timing relays following calibration
- 2B containment air and return fan following breaker replacement
- Unit 2 standby makeup pump following motor refurbishment
- Unit 1 pressurizer PORV block valve 1NC-33A stroke testing following implementation of temporary modification to address electrical ground
- Unit 1 and Unit 2 vital battery EVCA functional testing follow replacement
- 2A centrifugal charging pump following pump motor maintenance

The inspectors evaluated these activities for the following:

- acceptance criteria were clear and demonstrated operational readiness
- effects of testing on the plant were adequately addressed
- test instrumentation was appropriate
- tests were performed in accordance with approved procedures
- equipment was returned to its operational status following testing
- test documentation was properly evaluated

Additionally, the inspectors reviewed a sample of corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with post-maintenance testing. Documents reviewed are listed in the attachment.

b. Findings

No findings were identified.

1R20 Refueling and Other Outage Activities (71111.20)

a. Inspection Scope

For the Unit 1 refueling outage completed on April 17, 2016 the inspectors evaluated the following outage activities:

- reactor refueling, coolant fill and vent, heatup, and startup
- reactor coolant system instrumentation and electrical power configuration
- reactivity and inventory control
- decay heat removal and spent fuel pool cooling system operation
- containment closure

The inspectors verified that the licensee:

- considered risk in developing the outage schedule
- controlled plant configuration per administrative risk reduction methodologies
- developed work schedules to manage fatigue
- developed mitigation strategies for loss of key safety functions
- adhered to operating license and technical specification requirements

The inspectors verified that safety-related and risk-significant structures, systems, and components not accessible during power operations were maintained in an operable condition. The inspectors also reviewed a sample of related corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with outage activities. Documents reviewed are listed in the attachment.

b. Findings

Introduction: An NRC-identified Green NCV of TS 5.4.1.d, "Procedures," was identified for the licensee's failure to adequately implement the commitments in SLC 16.9.25, "Refueling Operations – Containment Equipment Hatch," which required the containment equipment hatch to be closed during the movement of non-recently irradiated fuel inside containment.

Description: SLC 16.9.25, "Refueling Operations – Containment Equipment Hatch," required the containment equipment hatch to be closed and held in place by a minimum of four bolts during movement of non-recently irradiated fuel assemblies within containment. In accordance with SLC 16.9.25, when this commitment is not met, it requires the immediate suspension of the movement of irradiated fuel assemblies within containment. Procedure MP/1/A/7150/124, "Unit 1 Containment Vessel Equipment Hatch Opening and Closing," is used by the licensee to open and close the Unit 1 equipment hatch during refueling outage activities. Step 7.3.9 of this procedure states, "ensure equipment hatch is properly closed and sealed by performing a 100% visual inspection of the o-ring seal gap, where the equipment hatch and the barrel make contact to ensure metal-to-metal contact. By confirming this contact, it is ensured that no gap can exist and that proper closure has been obtained." On April 5, 2016, at approximately 0040, licensee material handlers closed the Unit 1 containment equipment hatch using procedure MP/1/A/7150/124 in anticipation of reactor vessel fuel reloading. On April 6, at approximately 0440, the licensee commenced reloading the

reactor vessel. On April 7, while conducting inspections inside containment directly above the equipment hatch, the inspectors identified sunlight coming from the gap between the equipment hatch and the containment flange seal. Upon closer inspection, the inspectors noted a ¼ to ½-inch air gap at the 9 to 12 o'clock hatch position which would allow direct communication of the containment atmosphere with the environment. At this time, refueling activities were still ongoing, with 131 of the total 193 fuel assemblies reloaded into the reactor vessel. The inspectors immediately notified operations personnel of the discrepancy. The licensee halted fuel movements were halted until the equipment hatch bolts were properly tightened to eliminate the gap opening.

Analysis: The licensee's failure to ensure the containment equipment hatch was properly closed during fuel movements in accordance with SLC 16.9.25 was a PD. This PD was more than minor because it impacted the configuration control attribute of the barrier integrity cornerstone and affected the cornerstone objective to provide reasonable assurance that containment protects the public from radionuclide releases caused by accidents or events. Additionally, if left uncorrected, the PD would have the potential to lead to a more significant safety concern. Specifically, the radiological barrier functionality of the containment equipment hatch was degraded due to the gap opening which could have allowed direct access of radiological releases from the containment atmosphere to the outside environment during a potential fuel handling accident inside containment. The inspectors screened the finding in accordance with IMC 0609, Appendix G, "Shutdown Operations Significance Determination Process," Attachment 1, "Shutdown Operations Significance Determination Process Phase 1 Initial Screening and Characterization of Findings." Because the finding degraded the ability to close or isolate the containment, it required review using IMC 0609, Appendix H, "Containment Integrity Significance Determination Process." While the containment boundary function was considered degraded, the incident occurred eight days after the beginning of the refueling outage when short lived volatile radioisotopes had decayed sufficiently such that the potential radiological releases to the public would not likely contribute to the Large Early Release Frequency (LERF). Based on this, the finding was screened as having very low safety significance (Green). The cause of the PD was directly related to the cross-cutting aspect of procedure adherence in the cross-cutting area of human performance because the licensee failed to follow containment equipment hatch closing procedures which explicitly required performing a visual inspection that the containment equipment hatch was sealed and secured with metal-to-metal contact with the containment hatch flange and had no visual gaps. [H.8]

Enforcement: TS 5.4.1.d, "Procedures," required, in part, that applicable procedures covered by commitments contained in UFSAR Chapter 16.0, "Selected Licensee Commitments," be established, implemented, and maintained. SLC 16.9.25, "Refueling Operations – Containment Equipment Hatch," required that the containment equipment hatch shall be closed and held in place by a minimum of four bolts during movement of non-recently irradiated fuel assemblies within containment. Procedure MP/1/A/7150/124, "Unit 1 Containment Vessel Equipment Hatch Opening and Closing," Rev. 24, implemented the requirements of SLC 16.9.25. Procedure MP/1/A/7150/124 required the equipment hatch to be properly closed and sealed by performing a 100% visual inspection of the o-ring seal gap, where the equipment hatch and the barrel make contact to ensure metal-to-metal contact and no gaps exists. Contrary to this, from April 6-7, 2016, the licensee failed to implement the commitments in SLC 16.9.25, "Refueling Operations – Containment Equipment Hatch." Specifically, the licensee failed to ensure

that the containment equipment hatch was adequately closed and sealed with no gaps during the movement of non-recently irradiated fuel in containment. Because this violation was determined to be of very low safety significance and has been entered into the licensee's CAP as ARs 02018605 and 02018701, it is being treated as an NCV consistent with Section 2.3.2.a of the NRC Enforcement Policy and is identified as NCV 05000369/2016002-02, "Failure to Ensure Containment Equipment Hatch Was Properly Closed During Fuel Movements."

