



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

July 24, 2017

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  
05000369/2017002 AND 05000370/2017002**

Dear Mr. Capps:

On June 30, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your McGuire Nuclear Station Units 1 and 2. On July 12, 2017, the NRC inspectors discussed the results of this inspection with you and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented one finding of very low safety significance (Green) in this report. The finding involved a violation of NRC requirements. The NRC is treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest the violation or significance of the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement; 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 U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; and the NRC resident inspector at the McGuire Nuclear Station.

S. Capps

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

Sincerely,

*/RA/*

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

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

Enclosure:  
IR 05000369/2017002 and 05000370/2017002  
w/Attachment - Supplemental Information

cc: Distribution via ListServ

SUBJECT: MCGUIRE NUCLEAR STATION – NRC INTEGRATED INSPECTION REPORT  
05000369/2017002 AND 05000370/2017002 July 24, 2017

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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.: 05000369/2017002 and 05000370/2017002

Licensee: Duke Energy Carolinas, LLC

Facility: McGuire Nuclear Station, Units 1 and 2

Location: Huntersville, NC 28117

Dates: April 1, 2017 through June 30, 2017

Inspectors: A. Hutto, Senior Resident Inspector  
R. Cureton, Resident Inspector  
B. Collins, Reactor Inspector (Sections 1R08, 4OA5)  
W. Loo, Senior Health Physicist (Sections 2RS1, 2RS8)  
A. Nielsen, Senior Health Physicist (Sections 2RS6, 2RS8)  
W. Pursley, Health Physicist (Sections 2RS07, 4OA1)  
R. Williams, Senior Reactor Inspector (Section 1R08)

Approved by: Frank Ehrhardt, Chief  
Reactor Projects Branch 1  
Division of Reactor Projects

Enclosure

## SUMMARY

IR 05000369/2017002, and 05000370/2017002, April 1, 2017, through June 30, 2017; McGuire Nuclear Station, Units 1 and 2; Radiological Hazard Assessment and Exposure Controls

The report covered a 3-month period of inspection by resident inspectors and regional inspectors. There was one self-revealing violation 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. The cross-cutting aspects are determined using IMC 0310, "Aspects within the Cross-Cutting Areas" dated December 4, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy dated November 1, 2016. The NRC's program for overseeing the safe operations of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6.

Cornerstone: Occupational Radiation Safety

- Green. A self-revealing Green non-cited violation (NCV) of 10 CFR 20.1501(a)(2) was identified for the licensee's failure to conduct an adequate area radiation survey in Room 619 of the auxiliary building (waste gas decay tank (WGDT) room). Specifically, on April 19, 2016, a high radiation area (HRA) was identified near WGDT "A" in the WGDT room when a worker entering the area received a dose rate alarm on his electronic dosimeter (ED) and follow-up surveys revealed dose rates as high as 110 mrem/hr at 30cm. Also, as a result of the licensee's failure to perform a survey, the area was not barricaded and posted in accordance with plant Technical Specification (TS) 5.7.1, "High Radiation Area." The licensee immediately barricaded and posted the area as an HRA, performed an apparent cause evaluation to determine additional long term actions and entered the issue into their corrective action program as Nuclear Condition Report (NCR) 02021742.

The licensee's failure to conduct an area radiation survey to evaluate the magnitude and extent of radiation levels near WGDT "A" was a performance deficiency. This finding was determined to be more than minor because it was associated with the occupational radiation safety cornerstone attribute of human performance and adversely affected the cornerstone objective of ensuring adequate protection of worker health and safety from exposure to radiation from radioactive material during routine civilian nuclear reactor operation. Specifically, failure to identify, post and control HRAs could allow workers to enter HRAs without knowledge of the radiological conditions in the area and receive unintended occupational exposure. The finding was evaluated using Inspection Manual Chapter (IMC) 0609 Appendix C, "Occupational Radiation Safety Significance Determination Process." The finding was not related to the as low as reasonably achievable (ALARA) planning, did not involve an overexposure or substantial potential for overexposure, and the ability to assess dose was not compromised. Therefore, the inspectors determined the finding to be of very low safety significance (Green). This finding involved the cross-cutting aspect of avoid complacency in the area of human performance because the possibility of significant dose rate changes in the WGDT room during startup was a latent issue for which the licensee failed to recognize and plan. (H.12) (Section 2RS1)

## REPORT DETAILS

### Summary of Plant Status

Unit 1: Operated at approximately 100 percent rated thermal power (RTP) for the entire inspection period.

Unit 2: Began the inspection period shutdown for a scheduled refueling outage. The unit was placed online April 21, 2017 and was returned to 100 percent RTP on April 25. The unit was operated at essentially full power for the remainder of the inspection period.

### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

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

##### a. Inspection Scope

##### .1 Summer Readiness of Offsite and Alternate AC Power System

Because the licensee changed procedures affecting operation of the switchyard, the inspectors reviewed the licensee's procedures for operation and continued availability of offsite and onsite alternate AC power systems. The inspectors also reviewed the communications protocols between the transmission system operator and the licensee to verify that the appropriate information is exchanged when issues arise that could affect the offsite power system. 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. Documents reviewed are listed in the attachment.

##### .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 standby nuclear service water (RN) pond
- Unit 1 and Unit 2 containment ventilation system cooling to auxiliary and fuel building air handling units

##### b. Findings

No findings were identified.

