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

July 24, 2017

Mr. Tom Simril
Site Vice President
Duke Energy Corporation
Catawba Nuclear Station
4800 Concord Road
York, SC 29745-9635

SUBJECT: CATAWBA NUCLEAR STATION – NRC INTEGRATED INSPECTION REPORT 05000413/2017002 AND 05000414/2017002

Dear Mr. Simril:

On June 30, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Catawba Nuclear Station Units 1 and 2. On July 19, 2017, the NRC inspectors discussed the results of this inspection with Mr. Curry and other members of your staff. The results of this inspection are documented in the enclosed report.

The NRC inspectors did not identify any findings or violations of more than minor significance.

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.: 50-413, 50-414
License Nos.: NPF-35, NPF-52

Enclosure:
IR 05000413/2017002, 05000414/2017002
w/Attachment: Supplemental Information

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SUBJECT: CATAWBA NUCLEAR STATION - NRC INTEGRATED INSPECTION REPORT 05000413/2017002 AND 05000414/2017002 July 24, 2017

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REGION II

Docket Nos.:	50-413, 50-414
License Nos.:	NPF-35, NPF-52
Report No.:	05000413/2017002 and 05000414/2017002
Licensee:	Duke Energy Carolinas, LLC
Facility:	Catawba Nuclear Station, Units 1 and 2
Location:	York, SC 29745
Dates:	April 1, 2017 through June 30, 2017
Inspectors:	J. Austin, Senior Resident Inspector C. Scott, Resident Inspector J. Parent, Oconee Resident Inspector W. Loo, Senior Health Physicist (Section 2RS1) J. Panfel, Health Physicist (Section 2RS8) R. Williams, Senior Reactor Inspector (Section 1R08)
Approved by:	Frank Ehrhardt, Chief Reactor Projects Branch 1 Division of Reactor Projects

Enclosure

SUMMARY

IR 05000413/2017002 and 05000414/2017002, April 1, 2017 through June 30, 2017; Catawba Nuclear Station, Units 1 and 2; Integrated Inspection Report

The report covered a three-month period of inspection by the resident inspectors and regional inspectors. No findings were identified during this inspection period. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6.

REPORT DETAILS

Summary of Plant Status

Unit 1: Operated at or near 100 percent rated thermal (RTP) power through April 27. On April 28, the unit commenced refueling outage 1EOC23. Unit 1 achieved 100 percent RTP on May 26, 2017 and remained at or near 100 percent RTP for the remainder of the inspection period.

Unit 2: Operated at or near 100 percent rated thermal power for the entire inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

a. Inspection Scope

.1 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 extreme weather conditions. Documents reviewed are listed in the attachment.

The inspectors evaluated the following risk-significant systems:

- safe shutdown facility
- service water (RN)

.2 Impending Adverse Weather Conditions

The inspectors reviewed the licensee's preparations to protect risk-significant systems from tornado adverse weather conditions on May 24, 2017. The inspectors evaluated the licensee's implementation of adverse weather preparation procedures and compensatory measures, including operator staffing, during the adverse weather conditions. The inspectors reviewed the licensee's plans to address the consequences that may result from the tornado adverse weather conditions. The inspectors verified that operator actions specified in the licensee's adverse weather procedure maintain readiness of essential systems. The inspectors verified that required surveillances were current, or were scheduled and completed, if practical, before the onset of anticipated adverse weather conditions. The inspectors also verified that the licensee implemented periodic equipment walkdowns or other measures to ensure that the condition of plant equipment met operability requirements. Documents reviewed are listed in the attachment.

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 three systems or trains to inspect:

- Unit 1 A emergency diesel generator (EDG)
- Unit 1 B EDG
- Unit 2 RN pumps

.2 Complete Walkdown

The inspectors verified the alignment of the Unit 1 standby makeup pump. 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, 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. The inspectors observed whether there was indication of degradation, and if so, verified the degradation was being appropriately managed in accordance with an aging management program and it had been entered into the licensee's corrective action program.

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 four fire areas to assess material condition and operational status of fire protection equipment. Documents reviewed are listed in the attachment.

- Unit 1 annulus, fire zone RB-1
- Unit 1 reactor building, fire zone RB-2
- Unit 1 and Unit 2, auxiliary building, 594 elevation, fire area 22
- Unit 1 essential switchgear room, 560 elevation, fire zone 8

b. Findings

No findings were identified.