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors reviewed the six surveillance tests listed below and either observed the test or reviewed test results to verify testing adequately demonstrated equipment operability and met technical specification and current licensing basis. The inspectors evaluated the test activities to assess for preconditioning of equipment, procedure adherence, and equipment alignment following completion of the surveillance. Additionally, the inspectors reviewed a sample of related corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with surveillance testing. Documents reviewed are listed in the attachment.

Routine Surveillance Tests

- PT/0/A/4150/028, Initial Criticality and Zero Power Physics Testing, Rev. 67
- PT/2/A/4403/001A, 2A RN Pump Performance Test, Rev. 52
- PT/1/A/4209/001C, Standby Makeup Pump Flow Periodic Test, Rev. 39

Containment Isolation Valve

- PT/1/A/4200/001C, Isolation Leak Rate Test, Rev. 127 (Enclosure 13.46, Test Sheet for Penetration M-385)

In-Service Tests (IST)

- PT/1/A/4252/001, #1 TDCA Pump Performance Test, Rev. 131

Ice Condenser System Test

- PT/0/A/4200/032, Periodic Inspection of Ice Condenser Lower Inlet Doors, Rev. 21

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation (71114.06)

a. Inspection Scope

The inspectors observed the emergency preparedness drill conducted on May 10, 2016. The inspectors observed licensee activities in the simulator and technical support center to evaluate implementation of the emergency plan, including event classification, notification, and protective action recommendations. The inspectors evaluated the licensee's performance against criteria established in the licensee's procedures. Additionally, the inspectors attended the post-exercise critique to assess the licensee's effectiveness in identifying emergency preparedness weaknesses and verified the identified weaknesses were entered in the corrective action program. Documents reviewed are listed in the attachment.

b. Findings

No findings were identified.

2. RADIATION SAFETY (RS)

2RS1 Radiological Hazard Assessment and Exposure Controls

a. Inspection Scope

Hazard Assessment and Instructions to Workers: During facility tours, the inspectors directly observed labeling of radioactive material and postings for radiation areas, high radiation areas (HRA), and very HRA (VHRA) established within the radiologically controlled area (RCA) of the auxiliary building, Unit 1 (U1) reactor containment building, independent spent fuel storage installation (ISFSI), and radioactive waste (radwaste) processing and storage locations. The inspectors independently measured radiation dose rates or directly observed conduct of licensee radiation surveys for selected RCA areas. Inspectors also observed continuous air monitors and other instruments to monitor for airborne conditions in use. The inspectors reviewed survey records for several plant areas including surveys for airborne radioactivity, gamma surveys with a range of dose rate gradients, surveys for alpha-emitters and other hard-to-detect radionuclides, and pre-job surveys for upcoming tasks. The inspectors also discussed changes to plant operations that could contribute to changing radiological conditions since the last inspection. For selected U1 end-of-cycle 24 (1EOC24) refueling outage tasks, the inspectors attended pre-job briefings and reviewed radiation work permit (RWP) details including electronic dosimeter (ED) alarm setpoints, to assess communication of radiological control requirements and current radiological conditions to workers.

Control of Radioactive Material: The inspectors observed surveys of material and personnel being released from the RCA using small article monitor, personnel contamination monitor, and portal monitor instruments. The inspectors reviewed the last two calibration records for selected release point survey instruments and discussed equipment sensitivity, alarm setpoints, and release program guidance with licensee staff.

The inspectors also reviewed records of leak tests on selected sealed sources and discussed nationally tracked source transactions with licensee staff.

Hazard Control: The inspectors evaluated access controls and barrier effectiveness for selected HRA, locked high radiation area (LHRA), and VHRA locations and discussed changes to procedural guidance for LHRA and VHRA controls with radiation protection (RP) supervisors. The inspectors reviewed implementation of controls for the storage of irradiated material within the spent fuel pool. Established radiological controls were evaluated for selected 1EOC24 tasks including removal of reactor head ventilation duct work and cutting/welding activities on valves inside. Electronic dosimeter alarm set points and worker stay times were evaluated against area radiation survey results for selected 1EOC24 job tasks. In addition, the inspectors reviewed licensee controls for areas where dose rates could change significantly as a result of plant shutdown and refueling operations.

Radiation Worker Performance and RP Technician Proficiency: Through direct observations and interviews with licensee staff, inspectors evaluated occupational workers' adherence to selected RWPs and health physics technician proficiency in providing job coverage. As part of Inspection Procedure (IP) 71124.04, inspectors reviewed the use of personnel dosimetry (extremity dosimetry, multibadging in high dose rate gradients, etc.). The inspectors also evaluated worker responses to dose and dose rate alarms during selected work activities.

Problem Identification and Resolution: The inspectors reviewed corrective action program documents associated with radiological hazard assessment and control. The inspectors evaluated the licensee's ability to identify and resolve the issues. The inspectors also reviewed recent self-assessment results.

Radiation protection activities were evaluated against the requirements of UFSAR Section 12; TS Section 5; 10 CFR Parts 19 and 20 and approved licensee procedures. Licensee programs for monitoring materials and personnel released from the RCA were evaluated against 10 CFR Part 20 and IE Circular 81-07, "Control of Radioactively Contaminated Material." Documents and records reviewed are listed in the attachment.

The inspectors completed the required seven (7) samples specified in IP 71124.01.

b. Findings

No findings were identified.

2RS2 Occupational As Low As Reasonably Achievable (ALARA) Planning and Controls

a. Inspection Scope

Work Planning and Exposure Tracking: The inspectors reviewed work activities and their collective exposure estimates for the 1EOC24 outage. The inspectors reviewed ALARA planning packages for activities related to the following high collective exposure tasks: reactor coolant pump maintenance, reactor head and refueling activities, and valve work. For the selected tasks, the inspectors reviewed established dose goals and discussed assumptions regarding the bases for the current estimates with responsible ALARA planners. The inspectors evaluated the incorporation of exposure reduction

initiatives and operating experience, including historical post-job reviews, into RWP requirements. Day-to-day collective dose data for the selected tasks were compared with established dose estimates and evaluated against procedural criteria (work-in-progress review limits) for additional ALARA review. Where applicable, the inspectors discussed changes to established estimates with ALARA planners and evaluated them against work scope changes or unanticipated elevated dose rates.