## 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 four systems or trains to inspect:

- Unit 2, 2B diesel generator (DG) while the 2A DG was out of service (OOS) for outage maintenance during core re-load
- Unit 1, 1B nuclear service water train while the 1A RN train was OOS for maintenance on valve 0RN-13A
- Unit 1, 1B1 and 1B2 component cooling water (KC) pumps while the 1A2 KC pump was OOS for coupling maintenance
- Unit 1, 1B auxiliary feedwater (CA) train while the 1A CA pump was OOS for testing

#### .2 Complete Walkdown

The inspectors verified the alignment of the Unit 1 "A" train of the KC system. The inspectors selected this system for assessment because it is a risk-significant mitigating system. The inspectors determined the correct system lineup by reviewing plant procedures, drawings, the updated final safety analysis report (UFSAR), and other documents. The inspectors reviewed records related to the system design, maintenance work requests, and deficiencies. The inspectors verified that the selected system was correctly aligned by performing a complete walkdown of accessible components.

To verify the licensee was identifying and resolving equipment alignment discrepancies, the inspectors reviewed corrective action documents, including condition reports 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

#### .1 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, turbine building basement (fire area 38)
- Unit 2, auxiliary building 716' elevation (fire area 4)
- Unit 1, A/B emergency diesel generator rooms (fire areas 5 and 6)
- Unit 1, CA pump room (fire area 2)
- Unit 1/2, vital battery area (fire area 13)

### 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' elevation
- Unit 2 auxiliary building 695' elevation

b. Findings

No findings were identified.

1R08 Inservice Inspection Activities (711111.08)

a. Inspection Scope

Non-Destructive Examination Activities and Welding Activities

From April 3-14, 2017, the inspectors conducted an onsite review of the implementation of the licensee's inservice inspection (ISI) program for Unit 2. The ISI program is designed to monitor degradation of pressure retaining components in vital system boundaries. The scope of this program includes components within the reactor coolant system boundary, risk-significant piping boundaries, and containment system boundaries.

The inspectors either directly observed or reviewed the following non-destructive examination (NDE) activities. These activities were mandated by the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code of Record: 2007 Edition with 2008 Addenda). The inspectors evaluated the NDE activities for compliance with the requirements in Section XI and Section V of the ASME Code. The inspectors also evaluated if any identified indications or defects were dispositioned in accordance with either the ASME Code or an NRC-approved alternative requirement. Additionally, the inspectors reviewed the qualifications of the NDE technicians performing the examinations to determine if they were in compliance with ASME Code requirements.

- ultrasonic testing (UT) examination of weld 2NC2FW13-10, ASME Class 1, NC system (reactor coolant), 6" diameter elbow-to-pipe weld (observed)
- UT examination of weld 2NC2FW13-11, ASME Class 1, NC system (reactor coolant), 6" diameter elbow-to-pipe weld (observed)
- liquid penetrant testing (PT) examinations (5) of welds associated with ASME Code repair of NC2FW45 piping, ASME Class 1, reactor coolant (NC) system, 1.5" diameter (reviewed)

The inspectors directly observed the following welding activities. The inspectors evaluated these activities for compliance with site procedures and the requirements in Section IX and Section XI of the ASME Code. Specifically, the inspectors reviewed the work orders, repair or replacement plans, weld data sheets, welding procedures, procedure qualification records, welder performance qualification records, and NDE reports.

- Work Order (WO) 20151614 01, Replace 2D 1.5 Pipe at RCS Nozzle 4-1, NC system, 6" diameter, ASME Class 1

The inspectors reviewed the listing of non-destructive surface and volumetric examinations performed during the previous refueling outage. The inspectors verified that the licensee did not identify any relevant indications that were analytically evaluated and accepted for continued service.

#### PWR Vessel Upper Head Penetration Inspection Activities

The inspectors performed the following activities to verify that the requirements of the ASME Code and applicable licensee procedures were being met for the Unit 2 reactor vessel upper head:

- reviewed the Effective Degradation Years and Reinspection Years calculations to determine if a volumetric examination or bare metal visual examination of the penetration nozzles was required during the current outage
- verified that the examinations were performed in accordance with the requirements of the ASME Code and that the frequency was consistent with ASME Code Case N-729-1
- reviewed the results of the visual examination performed under the vessel head insulation

The inspectors verified that the licensee did not identify any indications that were accepted for continued service. Additionally, the inspectors verified that the licensee did not perform any welding repairs to the upper head penetrations since the last Unit 2 refueling outage.

#### Boric Acid Corrosion Control Inspection Activities

The inspectors reviewed the licensee's boric acid corrosion control program (BACCP) activities to determine if they were implemented in accordance with program requirements, applicable regulatory requirements, and industry guidance. Specifically, the inspectors performed the following activities:

- reviewed applicable procedures and the results of the licensee's most recent containment walkdown inspection
- interviewed the BACCP owner
- conducted an independent walkdown of accessible areas of the Unit 2 reactor building containment pipe chase
- 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
- reviewed engineering evaluations of components with boric acid leakage which verified that minimum wall thickness of those components was maintained

### Steam Generator Tube Inspection Activities

The inspectors reviewed the Unit 2 steam generator maintenance program. This inspection schedule was verified with the requirements of the ASME Code, the licensee's technical specifications, and applicable industry guidance. For steam generators A, B, C, and D, the inspectors performed the following activities to verify compliance with program requirements, regulatory requirements, and industry guidance:

- reviewed the scope of the eddy current (ET) examinations, and the implementation of scope expansion criteria
- reviewed documentation for a sample of ET data analysts, probes, and testers to verify that personnel and equipment were qualified to detect the applicable degradation mechanisms
- reviewed a sample of site-specific examination technique specification sheets (ETSSs)
- reviewed the in-situ steam generator tube pressure testing screening criteria; inspectors verified that the assumed NDE flaw sizing accuracy was consistent with data from the ETSSs or other applicable performance demonstrations
- reviewed a sample of ET data for six steam generator tubes (SGC-R113C72, SGC-R112C73, SGC-R80C67, SGC-R92C79, SGA-R111C70, and SGA-R86C73) with a qualified data analyst
- verified that recordable indications were detected and sized in accordance with vendor procedures
- reviewed ET indication reports to determine if steam generator tubes with relevant indications were appropriately screened for in-situ pressure testing
- compared the latest ET examination results with the last Condition Monitoring and Operational Assessment report to assess the licensee's prediction capability for maximum tube degradation and number of tubes with indications
- verified that current examination results were bounded by the operational assessment projections
- assessed the latest ET examination results to verify that new degradation mechanisms, if any, were identified and evaluated before plant startup
- reviewed the licensee's secondary side steam generator foreign object search and retrieval activities
- reviewed the steam generator tube plugging procedure and verified that appropriate tubes were selected for plugging based on the required plugging criteria
- reviewed plugging activities for five steam generator tubes
- reviewed a sample of primary-to-secondary leakage data for Unit 2 to confirm that operational leakage in each steam generator remained below the detection or action level threshold during the previous operating cycle

### Identification and Resolution of Problems

The inspectors reviewed a sample of ISI-related issues entered into the corrective action program. The inspectors evaluated 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.

b. Findings

No findings were identified.

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

a. Inspection Scope

.1 Resident Inspector Quarterly Review of Licensed Operator Regualification

On May 11, 2017, the inspectors observed an evaluated simulator scenario administered to an operating crew conducted in accordance with the licensee's accredited regualification training program. The scenario included a ruptured steam generator, which was complicated by a stuck open steam generator power operated relief valve (PORV) and failed emergency core cooling system equipment.

On May 31, 2107, the inspectors observed an evaluated simulator scenario administered to an operating crew conducted in accordance with the licensee's accredited regualification training program. The scenario involved the failure of a volume control tank level instrument, followed by a steam generator tube leak. The leak degraded to a tube rupture that required a manual reactor trip and safety injection.

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

The inspectors observed licensed operator performance in the main control room during Unit 2 reactor startup, low power physics testing and power ascension.

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.

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.

- Unit 2, decay heat removal (ND), (a)(1) evaluation for ND due to repetitive maintenance rule functional failures
- Unit 1/2, waste gas system failed its (a)(1) monitoring goal, NCR 2125725

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors reviewed the six 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.

- Unit 2, April 3, 2017, defense in depth verification for reduced inventory for Mode 6 entry

- Unit 1, May 2, 2017, risk mitigation activities for planned maintenance on 1A2 KC pump
- Unit 1, May 2, 2017, risk mitigation activities for planned maintenance on the 1A ND system
- Units 1 and 2, May 30, 2017, risk mitigation activities for planned maintenance on the A train of the RN system
- Unit 2, June 18, 2017, risk mitigation activities for planned maintenance on the turbine driven CA pump
- Unit 1, June 27, 2017, risk mitigation activities for planned maintenance on the 1A RN pump

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15)

a. Inspection Scope

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.

- Unit 2, End-of-cycle ice baskets below safety analysis mean, NCR 2116272
- Unit 2, 2NM-210A actuator oil leak, NCR 2118576
- Unit 2, 2NC-2 loop seal drain temperature reading low, NCR 2120297
- Unit 2, Turbine driven CA pump governor oil level high out of band, NCR 02124593
- Unit 1/2, ORN-010AC gear case grease is degraded but operable, NCR 02130379
- Unit 1/2, EVCC battery charger past 10 year 1E component changeout, NCR 2130857

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 modifications 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.

- Engineering Change (EC) 408097, "Unit 2 Cold Leg Injection Bleed Path"

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.

- Work Orders (WO) 20058410, 2008515, "2B DG outage maintenance," April 9, 2017
- WO 20076399, "Core re-load," April 11-12, 2017
- WO 20085028, "2A1 KC motor replacement," April 12, 2017
- WO 20010409, "2A DG voltage regulator replacement," April 17, 2017
- WO 20040006, "Replace and charge Unit 2 standby makeup pump pulsation damper," June 22-23, 2017
- WO 20135009, "PM 1A DG lube oil strainer," June 27, 2017

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 2 refueling outage from March 30, 2017 through April 21, 2017 the inspectors evaluated the following outage activities:

- refueling, 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:

- 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

No findings were identified.

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/4200/018, "Ice Bed Analysis" (Unit 2)
- PT/2/A/4403/002 D, "RN Train A Valve Stroke Timing – Quarterly Plant Evolution Valves"
- PT/2/A/4350/002 B, "2B Diesel Generator Operability Test"

#### Containment Isolation Valve

- PT/2/A/4200/001 C, "Isolation Valve Leak Rate Test," Enclosure 13.45, "Test Sheet for Penetration M-384 (VQ)"

#### In-Service Tests (IST)

- PT/2/A/4403/001 A, "2A RN Pump Performance Test"
- PT/1/A/4252/001 A, "1A CA Pump Performance Test"

#### 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 24, 2017. The inspectors observed licensee activities in the simulator and/or 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 (CAP). 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 radiological postings and container labeling for areas established within the radiologically controlled area (RCA) of the Units 1 and 2 auxiliary buildings, Unit 2 containment and turbine building, 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 RCAs. 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. The inspectors attended pre-job briefings and reviewed radiation work permit (RWP) details 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 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 high radiation area (HRA), locked high radiation area (LHRA), and very high radiation area (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, including airborne controls and electronic dosimeter alarm setpoints, were evaluated for selected Unit 2 refueling outage 24 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. The inspectors also reviewed the use of personnel dosimetry in high dose gradients to include extremity dosimetry and multi-badging.

Radiation Worker Performance and RP Technician Proficiency: Occupational workers' adherence to selected RWPs and RP technician proficiency in providing job coverage were evaluated through direct observations and interviews with licensee staff. Jobs observed included RP VHRA boundary postings and preparations for Steam Generator activities in Unit 2 containment high radiation and contaminated areas. The inspectors also evaluated worker responses to dose and dose rate alarms during selected work activities.