1R07 Heat Sink Performance (71111.07)

a. Inspection Scope

Annual Review

The inspectors verified the readiness and availability of the Unit 1 component cooling water heat exchanger 1B to perform its design function by reviewing completed performance test records and verifying correct categorization and receipt of maintenance under the Maintenance Rule (MR). Additionally, the inspectors verified that the licensee had 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 Activities (71111.08)

a. Inspection Scope

Non-Destructive Examination Activities and Welding Activities

From May 8, 2017, through May 12, 2017, the inspectors conducted an onsite review of the implementation of the licensee's inservice inspection (ISI) program for Unit 1. 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 examination (UT) of weld 1NI64-41, pipe to tee weld, ASME Class 2 (reviewed)
- UT of weld 1ND37-5, pipe to elbow weld, ASME Class 1 (reviewed)
- liquid penetrant examination (PT) of weld 1NI64-41, pipe to tee weld, ASME Class 2 (reviewed)
- radiography (RT) of weld 1NI64-41, pipe to tee weld, ASME Class 2 (observed)
- visual examination of the bottom mounted instrumentation of the reactor pressure vessel lower head, ASME Class 1 (reviewed)

The inspectors either directly observed or reviewed 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.

- weld 1NI64-41, pipe to tee weld, ASME Class 2 (reviewed)
- weld 1NI64-42, pipe to tee weld, ASME Class 2 (reviewed)
- weld 1NI64-43, pipe to pipe weld, ASME Class 2 (reviewed)

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 1 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
- observed the examination for the bare metal visual examination of upper head penetrations
- 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

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 1 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 1 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 1 steam generator maintenance program. The inspectors verified that no steam generator tube inspection activities were required this refueling outage. This inspection schedule was verified with the requirements of the ASME Code, the licensee's technical specifications, and applicable industry guidance.

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 Requalification Program and Licensed Operator Performance (71111.11)

a. Inspection Scope

1. Resident Inspector Quarterly Review of Licensed Operator Requalification

On June 22, 2017, the inspectors observed a simulator scenario conducted for training of an operating crew for a response to a leak in the component cooling water system, feedwater pump loss of oil, fire in the auxiliary building, loss of a unit main transformer, turbine runback, reactor scram, and loss of all feedwater.

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 a Unit 1 shutdown for a refueling outage on April 28, 2017.

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 three 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, Condition Report (CR) 2118984, NC-30 spray bypass valve closed since 1995
- Unit 1, CR 2109683, A(1) Evaluation needed for VA.8 MR function
- Unit 2, CR 2113493, 2SV (2C steam generator (SG) power operated relief valve) failed nitrogen leakage test

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors reviewed the four 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 12, 2017, Protected equipment plan with the 2A EDG out of service
- Unit 1, April 19, 2017, Yellow risk condition for motor driven auxiliary feedwater (CA) pump A unavailable during pipe flush
- Unit 1, May 2, 2017, Yellow risk condition during reduced inventory
- Unit 2, May 5, 2017, Yellow risk condition while the SSF was unavailable during supplemental diesel generator (DG) cable tie

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 1, Following the 1A DG periodic test on April 18, 2017, a 10 drop per minute lube oil leak from the 1A engine driven lube oil pump was identified, CR 2117628
- Unit 2, DG-2A Power-driven Potentiometer pre-position circuit, CR 2116554
- Unit 2, Acoustic monitors for the pressurizer safety valves, CR 2125238
- Unit 1, Faint abnormal odor on 1 DG control panel "A", CR 2132262
- Unit 1, 1A EDG kilowatts spiked from 900 kw to 7000 kw when jumper was placed in circuit for testing, CR 2118549
- Unit 2, Questions on auxiliary shutdown panel supply unit, CR 2124814

b. Findings

(Opened) Unresolved item (URI): 10 CFR 50.59 Evaluation of a Change to an Engineered Safety Features Actuation (ESFAS) Test Procedure

Introduction: The inspectors identified a URI associated with the implementation of a procedure change to the Unit 1 auxiliary shutdown panel (ASP) room air conditioning system. Additional information is needed to determine if a performance deficiency exists.

Description: In November 2015, the licensee changed procedure PT/1/A/4200/009, "Engineering Safety Features Actuation periodic test (ESFAS)," to allow testing of the 1A ASP room air conditioning unit while it was unavailable. A URI was identified because the change verified the ESFAS "Sequenced On" light was lit, where the previous version of the procedure confirmed the air conditioning unit was running. The licensee did not perform a 50.59 evaluation, and the inspectors determined the change may affect the intent of the surveillance requirement.