Source Term Reduction and Control: The inspectors reviewed the collective exposure three-year rolling average from 2012 – 2014. The inspectors evaluated historical dose rate trends for reactor coolant system piping and compared them to current 1EOC24 data. Source term reduction initiatives, including cobalt reduction and zinc injection, were reviewed and discussed with RP staff. The inspectors also reviewed temporary shielding packages for the 1EOC24 outage.

Radiation Worker Performance: As part of IP 71124.01, the inspectors observed pre-job ALARA briefings and radiation worker performance for various HRA jobs in the auxiliary building and containment. While observing job tasks, the inspectors evaluated the use of remote technologies to reduce dose including teledosimetry and remote visual monitoring.

Problem Identification and Resolution: The inspectors reviewed and discussed selected corrective action program documents associated with ALARA program implementation. The inspectors evaluated the licensee's ability to identify and resolve the issues. The inspectors also reviewed recent self-assessment results.

ALARA program activities were evaluated against the requirements of UFSAR Section 12, TS Section 5.4, 10 CFR Part 20, and approved licensee procedures. Documents reviewed are listed in the report attachment.

The inspectors completed the required five (5) samples specified in IP 71124.02.

b. Findings

No findings were identified.

2RS3 In-Plant Airborne Radioactivity Control and Mitigation

a. Inspection Scope

Engineering Controls: The inspectors reviewed the use of engineering controls to mitigate airborne radioactivity during the 1EOC24 refueling outage and maintenance work. The inspectors observed the use of portable air filtration units for work in contaminated areas of the containment building and reviewed filtration unit testing certificates. The inspectors evaluated the effectiveness of continuous air monitors and air samplers placed in work area "breathing zones" to provide indication of increasing airborne levels.

Respiratory Protection Equipment for Routine and Emergency Use: The inspectors reviewed the use of respiratory protection devices to limit the intake of radioactive material. This included review of devices used for routine tasks and devices stored for use in emergency situations. The inspectors reviewed total effective dose equivalent ALARA evaluations for the use of respiratory protection devices during cutting and welding

activities. Selected self-contained breathing apparatus (SCBA) units and negative pressure respirators (NPR) staged for routine and emergency use in the main control room and other locations were inspected for material condition, SCBA bottle air pressure & condition, number of units, and number of spare masks and air bottles available. The inspectors reviewed maintenance records for selected SCBA units for the past two years and evaluated SCBA and NPR compliance with National Institute for Occupational Safety and Health certification requirements. The inspectors also reviewed records of air quality testing for supplied-air devices and SCBA bottles.

The inspectors discussed the use of powered air-purifying hoods and full-face NPR during 1EOC24 activities inside containment with health physics (HP) staff. The inspectors also discussed training for various types of respiratory protection devices and interviewed radworkers and control room operators on use of the devices including SCBA bottle change-out and use of corrective lens inserts. The inspectors reviewed respirator qualification records for several main control room operators and emergency responder personnel in the maintenance and HP departments. In addition, inspectors evaluated qualifications for individuals responsible for testing and repairing SCBA vital components.

Problem Identification and Resolution: The inspectors reviewed corrective action program documents associated with airborne radioactivity mitigation and respiratory protection. The inspectors evaluated the licensee's ability to identify and resolve the issues. The inspectors also reviewed recent self-assessment results. Licensee activities associated with the use of engineering controls and respiratory protection equipment were reviewed against UFSAR Section 12, TS Section 5; 10 CFR Part 20; the guidance in Regulatory Guide 8.15, "Acceptable Programs for Respiratory Protection", and approved licensee procedures. Documents and records reviewed are listed in the attachment.

The inspectors completed the required four (4) samples specified in IP 71124.03.

b. Findings

No findings were identified.

2RS4 Occupational Dose Assessment

a. Inspection Scope

Source Term Characterization: The inspectors reviewed the plant radiation characterization (including gamma, beta, alpha, and neutron) and verified the use of scaling factors to account for hard-to-detect radionuclides in internal dose assessments.

External Dosimetry: The inspectors reviewed national voluntary accreditation program (NVLAP) certification data for the licensee's thermoluminescent dosimeter (TLD) processor for the current year for ionizing radiation dosimetry. The inspectors observed and evaluated onsite storage of TLDs. Comparisons between ED and TLD results, including correction factors, were reviewed and discussed. The inspectors also evaluated licensee procedures for unusual dosimetry occurrences. Electronic dosimeter alarm logs were reviewed as part of IP 71124.01.

Internal Dosimetry: The inspectors reviewed and discussed the in vivo bioassay program with the licensee. Inspectors reviewed procedures that addressed methods for

determining internal or external contamination, releasing contaminated individuals, and the assignment of dose. The inspectors evaluated the licensee's program for in vitro monitoring and reviewed recent bioassay results for diving activities. The inspectors also reviewed contamination logs and evaluated events with the potential for internal dose.

Special Dosimetric Situations: The inspectors reviewed records for declared pregnant workers (DPW)s from January 2014 through March 2016 and discussed guidance for monitoring and instructing DPWs. Inspectors reviewed the licensee's program for monitoring external dose in areas of expected dose rate gradients, including the use of multi-badging and extremity dosimetry. The inspectors evaluated the licensee's neutron dosimetry program including instrumentation used to perform neutron surveys. In addition, the inspectors reviewed the licensee's program for evaluation of shallow dose equivalent (SDE). The inspectors also reviewed contamination logs and evaluated events with the potential for SDE.

Problem Identification and Resolution: The inspectors reviewed and discussed selected corrective action program documents associated with occupational dose assessment. The inspectors evaluated the licensee's ability to identify and resolve the issues. The inspectors also reviewed recent self-assessment results.

The licensee's occupational dose assessment activities were evaluated against the requirements of UFSAR Section 12; TS Section 5.4; 10 CFR Parts 19 and 20; and approved licensee procedures. Documents reviewed are listed in the report attachment.

The inspectors completed the required five (5) samples specified in IP 71124.04.

b. Findings

No findings were identified.

2RS5 Radiation Monitoring Instrumentation

a. Inspection Scope

Walk Downs and Observations: During walk-downs of the liquid and gaseous radwaste systems in the auxiliary building, and the radiologically controlled area exit points, the inspectors observed installed radiation detection equipment. These included area radiation monitors (ARMs), liquid and gaseous effluent monitors, personnel contamination monitors (PCMs), small article monitors (SAMs), and portal monitors. The inspectors observed the physical location of the components, noted the material condition, calibration status and compared sensitivity ranges with UFSAR details. Setpoint methodologies for selected radiation monitors were evaluated for correct alarm setpoint determination based on offsite dose calculation manual requirements. In addition to equipment walk-downs, the inspectors observed functional checks, source checks on all appropriate scales and alarm set-point testing of various portable and fixed detection instruments, including ion chambers, telepoles, PCMs, SAMs, portal monitors, and a whole body counter (WBC).