Problem Identification and Resolution: The inspectors reviewed and assessed condition reports associated with radiological hazard assessment and control. The inspectors evaluated the licensee's ability to identify and resolve the issues in accordance with licensee procedures. The inspectors also reviewed recent self-assessment results.

Inspection Criteria: RP activities were evaluated against the requirements of UFSAR Section 12, Technical Specifications 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.

b. Findings

Introduction: A self-revealing Green NCV of 10 CFR 20.1501(a)(2) was identified for the licensee's failure to conduct an adequate area radiation survey which resulted in an unposted HRA near WGDT "A" in the plant's WGDT room.

Description: On April 19, 2016, a worker entered the WGDT room and received an ED dose rate alarm of 34.4 millirem per hour (mrem/hr). Follow-up surveys identified a maximum dose rate of 110 mrem/hr near WGDT "A". The worker was not authorized to enter an HRA and was not knowledgeable of actual dose rates in the area. The licensee's follow-up investigation determined that high dose rates near WGDT "A" were due to unusually high concentrations of Ar-41 in WGDT "A" which was aligned to the reactor coolant system (RCS). The licensee determined that high concentrations of Ar-41 in the RCS resulted from activation of argon purge gas used during welding on primary system piping during the Unit 1 End-Of-Cycle Outage 24 (1EOC24). Chemistry samples taken prior to April 19 indicated unusually high concentrations of Ar-41 in the RCS (7.0E-2 micro curies per cm<sup>3</sup>) and the licensee had observed a small increasing trend on a remote monitor in the WGDT room following unit start up on April 17. However, the licensee failed to perform any additional radiological surveys as a result of these indications. The licensee concluded the worker's dose rate alarm and subsequent unposted HRA was the result of a failure to recognize the consequences of unusually high concentrations of argon purge gas left in the primary system at unit startup.

Analysis: The failure to conduct an adequate area radiation survey to evaluate the magnitude and extent of radiation levels in the WGDT room was identified as a performance deficiency. This finding was determined to be more than minor because it was associated with the occupational radiation safety cornerstone attribute of human performance and adversely affected the cornerstone objective ensuring adequate protection of worker health and safety from exposure to radiation from radioactive material during routine civilian nuclear reactor operation. Specifically, failure to identify, post and control HRAs could allow workers to enter HRAs without knowledge of the radiological conditions in the area and receive unintended occupational exposure. The finding was evaluated using IMC 0609 Appendix C, "Occupational Radiation Safety Significance Determination Process," dated August 19, 2008. The finding was not related to ALARA planning, did not involve an overexposure or substantial potential for overexposure, and the ability to assess dose was not compromised. Therefore, the inspectors determined the

finding to be of very low safety significance (Green). This finding involved the cross-cutting aspect of avoid complacency in the area of human performance because the possibility of significant dose rate changes in the WGDT room during startup was a latent issue for which the licensee failed to recognize and plan. (H.12)

Enforcement: 10 CFR 20.1501(a)(2) requires that each licensee make or cause to be made, surveys of areas, including the subsurface, that are reasonable under the circumstances to evaluate the magnitude and extent of radiation levels. Technical Specification 5.7.1 requires each HRA with dose rates greater than 100 mrem/hr and less than or equal to 1000 mrem/hr be barricaded and conspicuously posted.

Contrary to the above, on April 19, 2016, the licensee failed to conduct a survey to evaluate the magnitude and extent of radiation levels in the WGDT room, and as a result, a HRA with dose rates up to 110 mrem/hr at 30cm existed near WGDT "A" that was not barricaded and conspicuously posted. The licensee immediately barricaded and posted the area and performed an apparent cause evaluation to determine if additional long term corrective actions were required. The violation was entered into the licensee's corrective action program as NCR 02021742. This violation is being treated as an NCV, consistent with Section 2.3.2.a of the Enforcement Policy. (NCV 05000369/370/2017002-01, "Inadequate Survey Results in Unposted HRA")

## 2RS6 Radioactive Gaseous and Liquid Effluent Treatment

### a. Inspection Scope

Radioactive Effluent Treatment Systems: The inspectors walked down selected components of the gaseous and liquid radioactive waste (radwaste) processing and effluent discharge systems. To the extent practical, the inspectors observed and evaluated the material condition of waste processing equipment for indications of degradation or leakage that could constitute a possible release pathway to the environment. Inspected components included waste gas decay tanks, monitor tanks, waste processing equipment, and associated piping and valves. The inspectors interviewed licensee staff regarding equipment configuration and effluent monitor operation. The inspectors also walked down and reviewed surveillance test records for the auxiliary building exhaust filtration system.

Effluent Sampling and Discharge: The inspectors observed the collection and processing of weekly gaseous effluent samples from the Unit 1 and Unit 2 vent stacks. Technician proficiency in collecting, processing, and preparing the applicable release permits was evaluated. The inspectors reviewed recent liquid and gaseous release permits including pre-release sampling results, effluent monitor alarm setpoints, and public dose calculations. For 1-EMF-24 (steam line monitor), 0-EMF-49 (waste liquid monitor), and 1-EMF-36HH (U1 vent high-high range), the inspectors reviewed calibration and functional test records and evaluated traceability of radioactive calibration sources to National Institute of Standards and Technology standards. The inspectors also evaluated the licensee's capability to collect high-range post-accident effluent samples from these monitoring systems. The inspectors reviewed and discussed with licensee staff methodology for determining stack flow rates and compared current vent flows to design values in the UFSAR.