The licensee has initiated a 50.59 evaluation to determine the impact of the change relative to ESFAS testing requirements. The inspectors will review the completed evaluation to determine if a performance deficiency exists. The licensee documented

this issue and background information in their corrective action program as CR 2124814. (URI 05000413/2017002-01, "10 CFR 50.59 Evaluation of a Change to an Engineered Safety Features Actuation (ESFAS) Test Procedure").

1R19 Post-Maintenance Testing (71111.19)

a. Inspection Scope

The inspectors either observed post-maintenance testing or reviewed the test results for the seven 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 Order (WO) 20158109, Perform test master relay (Train B) following logic card replacement, April 5, 2017
- WO 20159298, Perform functional test for replacement of power driven potentiometer on 2A EDG, April 13, 2017
- WO 20067746, Sequence halt received during mechanical trip testing, PT2/B/4250/002A, April 19, 2017
- WO 20047607, Perform 1 B D/G operability test following governor modification, May 10, 2017
- WO 20166874, Repair leak from engine mounted 1A EDG cooling water pump, May 16, 2017
- WO 20167193, Functional test following turbine driven auxiliary feedwater pump governor oil cooler repair, May 20, 2017
- WO 20073320, Replace potentiometer for 1SV-1 (1D SG PORV), May 21, 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 1 refueling outage from April 29, 2017 through May 23, 2017, the inspectors evaluated the following outage activities:

- outage planning
- shutdown, cooldown, 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:

- 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

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

- IP/2/A/3200/001B, Solid State Protection System Train B Periodic Testing
- PT/2/A/4400/014, RN to CA Suction Piping Flow Measurement
- PT/1/A/4600/017, Surveillance Requirements for Unit 1 Shutdown

Containment Isolation Valve

- PT/A/4200/041A, Containment Purge Isolation Valve Leak Rate Test

Reactor Coolant System Leak Detection

- PT/2/A/4150/001D, Reactor Coolant System Leakage Calculation

Ice Condenser Tests

- PT/0/A/4200/086, Ice Bed Analysis Periodic Test (Unit 1)

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 Unit 1 reactor building, Unit 1 and Unit 2 auxiliary and turbine buildings, 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 (ED) alarm setpoints, were evaluated for selected Unit 1 refueling

outage 23 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 including extremity dosimetry and multi-badging in high dose rate gradients.

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 core exit thermocouple, in-service inspections on steam generators, 1NI-60 check valve and radiography activities in 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: Radiation protection activities were evaluated against the requirements of Updated Final Safety Analysis Report Section 12, Technical Specifications Section 5.0, 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

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 the radwaste processing facility. During the walk-downs, 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 monitor tank building and the auxiliary building. The inspectors discussed the function of radwaste components with the radwaste operator. 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 the resin processing contractor.

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: The inspectors observed limited preparation and shipment activities for upcoming shipments of scrap material the following week. The inspectors reviewed six 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 report associated with 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 April 2016 and March 2017 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

- high pressure injection system
- emergency AC power system
- heat removal system

Cornerstone: Initiating Events

- unplanned scram with complications

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 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 and Observations

No findings were identified. The inspectors identified that an adverse trend exists associated with the configuration management of plant equipment. Specifically, the inspectors identified examples where plant equipment is not being maintained or operated in its designed configuration. This has resulted in longstanding nonconforming conditions with the updated final safety analysis report (UFSAR). The following items are examples of this trend:

- CR 2123713 documents that the pressurizer spray manual bypass valve, 2NC30, is currently closed and not able to be throttled open to provide a small continuous flow to reduce thermal stress when the spray valves are open, as described in the UFSAR. Following the inspectors questions associated with 2NC30, the licensee determined that this represented a nonconforming condition with the UFSAR.

- CR 2107611 documents that the Unit 1A auxiliary shutdown panel room supply unit (ASPSU), is out of service and cannot be placed in service without repair. Unit 1A ASPSU is nonconforming to the UFSAR.

- CR1898884 documents an operable but degraded/nonconforming condition associated with Unit 2 pressurizer level channel III. A small loop seal in the flex hosing did not allow the associated transmitter reference leg to fill. This caused a high indication for pressurizer level.