Calibration and Testing Program: The inspectors reviewed calibration records and evaluated alarm setpoint values for selected PCMs, portal monitors, ARMs, SAMs,

containment high range monitors, air samplers and a WBC. The radioactive sources used to calibrate the ARMs was evaluated for traceability to national standards. The most recent 10 CFR Part 61 analysis for dry active waste was reviewed to determine if calibration and check sources were representative of the plant source term. The inspectors also reviewed countroom calibration records for a gamma spectroscopy germanium detector, a liquid scintillation detector, and alpha/beta smear counters. For the portable instruments, the inspectors observed the use of a high-range calibrator and discussed periodic output value testing with a health physics technician.

Problem Identification and Resolution: The inspectors reviewed selected corrective action program documents in the area of radiological instrumentation. The inspectors evaluated the licensee's ability to identify and resolve the issues. Documents and records reviewed are listed in the attachment.

Effectiveness and reliability of selected radiation detection instruments were reviewed against details documented in the following: 10 CFR Part 20; NUREG-0737, Clarification of Three Mile Island Action Plan Requirements; UFSAR Chapters 11 and 12; and applicable licensee procedures. Documents and records reviewed are listed in the attachment.

The inspectors completed the required three (3) samples specified in IP 71124.05.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

a. Inspection Scope

The inspectors reviewed a sample of the performance indicator (PI) data, submitted by the licensee, for the Unit 1 and Unit 2 PIs listed below. The inspectors reviewed plant data compiled between April 2015 and March 2016 to verify the accuracy and completeness of the data reported for the station. The inspectors verified that the PI data complied with guidance contained in Nuclear Energy Institute 99-02, "Regulatory Assessment Performance Indicator Guideline," and licensee procedures. The inspectors verified the accuracy of reported data that were used to calculate the value of each PI. In addition, the inspectors reviewed a sample of related corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with PI data. Documents reviewed are listed in the attachment.

Cornerstone: Mitigating Systems

- safety system functional failures
- high pressure injection system
- emergency AC power system

The inspectors independently screened Shift Operations Management System (eSOMS) logs, selected control room logs, the corrective action program database, and

maintenance rule database, to confirm if failures and equipment unavailability/unreliability hours were accurately reported for the station.

Cornerstone: Occupational Radiation Safety

- occupational exposure control effectiveness

The inspectors reviewed the PI results for the occupational radiation safety cornerstone from July 2015 through March 2016. The inspectors reviewed electronic dosimeter alarm logs and ARs related to controls for exposure significant areas to confirm the accuracy of the data.

Cornerstone: Public Radiation Safety

- radiological control effluent release occurrences

The inspectors reviewed the PI results for the public radiation safety cornerstone from July 2015 through March 2016. The inspectors reviewed cumulative and projected doses to the public contained in liquid and gaseous releases to confirm the accuracy of the data.

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152)

.1 Routine Review

The inspectors screened items entered into the licensee's corrective action program to identify repetitive equipment failures or specific human performance issues for follow-up. The inspectors reviewed problem identification program reports, attended screening meetings, or accessed the licensee's computerized corrective action database.

.2 Semi-Annual Trend Review

a. Inspection Scope

The inspectors reviewed issues entered in the licensee's corrective action program and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors focused their review on repetitive equipment issues and human performance trends, but also considered the results of inspector daily problem identification program report screenings, licensee trending efforts, and licensee human performance results. The review nominally considered the 6-month period of January 2016 through June 2016 although some examples extended beyond those dates when the scope of the trend warranted. The inspectors compared their results with the licensee's analysis of trends. Additionally, the inspectors reviewed the adequacy of corrective actions associated with a sample of the issues identified in the licensee's trend reports. The inspectors also reviewed corrective action documents that were processed by the licensee to identify potential adverse trends in the condition of structures, systems, and/or components as evidenced by acceptance of long-standing

non-conforming or degraded conditions. Documents reviewed are listed in the attachment.

b. Findings and Observations

No findings were identified.

.3 Annual Followup of Selected Issues

a. Inspection Scope

The inspectors conducted a detailed review of AR 02023762, 2A main step-up transformer increase in dissolved combustible gas generation.

The inspectors evaluated the following attributes of the licensee's actions:

- complete and accurate identification of the problem in a timely manner
- evaluation and disposition of operability and reportability issues
- consideration of extent of condition, generic implications, common cause, and previous occurrences
- classification and prioritization of the problem
- identification of root and contributing causes of the problem
- identification of any additional condition reports
- completion of corrective actions in a timely manner

Documents reviewed are listed in the attachment.

b. Findings and Observations

No findings were identified.

4OA5 Other Activities

Operation of an Independent Spent Fuel Storage Installation (60855.1)

a. Inspection Scope

The inspectors performed a walkdown of the onsite ISFSI and monitored activities associated with the dry fuel storage campaign completed on May 23, 2016. The inspectors reviewed changes made to the ISFSI programs and procedures, including associated 10 CFR 72.48, "Changes, Tests, and Experiments," screens and evaluations to verify that changes made were consistent with the NAC-MAGNASTOR license and certificate of compliance. The inspectors reviewed records and observed the loading activities to verify that the licensee recorded and maintained the location of each fuel assembly placed in the ISFSI. The inspectors also reviewed surveillance records to verify that daily temperature surveillance requirements were performed as required by technical specifications. Documents reviewed are listed in the attachment.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

On July 7, 2016, the resident inspectors presented the inspection results to Mr. Steven Capps, Site Vice President, and other members of the licensee's staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee
B. Anderson, Superintendent of Operations
S. Capps, Vice President, McGuire Nuclear
S. Dean, NDE Level III
J. Gabbert, Chemistry Manager
J. Glenn, Organizational Effectiveness Manager
B. Kandell, Engineering Programs
M. Kelly, Outage and Scheduling Manager
K. Kinard, Security Manager
N. Kunkel, Engineering Manager
S. Mooneyhan, Radiation Protection Manager
G. Murphy, Licensing Specialist
R. Nelson-Skwirz, ISI Coordinator
J. Robertson, Regulatory Affairs Manager
P. Schuerger, Training Manager
S. Snider, Plant Manager