The inspectors reviewed the 2015 and 2016 Annual Radioactive Effluent Reports to evaluate reported doses to the public, unplanned releases, and to review Offsite Dose Calculation Manual (ODCM) changes. The inspectors also reviewed compensatory sampling data for time periods when selected radiation monitors were out-of-service. The inspectors reviewed the results of interlaboratory cross-checks for laboratory instruments used to analyze effluent samples. The inspectors also reviewed licensee effluent source term characterizations and changes to effluent release points. In addition, the inspectors evaluated recent land use census results.

Problem Identification and Resolution: The inspectors reviewed and discussed selected corrective action program documents associated with gaseous and liquid effluent processing and release activities including licensee sponsored assessments. The inspectors evaluated the licensee's ability to identify and resolve issues.

Inspection Criteria: Radwaste system operation and effluent processing activities were evaluated against requirements and guidance documented in the following: 10 CFR Part 20; 10 CFR Part 50 Appendix I; ODCM; UFSAR Sections 9, 11, and 16; Regulatory Guide (RG) 1.21, "Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants"; RG 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50 Appendix I"; and TS Section 5. Documents reviewed during the inspection are listed in the attachment.

b. Findings

No findings were identified.

2RS7 Radiological Environmental Monitoring Program (REMP)

a. Inspection Scope

REMP Implementation: The inspectors reviewed the 2015 and 2016 Annual Radiological Environmental Operating Reports and the 2015 and 2016 Annual Radioactive Effluent Release Reports. Selected environmental measurements were reviewed for consistency with licensee effluent data, evaluated for radionuclide concentration trends, and compared with detection level sensitivity requirements as described in the ODCM. The inspectors assessed the licensee's response to any missed or anomalous environmental samples. The inspectors also reviewed the results of interlaboratory cross-checks for laboratory instruments used to analyze environmental samples. Any changes to the ODCM, land use census, or environmental program processes were discussed with licensee staff.

The inspectors observed routine collection of environmental samples for airborne particulate and iodine samples, broadleaf vegetation and food products at selected locations as required by the licensee's ODCM. The inspectors noted the material condition of the continuous air samplers and environmental dosimeters. The inspectors also reviewed calibration and maintenance records for the environmental sampling equipment.

Meteorological Monitoring Program: The inspectors observed the physical condition of the meteorological tower and its instrumentation and discussed equipment operability and maintenance history with licensee staff. The inspectors evaluated transmission of locally generated meteorological data to other licensee groups such as emergency operations personnel and main control room operators. Calibration records for the meteorological measurements of wind speed, wind direction, and temperature were reviewed. The inspectors also reviewed meteorological measurement data recovery for 2015 and 2016.

Ground Water Protection: The inspectors reviewed the licensee's continued implementation of the industry's Ground Water Protection Initiative (Nuclear Energy Institute (NEI) 07-07) and discussed any changes to the program. The inspectors discussed program guidance for dealing with spills, leaks, and unexpected discharges with licensee staff and reviewed recent monitoring well results and any voluntary communications. The inspectors also reviewed recent entries into the 10 CFR 50.75(g) decommissioning file. The inspectors reviewed and discussed the licensee's program for monitoring of structures, systems, and components with the potential to release radioactive material to the environment. Potential effluent release points due to onsite surface water bodies were also evaluated.

Problem Identification and Resolution: The inspectors reviewed corrective action program documents in the areas of radiological environmental monitoring and meteorological tower maintenance. The inspectors evaluated the licensee's ability to identify and resolve the issues. The inspectors also reviewed recent self-assessment results.

Inspection Criteria: The inspectors evaluated REMP implementation and meteorological monitoring against the requirements and guidance contained in: 10 CFR Part 20; Appendices E and I to 10 CFR Part 50; TS Section 5.6; McGuire Nuclear Station Unit 1 and 2 ODCM; UFSAR Chapter 11.6; RG 4.15, Quality Assurance for Radiological Monitoring Programs (Normal Operation) - Effluent Streams and the Environment; Branch Technical Position, "An Acceptable Radiological Environmental Monitoring Program" – 1979; RG 1.23, "Meteorological Monitoring Programs for Nuclear Power Plants"; NEI 07-07, "Industry Groundwater Protection Initiative – Final Guidance Document"; and approved licensee procedures. Documents reviewed during the inspection are listed in the attachment.

b. Findings

No findings were identified.

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

a. Inspection Scope

Radioactive Material Storage: The inspectors walked down indoor and outdoor areas inside the protected area as well as warehouse 7 and the interim radwaste facility. During the walkdowns, the inspectors observed the physical condition and labeling of storage containers and the radiological postings for satellite radioactive material storage areas.

The inspectors also reviewed the licensee's radwaste procedures for routine surveys and waste storage.

Radioactive Waste System Walkdown, Characterization and Classification: The inspectors walked down accessible sections of the liquid and solid radwaste systems to assess material condition and conformance of equipment with system design diagrams. This included the interim radwaste facility, the radwaste solidification pad in the auxiliary building, radwaste storage tanks, resin transfer piping, and abandoned evaporator equipment. The inspectors discussed the function of radwaste components with radwaste staff. The inspectors discussed possible changes to the radwaste processing systems with radwaste staff. The processes for the dewatering of resins, spent resin tank recirculation, resin sampling, and transfer of resins from the processing pads to the shipping casks and temporary storage casks were reviewed and discussed with radwaste staff.

The inspectors reviewed the 2015 and 2016 Radioactive Effluent Release Reports and the 2016 radionuclide characterization and classification for the dry active waste and dewatered resin waste streams. The inspectors evaluated analyses for hard-to-detect nuclides, reviewed the use of scaling factors, and examined quality assurance comparison results between licensee waste stream characterizations and outside laboratory data. The inspectors also evaluated how changes to plant operational parameters were taken into account in waste characterization.