4OA6 Meetings, Including Exit

On July 19, 2017, the resident inspectors presented the inspection results to Mr. Clark Curry 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
C. Abernathy, Manager, Nuclear Site Services
S. Andrews, Sr. Engineer Regulatory Affairs,
T. Arlow, Emergency Planning Manager
E. Benfield, Radiation Protection Supervising Scientist
C. Bigham, Director Nuclear Organizational Effectiveness
M. Carwile, Chemistry Manager
B. Cauthen, Lead Engineer
C. Curry, Plant Manager
C. Fletcher, Regulatory Affairs Manager
N. Flippin, Work Management Manager
B. Foster, Operations Manager
T. Jenkins, Maintenance Manager
A. Keller, ISI Engineer
L. Keller, General Manager Nuclear Engineering
T. Koleva, BACCP Engineer
B. Leonard, Training Manager
T. Simril, Site Vice-President
J. Smith, Radiation Protection Manager
T. Tucker, NUC NDE Specialist
C. Wilson, Sr. Engineer Regulatory Affairs
J. Wylie, Director, Nuclear Plant Security

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

05000413/2017002-01	URI	10 CFR 50.59 Evaluation of a Change to an Engineered Safety Features Actuation (ESFAS) Test Procedure (Section 1R15)

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

PT/0/B/4700/039, Hot Weather Protection
CR02120401, Unit 1 Turbine Sump Pumps Tripped During RC System Draining
Hot Weather Action Register 2017
OP/0/B/6700/015, Weather Related Activities

Section 1R04: Equipment Alignment

CR02128631, 1HW27 Swinging and Causing 1B1 Heater Level Swings
CR02126539, RP-29 Entered due to Momentary Hydrogen Ignition
PT/1/A/4200/008, Standby Makeup Pump Piping Verification, Rev. 003
PT/1/A/4200/005 C, Standby Makeup Pump Check Valve Test, Rev.011
CN-1554-01.05, Flow Diagram NV system

Section 1R05: Fire Protection

Fire Strategy Plan, Fire Area 22: Unit 1 and Unit 2 Auxiliary Building, 594 level
Fire Strategy Plan, Fire Area RB-1, Unit 1 annulus
Fire Strategy Plan, Fire Area RB-2, Unit 1 reactor building,
Fire Strategy Plan, Fire Area 8, Unit 1 essential switchgear room, elevation 560

Section 1R07: Heat Sink Performance

PT/1/A/4400/06C, KC Heat Exchanger 1A Heat Capacity Test
PT/1/A/4400/006D, KC Heat Exchanger 1B Heat Capacity Test
CR02122369, ECT PM Results for KC HX 1B in 1EC23
CNTC-1573-KC-H002-01, KC System Test Acceptance Criteria KC HX 1B Heat Capacity Test
CNC-1223.24-00-0018, Acceptable RN Flow and Fouling in the KC Heat Exchangers

Section 1R08: Inservice Inspection Activities

Procedures
AD-EG-ALL-1702, ASME Section XI Inservice Inspection Program Administration, Rev. 3
AD-EG-PWR-1611, Boric Acid Corrosion Control Program – Implementation, Rev. 1
ASME Section XI Program Functional Area Manual, Rev. 28
NDE-10, General Radiography Procedure, Rev. 26
NDE-10A, General Radiography Procedure, Rev. 26
NDE-35, Liquid Penetrant Examination, Rev. 25
NDE-35, Liquid Penetrant Examination, Rev. 26
NDE-NE-ALL-7202, Visual Examination of PWR Reactor Pressure Vessel Upper Head Penetrations, Rev. 0
NDE-NE-ALL-7203, Visual Examination of PWR Reactor Pressure Vessel Bottom Mounted Instrument Penetrations, Rev. 1
PD-EG-PWR-1611, Boric Acid Corrosion Control Program, Rev. 1
Welding Procedure Qualification Record: L-110D Rev. 0, L-128 Rev. 0, L-148C Rev. 0

Calculations
CNC 1201.01-00-0009, Catawba 1EOC21 Steam Generator Condition Monitoring and Operational Assessment, Rev. 0
CNC-1201.01-00-0022, Determination of Periodic Inspection Requirements for the Reactor Vessel Head and Reactor Vessel Head Inspection Documentation, Rev. 25