LIST OF REPORT ITEMS

Closed

05000369, 370/2016002-01	NCV	Failure to Perform General Visual Examinations of Containment Moisture Barriers Associated with Containment Liner Leak Chase Test Connections (Section 1R08)
05000369/2016002-02	NCV	Failure to Ensure Containment Equipment Hatch Was Properly Closed During Fuel Movements (Section 1R20)

DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Summer Readiness of Offsite and Alternate AC Power System
NSD 417 Generation Risk Management Process, Rev. 17
Nuclear Switchyard Operating Guidelines, Rev. 9
Nuclear Switchyard Interface Agreement, Rev. 5
DPC-1381.06-00-0001, Catawba, McGuire & Oconee Degraded Grid Voltage Setpoints for Real Time Contingency, Rev. 24
AP/1/A/5500/005, Generator Voltage and Electric Grid Disturbances, Rev. 13

Seasonal Extreme Weather Conditions
AD-WC-ALL-0230, Seasonal Readiness, Rev. 0
PT/0/B/4700/039, Warm Weather Equipment Checkout, Rev. 22
Action register update summary reports for summer readiness between April – June, 2016
Selective hot weather preventive maintenance work orders and corrective work orders

Section 1R04: Equipment Alignment

Partial System Walkdown

OP/2/A/6350/002, Diesel Generator, Rev. 109
OP/1/A/6200/006, Safety Injection System, Rev. 71
OP/2/A/6200/004, Residual Heat Removal System, Rev. 97

Complete System Walkdown

MCFD 1593-01.00, Flow Diagram of Main Steam System (SM) Main Steam Vent to Atmosphere (SV), Rev. 21
MCFD 1593-01.02, Flow Diagram of Main Steam Supply to Auxiliary Equipment System (SA) Turbine Exhaust System (TE), Rev. 12
MCFD 1593-01.03, Flow Diagram of Main Steam System (SM) Main Steam Vent to Atmosphere (SV), Rev. 18
MCFD 2593-01.00, Flow Diagram of Main Steam System (SM) Main Steam Vent to Atmosphere (SV), Rev. 19
MCFD 2593-01.02, Flow Diagram of Main Steam Supply to Auxiliary Equipment System (SA) Turbine Exhaust System (TE), Rev. 8
MCFD 2593-01.03, Flow Diagram of Main Steam System (SM) Main Steam Vent to Atmosphere (SV), Rev. 18
OP/1/A/6250/002, Auxiliary Feedwater System, Rev. 129
OP/2/A/6250/002, Auxiliary Feedwater System, Rev. 97
NCRs 02027152 and 02031263

Section 1R05: Fire Protection

MCS-1465.00-00-0008, Design Basis Specification for Fire Protection, Rev. 20
MCS-1465.00-00-0022, Appendix R Safe Shutdown Analysis, Rev. 14
MCC-1435.00-00-0059, NFPA 805 – Appendix R Safe Shutdown Deterministic Analysis, Rev. 2
AD-EG-ALL-1520, Transient Combustible Control, Rev. 3
NSD-104, Material Condition/Housekeeping, Foreign Material Exclusion and Seismic Concerns, Rev. 39
NSD-316, Fire Protection Impairment and Surveillance, Rev. 17
MFSD-032, Unit 1 Lower Annulus/Containment, Rev. 0
FS/1/B/9000/032, Unit 1 Lower Annulus/Containment Fire Strategy #32, Rev. 1
FS/2/B/9000/007, 2A D/G Fire Strategy #7, Rev. 0
FS/2/B/9000/008, 2B D/G Fire Strategy #8, Rev. 0
MFSD-007.008, Unit 2 D/G Rooms, Rev. 1
FS/2/B/9000/010, Unit 2 733' Electrical Penetration Room Fire Strategy #10
FS/2/B/9000/012, 2ETB Room (Fire Strategy #12)
FS/1/B/9000/022, Unit 1 M/G Set Room
FS/2/B/9000/023, Unit 2 M/G Set Room
MFSD-22, Unit 1 M/G Set Room, Rev. 0
MFSD-23, Unit 2 M/G Set Room, Rev. 0

Section 1R06: Flood Protection Measures

MCC-1206.47-69-1001, Auxiliary Building Flooding Analysis, Rev. 18
MCS-1154.00-00-0004, Design Basis Specification for the Auxiliary Building Structures, Rev. 13
MCS-1465.00-00-0012, Design Basis Specification for Flooding From External Sources, Rev. 3
OP/1/A/6100/010N, Annunciator Response for Panel 1AD-13, Rev. 79
AP/0/A/5500/044, Plant Flooding, Rev. 20

Section 1R07: Heat Sink Performance

AD-EG-ALL-1401, Heat Exchanger Program, Rev. 1
Heat Exchangers Engineering Support Document (ESD), Rev. 14
WOs 2206703 and 2207115, 1A and 1B KC heat exchanger clean/inspect and eddy current test
1EOC24 Outage 1A KC Heat Exchanger Eddy Current Inspection Report, dated 4/1/2016
1EOC23 Outage 1A/1B KC Heat Exchanger Eddy Current Inspection Report, dated 10/5/2014
MP/0/A/7700/013, Component Cooling System Heat Exchanger Maintenance, Rev. 17
2016Q1, System Health Report, Component Cooling Water System

Section 1R08: Inservice Inspection (ISI) Activities

Procedures

NDE Procedures Manual – Volume 3 – NDE-35 Liquid Penetrant Examination, Rev. 26
NDE Procedures Manual – Volume 4 – NDE-946 Ultrasonic Thickness Measurement, Rev. 2
NDE Procedures Manual – Volume 4 – PDI-UT-2, Generic Procedure for the Ultrasonic Examination of Austenitic Pipe Welds, Rev. F
NDE Procedures Manual – Volume 4 – PDI-UT-7, Generic Procedure for the Manual Ultrasonic Through Wall and Length Sizing of Ultrasonic Indications in Reactor Pressure Vessel Welds, Rev. F
NDE-69 VE, Visual Examination of Reactor Vessel Bottom Mounted Instrument Penetrations, Rev. 2
NDE-70, Visual Examination of Reactor Pressure Vessel Upper Head Penetrations, Rev. 2
NDE-995, Ultrasonic Examination of Small Diameter Piping Butt Welds and Base Material for Thermal Fatigue Damage, Rev. 7
NDEMAN-PDI-UT-3, NDE Procedures Manual – volume 4 – PDI-UT-3 Generic Procedure for Ultrasonic Through Wall Sizing in Pipe Welds, Rev. D