Shipment Preparation and Records: There were no radioactive material shipments available for observation during the week of the inspection. The inspectors reviewed four shipping records for consistency with licensee procedures and compliance with NRC and Department of Transportation (DOT) regulations. This included review of emergency response information, waste classification, radiation survey results, information on the waste manifest, and the authorization of the receiving licensee to receive shipments. Training records for selected individuals currently qualified to ship radioactive material were reviewed for compliance with 49 CFR Part 172 Subpart H.

Problem Identification and Resolution: The inspectors reviewed condition reports in the areas of radwaste/shipping. The inspectors evaluated the licensee's ability to identify and resolve the issues. The inspectors also reviewed recent self-assessment results.

Inspection Criteria: Radioactive material and waste storage activities were reviewed against the requirements of 10 CFR Part 20. Radwaste processing activities and equipment configuration were reviewed for compliance with the licensee's Process Control Program. Waste stream characterization analyses were reviewed against regulations detailed in 10 CFR Part 20, 10 CFR Part 61, and guidance provided in the Branch Technical Position on Waste Classification (1983). Transportation program implementation was reviewed against regulations detailed in 10 CFR Part 20, 10 CFR Part 71 (which requires licensees to comply with DOT regulations in 49 CFR Parts 107, 171-180, and 390-397), as well as the guidance provided in NUREG-1608. Training activities were assessed against 49 CFR Part 172 Subpart H. Documents reviewed are listed in the attachment.

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 records compiled between January 2016 and December 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 reviewed the PI results for the occupational radiation safety cornerstone from April 2016 through April 2017. For the assessment period, the inspectors reviewed electronic dosimeter alarm logs and NCRs related to controls for exposure significant areas. Documents reviewed are listed in the attachment.

Cornerstone: Occupational Radiation Safety

- occupational exposure control effectiveness

The inspectors reviewed the PI data from April 2016 through April 2017 and reviewed recent PI results. For the assessment period, the inspectors reviewed cumulative and projected doses to the public contained in liquid and gaseous release data and NCRs related to effluent control issues. The inspectors also reviewed licensee procedural guidance for collecting and documenting PI data. Documents reviewed are listed in the attachment.

Cornerstone: Public Radiation Safety

- radiological control effluent release occurrences



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 nuclear condition 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 nuclear condition report screenings, licensee trending efforts, and licensee human performance results. The review nominally considered the 6-month period of January 2017 through June 2017 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

No findings were identified. In general, the licensee has identified trends and has appropriately addressed the trends with their corrective action program. However, the inspectors identified a trend associated with licensee personnel's adherence to transient combustible administrative controls. During the six month review period, the inspectors identified two instances of inadequate transient combustible issues (NCRs 2100090, 2119716). Several additional transient combustible control deficiencies were identified by the licensee and documented in NCRs 2100996, 2103006, and follow-up to 2119716). As a result of the observed issues, the licensee performed a transient combustible walkdown of the service building to identify any additional transient combustible issues that did not meet program requirements, and the results of the walkdown were documented in NCR 2127328. The licensee also initiated NCR 2100693 to improve personnel engagement/ownership of program adherence. As a result of the above corrective actions, the inspectors have seen significant improvements in the areas

of transient combustible controls and housekeeping in the auxiliary and service buildings. The inspectors will continue to monitor and assess the long term effectiveness of corrective actions. The documents reviewed and used as the basis for this trend statement are listed in the attachment to this report.

.3 Annual Follow-up of Selected Issues

a. Inspection Scope

The inspectors conducted a detailed review of NCR 2074676, "Elevated Unit 2 Identified Leakage".

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 any root, apparent or contributing causes of the problem as appropriate
- 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. Unit 2 identified leakage increase on October 29, 2016 was determined to be a result of packing leakage from a pressurizer PORV block valve (2NC-31B). A previous occurrence of this condition (2NC-33A) was identified on July 6, 2016 (NCR 2043441). In both cases, the licensee back-seated the valves to arrest the leakage until they were repacked during refueling outage 2EOC23 and a cause evaluation was performed. The licensee's cause evaluation was sufficiently detailed and identified the apparent cause and appropriate corrective actions to correct the issue.

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

.1 (Closed) Licensee Event Reports (LERs) 05000369/2016-001-0, -01, Degraded Condition due to Rejectable Flaw on U1 Charging Line

a. Inspection Scope

On July 22, 2016, the licensee submitted a revision of this LER, documenting the discovery of a rejectable indication on the Unit 1 charging line (ADAMS Accession Number ML16208A060).

During the Problem Identification and Resolution inspection conducted in May 2016 (ML16173A338), the team evaluated the licensee's actions to address the original condition (rejectable indication in ASME Class 1 piping) and determined that the licensee's actions were sufficient to address the condition. However, the team identified a minor violation for the licensee's failure to follow procedure AD-OP-ALL-0105, "Operability Determinations and Functionality Assessments." The licensee entered this issue into their corrective action program as Action Request (AR) 02030874.