Corrective Action Documents

AR 01686595, Emergent Scope Addition WO 2093150 (Leak Chase Channel), 09/17/14
AR 01900484, Regualtory Affairs Assistance is Requested for IN 2014-07, 02/12/2015
AR 01903101, Actions Needed to Conform to NRC Expectations in IN 2014-07, 03/23/2015
AR 01955812, 2EOC23 Emergent Issue, Leak Chase Cap Missing WO 02180107, 9/21/2015
AR 02026500, Correction Needed on UT Data Sheet, 05/05/2016
AR 01689080, One Circumferential inside surface connected (ID) Indication, 10/14/14
AR 01689127, Clarification Required in MO/0/A/7700/045 in Regards System Pressure Tests, 10/13/2014
AR 01695131, 1-NV-FT-5631 Work Requests for System/Boron Leaks, 11/25/2014
AR 01900137, 50.59 Applicability Review for NDE Procedure Changes, 11/06/14
AR 01902036, ISI Summary #M1.G12.1.001 to be Rescheduled to 1EOC24, 09/24/14
AR 02038505, MNS In Service Inspection (ISI) Plan, 06/16/2016
PIP M-14-10708, Boric Acid Indication on Test “T” Associated with 1-NC-FT-5010
PIP M-14-10879, Boric Acid Indication on Tube Cap Associated with 1-NC-FT-5080
PIP M-14-12113, Boric Acid Indication on Pipe Cap Downstream of 1-ND-VA-0077
PIP M-15-00924, Boric Acid Indication on Threaded Test Connection on the Bottom high pressure side of 1-ND-FT-5270
PIP M-15-01449, 1-NC-IV-5992 Has Excessive Boron Accumulation at the Tubing, 2/20/15
PIP M-15-01451, Boric Acid Indication on Pipe Cap Downstream of 1-NC-VA-0113
PIP M-15-01455, 1-NC-IV-6660 Boron Leakage, 02/20/15
PIP M-15-02245, 1-ND-PS-5050 Packing Gland Leakage, 03/23/15

Other Documents

Certification Records for Calibration Blocks, Serial Nos.: 800622, PDI-UT-2-M1, 14-3686, 50470

Certification Records for Thermometers, Serial Nos. G502481, G502480, G502483
Certification Records for UT Probes, Serial Nos. SC2041, 13F00YWA, SE0773, 0105LJ, 0085LV
Certified Test Reports for NDE Consumables, Batch Nos. Ultragel II-12125, Cleaner 12J23K, Penetrant 15C03K, Developer 12M14K
File 00006000752, Letter from J.C. Rogers to R.L. Dick, Reactor Building Containment Liner Plate Leak Chase, 10/8/1975
File 00006000779, Letter from L.C. Dall to R.L. Dick, Reactor Building Containment Liner Plate Leak Chase, 11/3/1975
Linearity Reports for Ultrasonic Instruments, Serial Nos. 023DP0
LTR-PAFM-05-76, Flaw Evaluation for McGuire Unit 1 Pressurizer Lower Head to Shell Weld, May 2010
MCC-1201.01-00-0064, EDY and RIY Calculation to Determine Reactor Vessel Head Inspection Requirements, Rev. 7
MCC-1206.02-56-0005, Fracture Mechanics Flaw Evaluation for Pressurizer Shell to Head Welds, Rev. 3
McGuire Nuclear Station – Third Interval Inservice Inspection Plan – Containment – Units 1 & 2, Rev. 3, October 2015
McGuire Unit 1 Steam Generator 1EOC24 Skipped Inspection Cycle Outage Review, Rev. 0
Metallurgy File #5453, MNS 2 – Deposit in Containment Leak Chase Ports, 09/25/15
NDE Examiner Certification Records for T Walkowiak, B. Muirhead, G. J. Ransom, W. C. Leeper, M. Hill, S. Dean, K. Bull, R. Jaschke, E. Adamson
NDE Report BOP-UT-16-564, UT Calibration/Examination Report, Pressurizer Lower Head to Shell Weld, 3/26/16
NDE Report PT-16-065, Liquid Penetrant Examination Report, Component 1-MCR-NC-762, Piping Welded Attachment, Reactor Coolant System, 3/21/16
NDE Report UT-14-515, UT Calibration/Examination and Indication Report, Component 1NC1F-1374, 10/13/2014
NDE Report UT-16-538, UT Erosion/Corrosion Examination, Component RN1F279, 3/26/16
NDE Report UT-16-548, UT Calibration/Examination, Component 1NC1F3920, 3/27/2016
NDE Report UT-16-576, UT Calibration/Examination and Indication Report, Component 1NC1F-1374, 4/5/2016
NDE Report VT-16-1142, Visual Examination for Boric Acid Detection, Reactor Vessel Bottom Mounted Instrumentation Nozzles, 3/28/16
NDE Report VT-16-1166, Visual Examination for Boric Acid Detection, RPV Closure Head Outer Surface, 3/30/16
Weld Doc. No. 142303, Duke Energy Corporation Weld Record, Reactor Coolant System, Weld No. NC1F-1614, October 2014
Weld Doc. No. 142862, Duke Energy Corporation Weld Record, Nuclear Service Water System, Weld Nos. RN1FW11-9, RN1FW11-11, RN1FW11-13, RN1FW11-12, RN1FW11-14, January 2015
Welder Performance Qualification Records for J.L. Raynor, C.E. Payseur, C.A.D. Irby, J.P. Austin, W.S. Whitmire, J. E. Reese
Welding Procedure Qualification Records L-146D (Rev. 0), L-102E 9 (Rev. 0), L-133 (Rev. 1), L-104 9 (Rev. 3), L-138 (Rev. 0), L-148C (Rev. 0)
Work Order 20042438-01, Unit 2 - VT-3 of Leak Chase Ports, 12/14/15
WPS GTOO0808-04, ASME Section IX Welding Procedure Specification Technical Sheet, Rev. 0
WPS GTSM0101-01, ASME Section IX Welding Procedure Specification Technical Sheet, Rev. 7

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

Quarterly Resident Inspector LOR Activity Review
NSD-509, Site Standards in Support of Operational Focus, Rev. 6
SOMP 01-07, Control Room Oversight, Rev. 2
Active Simulator Examination (for described scenario)
EP/1/A/5000/E-0, Reactor Trip or Safety Injection, Rev. 35
EP/1/A/5000/ES-0.1, Reactor Trip Response, Rev. 43
EP/1/A/5000/F-0, Critical Safety Function Status Trees, Rev. 6
EP/1/A/5000/FR-H.1, Response to Loss of Secondary Heat Sink, Rev. 19
EP/1/A/5000/FR-S.1, Response to Nuclear Power Generation/ATWS, Rev. 15
EP/1/A/5000/E-2, Faulted Steam Generator Isolation, Rev. 10

Resident Inspector Quarterly Review of Licensed Operator Performance in the Actual Plant/Main Control Room
AD-OP-ALL-1000, Conduct of Operations, Rev. 5
NSD 509, Site Standards in Support of Operational Focus, Rev. 6
OMP 4.3, Use of Emergency and Abnormal Procedures and FLEX Support Guidelines, Rev. 44
SOMP 01-07, Control Room Oversight, Rev. 2
OP/1/A/6100/001, Controlling Procedure for Unit Startup, Rev. 185
OP/1/A/6100/003, Controlling Procedure for Unit Operation, Rev. 197
PT/0/A/4150/021, Post Refueling Controlling Procedure for Criticality, Zero Power Physics, and Power Escalation Testing, Rev. 116
PT/0/A/4150/028, Initial Criticality and Zero Power Physics Testing, Rev. 69
PT/0/A/4150/047, 1/M Monitoring During Startup, Rev. 6

Biennial Licensed Operator Requalification Program Inspection Records:
License Reactivation Packages (Four Packages Reviewed)
Medical Files (Six Medical Records Reviewed)
Remedial Training Records (Four Records Reviewed)
Assessment M-Ops SA-14-07
Assessment M-Ops SA-14-05
LER AFW Mode 4
LOR Feedback Records (One Year of Records Reviewed)
Simulator Deficiency Reports (Two years of Records Reviewed)

Written Examinations:
LOCT 2016 A RO & SRO Annual Exam Closed
LOCT 2016 B RO & SRO Annual Exam Closed
LOCT 2016 E Shift RO & SRO Open Reference Annual Exam
LOR 2016 Exam 1, RO Annual Exam
LOR 2016 Exam 1, SRO Annual Exam
LOR 2016 Exam 1, RO-SRO Closed Reference Annual Exam

Procedures:
MTP 2701.0, Simulator Configuration Management and Operating Limits, Rev. 9
MTP 4116.1, Licensed Requalification Program, Rev. 32
MTP 5405.0, Operations Examination Development, Validation, and Security, Rev. 18
AD-TQ-ALL-0068, Licensed Operator Continuing Training Program, Rev. 1
AD-TQ-ALL-0230, Licensed Operator Requalification Annual and Biennial Exam Development, Rev. 3

AD-TQ-ALL-0410, Remediation and Revaluation, Rev. 2
AD-TQ-ALL-0420, Conduct of Simulator Training and Evaluation, Rev. 0
Plant Risk Information e-Book (PRIB), dated April 18, 2012, Model Version: 8.20
McGuire 2016 Requalification Exam Operator Remediation, dated 2016

Simulator Review:
McGuire Cycle Simulator and Plant Plots for Plant Startup, Shutdown and Normal Operations, dated 2015 and 2016
McGuire Simulator Deviation Tolerance Limits, dated 2015 and 2015

Scenario Packages:
ASE-33, ATWS and Steam Line Break Outside Containment, Rev. 14
ASE-36, Loss of Secondary Heat Sink, Rev. 13
ASE-32, Feedwater Line Break Inside Containment, Rev. 13
ASE-42, Loss of Heat Sink, Rev. 5
ASE-104, Steam Generator Tube Rupture, Rev. 2
ASE-110, Steam Line Break Inside Containment, Rev. 2

JPM Packages:
OP-MC-CA-SS-VI:164A, Ensure Proper Response of Diesel VI Compressors on Loss of VI, Rev. 6
OP-MC-IC-IPE:197-IA, Respond to an ATWS, Rev. 4
OP-MC-CA-SA:217, Manually Fail Open 2SA-48ABC and 2SA-49AB, Rev. 5
OP-MC-PS-NC:317-IA, Respond to Pressurizer Pressure Anomalies, Rev. 1
OP-MC-PS-NC:319A, Emergency Borate the NCS, Rev. 0
OP-MC-CP-AD:322A, Establish NC Pump Seal Injection from the SSF per ECA-0.0, Rev. 0
OP-MC-ECC-ISE:327A, Respond to Failed ESF Actuation, Rev. 0
OP-MC-JPM-IC-ENB:330, Restore Repaired Power Range Chanel to Service, Rev. 0
OP-MC-CF-CA:331, Reset the Unit 2 Turbine Drive CA Pump Stop Valve, Rev. 0
OP-MC-PS-NC:334A, Emergency Borate the NCS Using the PD Pump, Rev. 0

Section 1R12: Maintenance Effectiveness
AD-EG-ALL-1204, Single Point Vulnerability Identification, Elimination and Mitigation, Rev. 1
AD-EG-ALL-1206, Equipment Reliability Classification, Rev. 1
AD-EG-ALL-1209, System, Component, and Program Health Reports and Notebooks, Rev. 2
AD-EG-ALL-1210, Maintenance Rule Program, Rev. 0
AD-EG-ALL-1211, System Performance Monitoring and Trending, Rev. 2
SSC Function Scoping Database
VC System Health Report Q1

Section 1R13: Maintenance Risk Assessments and Emergent Work Control
NSD-213, Risk Management Process, Rev. 13
NSD-415, Operational Risk Management (Modes 1–3) per 10 CFR 50.65(a)(4), Rev. 8
SOMP 02-02, Operations Roles in the Risk Management Process, Rev. 16
OMP 13-7, Operational Control of Protected Equipment, Rev. 6
AD-OP-ALL-0201, Protected Equipment, Rev. 0

Section 1R15: Operability Determinations and Functionality Assessments
WO 20082987, Perform ultrasonic testing of piping adjacent to valve 1RN-884
MCC-1206.00-84-2030, Piping analysis of through wall leakage in 3” drain piping adjacent to valve 1RN-884

Regulatory Guide, 1.147, “Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1, Rev. 17
OP/0/A/6450/011, Controlled Area Ventilation/ Chilled Water System, Rev. 103

Section 1R18: Plant Modifications
ARs 02020734 and 02020403
WOs 20073101, Troubleshooting 1NC-33A issue and implementation of EC 403809
AP1/A/5500/11, Pressurizer Pressure Anomalies, Rev. 11
Operations Immediate Information Package for EC 403809, dated 4/21/16