During this inspection period, the inspectors determined that the licensee's corrective actions resulting from AR 02030874 were sufficient to address the violation. Therefore, LERs 05000369/2016-001-0, -01 are closed.

b. Findings

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 independent spent fuel storage installation (ISFSI). 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 license or certificate of compliance. The inspectors reviewed records 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 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 12, 2017, the resident inspectors presented the inspection results to Mr. Steven Capps 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 Personnel

S. Capps, Vice President, McGuire Nuclear  
S. Gibby, Maintenance Manager  
J. Glenn, Organizational Effectiveness Manager  
J. Hussey, Licensing Engineer  
M. Kelly, Training Manager  
K. Kinard, Security Manager  
N. Kunkel, Engineering Manager  
S. Mooneyhan, Radiation Protection Manager  
T. Paglia, Work Control Manager  
E. Pigott, Operations Manager  
S. Snider, Plant Manager  
J. Thomas, Regulatory Affairs Manager

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

#### Opened and Closed

05000369/370/2017002-01    NCV    Inadequate Survey Results in Unposted HRA (2RS1)

#### Closed

05000369/2016-001-0        LER    Degraded Condition due to Rejectable Flaw on U1  
Charging Line (4OA3.1)

05000369/2016-001-1        LER    Degraded Condition due to Rejectable Flaw on U1  
Charging Line (4OA3.1)

## LIST OF DOCUMENTS REVIEWED

### **Section 1R01: Adverse Weather Protection**

AD-WC-ALL-0230, Seasonal Readiness  
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  
CSD-EG-ALL-2000.1, Nuclear Switchyard Interface Agreement  
CSD-EG-ALL-2000.2, Nuclear Switchyard Operating Guidelines  
DPC-1381.06-00-0001, Catawba, McGuire & Oconee Degraded Grid Voltage Setpoints for Real Time Contingency

### **Section 1R04: Equipment Alignment**

MCFD-2592-01.01, "Unit 1, Flow Diagram of Auxiliary Feedwater System"  
OP/2/A/6350/002, "Diesel Generator"  
OP/1/A/6250/002, "Auxiliary Feedwater System"  
MCFD-1574-01.01, "Flow Diagram of Nuclear Service Water System (Unit 1)"  
MCFD-2573-01.00, "Flow Diagram of Component Cooling System (Unit 2)"  
MCFD-1573-01.00, "Flow Diagram of Component Cooling System (Unit 1)"  
OP/1/A/6400/005 A, "Component Cooling Water System Valve and Power Supply Checklists"  
NCR 2050648, Inadvertent KC flow through 1A NDHX  
NCR 2102846, Cycling U1 KC surge tank level instrument  
NCR 2036356, Chemical accumulation on 1A2 KC pump seals

### **Section 1R05: Fire Protection**

MCS-1465.00-00-0008, Design Basis Specification for Fire Protection  
MCS-1465.00-00-0022, Appendix R Safe Shutdown Analysis  
MCC-1435.00-00-0059, NFPA 805 – Appendix R Safe Shutdown Deterministic Analysis  
AD-EG-ALL-1520, Transient Combustible Control  
FS/0/B/9000/004, (Aux 716) Fire Strategy #4  
FS/1/B/9000/038, Unit 1 turbine building basement Fire Strategy #38  
FS/1/B/9000/005/006, Unit 1 A/B diesel generator rooms Fire Strategies #5 and #6  
FS/1/B/9000/002, Unit 1 CA pump room Fire Strategy #2  
FS/0/B/9000/013, Unit 1/2 vital battery area Fire Strategy #13  
MFSD-004, Aux 716  
MFSD-038, Unit 1 turbine building basement  
MFSD-005/006, Unit 1 A/B diesel generator rooms  
MFSD-002, Unit 1 CA pump room  
MFSD-013, Unit 1/2 vital battery area

### **Section 1R06: Flood Protection Measures**

MCC-1206.47-69-100, Auxiliary Building Flooding Analysis  
MCS-1154.00-0004, Design Basis Specification for Auxiliary Building Structures  
AP/0/A/5500/44, Plant Flooding

**Section 1R08: Inservice Inspection Activities**Procedures:

03-1275284, Field Procedure for Remote Rolled Plugging Utilizing Plugging Control Box, Rev. 22  
 54-ISI-400, Multi-Frequency Eddy Current Examination of Tubing, Rev. 21  
 Examination Technique Specification Sheet #: 11956.3 R2, 11956.4 R2, 96004.3 R13, ETSS\_1\_R0, ETSS\_2\_R0  
 MP/0/A/7700/080, Inspection, Assessment and Cleanup of Boric Acid on Plant Materials, Rev. 021  
 NDEMAN-NDE-640, NDE Procedures Manual – Volume 4 – Ultrasonic Examination Using Longitudinal Wave and Shear Wave, Straight Beam Techniques NDE-640, Rev. 5  
 NDE-NE-ALL-6102, Utilization of PDI-UT-2 Generic Procedure for the Ultrasonic Examination of Austenitic Pipe Welds, Rev. 001  
 PT/2/A/4200/044, Containment Structural Integrity Inspection, Rev. 011  
 SM/0/A/8140/001, Welding of QA and Non-QA Piping, Valves and Components, dated 4/7/17

Drawings:

10019718, Exp/Fan Bar ASME Standard, Rev. B  
 10019722, ID/OD AX/CIRC Sprial/EDM Combo Standard Assembly, Rev. B  
 10032204, ZCSEK0200-E00.68 8X0.040-J03-1K032P, Rev. C  
 MC-ISIC2-2042-0002, Reactor Building – Unit 2, Steel Containment Vessel – Inside Surface Inservice Inspection Areas – Developed Elevation – Sheet 1, Rev. 4  
 MC-ISIC2-2042-0003, Reactor Building – Unit 2, Steel Containment Vessel – Inside Surface Inservice Inspection Areas – Developed Elevation – Sheet 2, Rev. 5  
 MC-ISIC2-2042-0004, Reactor Building – Unit 2, Steel Containment Vessel – Outside Surface Inservice Inspection Areas – Developed Elevation – Sheet 1, Rev. 4  
 MC-ISIC2-2042-0005, Reactor Building – Unit 2, Steel Containment Vessel – Inside Surface Inservice Inspection Areas – Developed Elevation – Sheet 2, Rev. 4  
 MC-ISIC2-2042-0020, Reactor Building – Unit 2, Steel Containment Vessel – Inside Surface Augmented Examination Areas – Details – Sheet 5, Rev. 3

Work Orders/Work Requests:

WO20054361 16, Repair Pipe with Overlay Weld 2D Cold Leg, dated 2/27/17  
 WO20151614 01, Replace 2D 1.5 Pipe at RCS Nozzle 4-1, dated 04/07/17

Condition Reports:

AR01993905, Two Couplings on 2-NV-FT-6080 Non-Active Dry Boron Accumulation  
 AR01995033, Active & Excessive Leakage from 2-NM-PP-PIPING  
 AR02029266, Excessive Boron on 90-degree Tubing Fitting 2-NM-VA-0038  
 AR02030874, Degraded Condition due to Rejectable Flaw on U1 Charging Line  
 AR02095262, Excessive Dry Boron Accumulation on 2-ND-PS-5040  
 AR02103759, Active Leakage from Base Metal/Through-Wall 2-NC-PP-PIPING  
 AR02103761, Active Boron Leakage from 2-WL-VA-0018  
 AR02104402, Excessive Boron Leakage/Accumulation on 2-NI-VA-0451  
 AR02116657, 2EOC21 CMOA did not cover the previous OA

NDE Examiner Qualifications:

Certificate of Personnel Qualifications for Examiners: B3720, B1055, B2860, C1250, C5542, E2448, F3453, K0727, M3442, M7006, V3197

System One Certificate of Method Qualification: UT LII (Williams), dated 9-13-15

Day & Zimmerman Certification Record (Hill), dated 3/9/2016

System One Visual Acuity Examination Record (Williams), dated 2/10/2017

Day & Zimmerman Vision Acuity Record (Hill), dated 3/23/2017

Miscellaneous Documents:

0217-AST-101193, Condition Monitoring and Preliminary Operational Assessment for McGuire Unit 2 EOC24 Outage, Rev. 0

170318, Weld Record (NC2FW45-6-BMR), dated 2-28-17

170459, Weld Record (NC2FW45-12), dated 4/10/17

170459, Weld Record (NC2FW45-13), dated 4/10/17

170459, Weld Record (NC2FW45-5), dated 4-9-17

170459, Weld Record (NC2FW45-6), dated 4/10/17

170459, Weld Record (NC2FW45-7), dated 4/10/17

170459, Weld Record (NC2FW45-8), dated 4/10/17

170459, Weld Record (NC2FW45-9), dated 4/10/17

51-9265917, McGuire Unit 2 EOC24 S/G Eddy Current Inspection Plan, Rev. 0

Aerotech Transducer Certification: UT, S/N 46208558, dated 04-19-1994

Certificate of Authenticity for Eddy Current Probe SN: 646326, 598861, 598864, 696283, 696282, 691254, 691256, 646327, 683220, 683221, 691117, 691118

Certificate of Calibration for Eddy Current Tester SN: 5025222, 5025223, 5025413, 6610369, 6610370, 6610374, 6610377, 6610382, 6610383, 6610390, 6610396, 6610399, 6610401, 6610556, VH-12768, VH-14696

Certificate of Conformance for Eddy Current Probe SN: 718260, 718261, 718262, 718263, 718264, 718265, 718266, 718267, 718268, 718269, 718270, 718271

CFR80 Steam Generator Site Technique Validation for Catawba Nuclear Station Unit 1 McGuire Nuclear Station Units 1 & 2, Rev. 1

Duke Energy Standards Lab Instrument Certification, Infrared Thermometer: S/N 24621020, dated 6/28/16

Eddy Current Guidelines for Duke Energy CFR80 Steam Generators, Rev. 0

GE Certificate of Conformity, UT Probe: S/N 00SB1593, dated 06/10/2015

GE Certificate of Conformity, UT Probe: S/N 00SB1595, dated 06/10/2015

GE Certificate of Conformity, UT Probe: S/N 00SB1628, dated 08/21/2015

GT000808-04, Weld Procedure Specification, Rev. 0

GT-43-2 3/4 X 5/8-1, Record of Welder Performance Qualification Test – ASME Section IX (Freeman), dated 04/26/2015

GT-43-2 3/4 X 5/8-1, Record of Welder Performance Qualification Test – ASME Section IX (Irizarry), dated 11/15/2014

GT-6 1 1/2 -.281-1, Record of Welder Performance Qualification Test – ASME Section IX (Freeman), dated 08/31/2015

GT-6 1 1/2 -.281-1, Record of Welder Performance Qualification Test – ASME Section IX (Irizarry), dated 09/01/2015

GT-6-.675 X .126, Record of Welder Performance Qualification Test – ASME Section IX (Irizarry), dated 03/09/2015

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### **Section 1R11: Licensed Operator Regualification Program and Licensed Operator Performance**

#### Quarterly Resident Inspector LOR Activity Review

NSD-509, Site Standards in Support of Operational Focus

SOMP 01-07, Control Room Oversight

Active Simulator Examination ASE-17

EP/1/A/5000/E-0, Reactor Trip or Safety injection

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

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OMP 4.3, Use of Emergency and Abnormal Procedures and FLEX Support Guidelines  
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**Section 1R12: Maintenance Effectiveness**

AD-EG-ALL-1204, Single Point Vulnerability Identification, Elimination and Mitigation

AD-EG-ALL-1206, Equipment Reliability Classification

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

NSD-213, Risk Management Process

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SOMP 02-02, Operations Roles in the Risk Management Process

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**Section 1R22: Surveillance Testing**

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**Section 1EP6: Drill Evaluation**

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 AD-RP-ALL-3001, Control of Radioactive Material and Use of Radioactive Material Labels, Rev. 1  
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### **Section 2RS8: Radioactive Material Processing and Transportation**

#### Procedures, Guidance Documents, and Reports

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