Section 1R19: Post-Maintenance Testing
NSD-408, Testing, Rev. 18
AD-EG-ALL-1155, Post Modification Testing, Rev. 0
PT/1/A/4350/002 A, Diesel Generator 1A Operability Test, Rev. 101
PT/0/A/4350/021, Nordberg Diesel Engine Periodic Maintenance, Rev. 38
PT/1/A/4350/055A, 1A D/G Slave Start Test, Rev. 26
PT/2/A/4252/007A, CA System Train 2A Performance Test, Rev. 29
IP/0/A/3066/013, Using Crane VIPER to Obtain Data for Trending Valve Performance, Rev. 8
WOs 01914347, 20045279, 20077769, Replace vital battery EVCA
PT/0/A/4350/040E, 125 VDC Vital I and C Battery Modified Performance Test Using BCT-2000, Rev. 15
WO 20003400, Replace breaker 2EMXD-6E (2B VX fan motor)
WO 020177957, 2A NV pump motor electrical testing/inspection
IP/0/A/3190/005, Inspection and Testing of Motors, Rev. 36
OP/2/A/6200/001B, Chemical and Volume Control System Charging, Rev. 72
PT/2/A/4209/001 C, Standby Makeup Pump Flow Periodic Test, Rev. 40
WO 02176924, Refurbish Unit 2 Standby Makeup Pump Motor

Section 1R20: Refueling and Other Outage Activities
NSD 403, Shutdown Risk Management (Modes 4, 5, 6, and No-Mode) Per 10CFR50.65 (a)(4), Rev. 34
MSD-585, Reactor Building Personnel Access and Material Control, Rev. 17
OP/1/A/6100/002, Controlling Procedure for Unit Shutdown, Rev. 182
OP/1/A/6100/003, Controlling Procedure for Unit Operation, Rev. 197
OP/1/A/6100/SO-1, Maintaining NC System Level, Rev. 65
OP/1/A/6100/SO-10, Controlling Procedure for LTOP Operation, Rev. 39
OP/1/A/6100/SU-2, Refueling and Replacing Reactor Vessel Head, Rev. 40
OP/1/A/6100/SU-3, Mode 5 Checklist, Rev. 32
OP/1/A/6100/SU-5, Filling the NC System, Rev. 58
OP/1/A/6100/SU-6, Venting the NC System, Rev. 35
OP/1/A/6100/SU-7, Fill and Vent Valve Checklist, Rev. 17
OP/1/A/6100/SU-8, Heatup to 200 Degrees F, Rev. 57
OP/1/A/6100/SU-9, Mode 4 Checklist, Rev. 70
OP/1/A/6100/SU-10, Heatup Checklist, Rev. 13
OP/1/A/6100/SU-13, Heatup to 350 Degrees F, Rev. 58
OP/1/A/6100/SU-14, Removing ND from Service, Rev. 32
OP/1/A/6100/SU-15, Mode 3 Checklist, Rev. 51
OP/1/A/6100/SU-19, Heatup to 557 Degrees F, Rev. 65
OP/1A/6100/SU-20, Modes 1 and 2 Checklist, Rev. 41
PT/0/A/4150/033, Total Core Reloading, Rev. 68
PT/0/A/4150/046, Containment Walkdown, Rev. 5

PT/1/A/4600/003F, Containment Cleanliness and ECCS Operability Inspection, Rev. 19
PT/0/A/4150/021, Post Refueling Controlling Procedure for Criticality, Zero Power Physics, and Power Escalation Testing, Rev. 116
PT/0/A/4150/026, Power Escalation Testing, Rev. 20
PT/0/A/4150/028, Initial Criticality and Zero Power Physics Testing, Rev. 69
PT/0/A/4150/047, 1/M Monitoring During Startup, Rev. 6

Section 2RS1: Radiological Hazard Assessment and Exposure Controls

Procedures, Guidance Documents, and Manuals

AD-PI-ALL-0100, Corrective Action Program, Rev. 3
AD-RP-ALL-2005, Posting of Radiological Hazards, Rev. 1
AD-RP-ALL-2017, Access Controls for High, Locked High and Very High Radiation Areas, Rev. 2
AD-RP-ALL-2001, Taking, Counting and Recording Surveys, Rev. 1
AD-RP-ALL-3002, Unconditional Release of Material, Rev. 0
AD-RP-ALL-2009, Personnel Contamination Monitoring and Reporting, Rev. 0
AD-RP-ALL-3001, Control of Radioactive Material and Use of Radioactive Material Labels, Rev. 1
HP/2/B/1006/015, Surveying New Fuel After Receipt, Rev. 4
HP/2/B/1006/020, Tool, Equipment, and Area Decontamination, Rev. 4
HP/2/B/1006/024, Outage Controls and Surveillance, Rev. 22
HP/0/B/1006/044, Station Controls for Radiography, Rev. 0
RPMP 7-1, Radiological Key Control, Rev. 13
RPMP 7-9, Management's Expectations for Single Point Access (SPA) Duties and Investigation of Portal and Whole Body Monitor Alarms, Rev. 5
RPMP 7-11, Contamination Controls, Rev. 13
AD-RP-ALL-2014, Work in Alpha Environments, Rev. 2

Records and Data

HP/2/B/1003/063, Enclosure 5.17, Routine Surveillance- ISFSI, 6/1/15; 7/20/15
HP/2/B/1003/063, Enclosure 5.32, Quarterly Trending of ISFSI Survey Data, 06/30/2015 12/14/15
MNS-M-20160330-29, 1-NI-082 Initial Breach, 03/30/2016
MNS-M-20160331-14, 1-NI-082 Post Decon, 03/30/2016
MNS-M-20160331-16, 1-NI-082 Post Seat Removal, 03/31/2016
Gamma Spectrum Analysis MN16040100033, U1 RX L/C Lapping NI 82, 04/01/2016
Gamma Spectrum Analysis MN16040100058, U1 RX L/C Lapping NI 82, 04/01/2016
Gamma Spectrum Analysis MN16040200006, U1 L/C 1NI82 J Lamarre, 04/02/2016
Gamma Spectrum Analysis MN16040100016, U1 RX L/C 1NI82 Flap Seat Surface, 04/01/2016
Gamma Spectrum Analysis MN16033100046, Cut Out Weld, 03/31/2016
Gamma Spectrum Analysis MN16032200019, U1 UC Blind Flange Removal Filtration RWP 1955, 03/22/2016
Gamma Spectrum Analysis MN16040300009, U1 L/C RX 1NI126 RWP1250, 04/03/2016
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