Condition Reports
CR 01997737, 1-NV-VA-327 boron at pressure boundary component location
CR 02001622, 1-NV-VA-181A Active/Excessive/Rusty boron accumulation
CR 02032627, 1-NS-VA-6 Excessive boron on vent pipe
CR 02052124, Bonnet bolts on 1-NB-VA-449 were found to be broken, 08/08/2016
CR 02086519, 0-NB-FL-BCONCEN Excessive/rusty boron from adjacent flange
CR 02096758, Active boron leak at 1KFPG5140
CR 02097767, 1-NV-FT-6150 Leak rate increase
CR 02118984, Questions related to operating with 2NC-30 closed, 04/24/2017
CR 02119934, Steam Generator 1EOC23 Skipped Cycle Assessment, 04/27/2017
CR 02121060, Incorrect filler material used for class G weld, 05/03/2017
CR 02121063, Acceptable ultrasonic testing (UT) indication, 05/03/2017
CR 02121173, Coverage limitations encountered during UT exams
CR 02122751, ISI and PSI datasheets missing ANII signature from 1EOC22, 05/09/2017
CR 02123038, Documenting NRC BAC walkdown in U1 containment, 05/10/2017
CR 02123644, Incorrect temperature stated for corrosion rate in BAC Eval, 05/11/2017
CR 02125301, NRC ask question regarding NDE procedure NDE-10, 05/17/2017

Miscellaneous Documents
51-9195436-000, Catawba Unit 1 EOC20 RVCH Examination Final Report
AD-MN-ALL-0006, Fluid Leak Management, Rev. 0
ASME Section XI Program Functional Area Manual, Rev. 28
Certificate of Compliance for Heat#: 537291 Lot CF0029, 744825 Lot DT9850, 743009 Lot CT9686
Certificate of Conformance for Batch: 11A23K, 11H06K, 12A03K, 13M12K, 14L06K
NDE Examiner Certification: T. Walkowiak, T. Morrison, T. Goldsmith, K. Hill, W. McNeal, J. Ross, Q. Smith
Record of Welder Performance Qualification Test for Welder: W. Cochran, K. Smart, J. Staggs, A. Walker, W. Whitmire
UT Calibration/Examination Report BOP-UT-15-393
VT-15-1316, Visual Examination for Boric Acid Detection for Component 1RPV-HEAD-SURFACE-MULTIPLE
VT-17-021, Visual Examination for Boric Acid Detection for Component 1RPV-BMI-NOZZLE
VT-17-200, Visual Examination for Boric Acid Detection for Component 1RPV-HEAD-SURFACE
Weld Documents: 151281, 161106

Section 1R11: Licensed Operator Requalification
AD-OP-ALL-1000, Conduct of Operations, Rev.13

Section 1R12: Maintenance Effectiveness
CR02132449, NOS ID Maintenance Rule (a)(1) Evals. Exceeded Time Limit

Section 1R13: Maintenance Risk Assessments and Emergent Work Control
1EOC23, Protected Equipment List, 5/2/2017
1EOC23, Protected Equipment List, 5/5/2017
CR 2100391, Unexpected U1 DCS Response Caused Letdown Isolation

Section 1R15: Operability Evaluations
CR 02125052, Trip of Breaker 1LXD-5B
CR02130123, Fine Particulate Found in 1B EDG Combustion Air Header Drain
CR02131664, U1 N-42 Indicated Erratically During Cal. at Power
CN-1499-SM.02-00, Instrument Detail Main Steam Flow, Rev.15
CR 2125674, I/R Wrapping on cabling of 1SMFT5050

Section 1R19: Post-Maintenance Testing
CR02132184, Late Identified Equiv. EC Needed for 2B LD Motor Replacement
CR 02132177, Engineering to Evaluate U-2 NS Channel Cal. Model Work Orders
CR 02124130, Sequence Halt Received During Mechanical Trip Test CNS Unit 1 Outage Log, 1B MG Set Was Placed in Service After Troubleshooting Determined

Section 1R20: Refueling and Other Outage Activities
CR02126447, CNS1EOC23, Excitation Failed to Start from Control Room
CR02127170, I/R 1HW-59 Not Controlling 1C1 HDT Level Automatically
CR02126564, 1D SG PORV Intermediate When Placed to Full Open
CR02126762, Unit 1 Low Power Flux Map Testing
PT/0/A/4200/002, Containment Cleanliness Inspection, Rev.034
CR 21212455, Independent Review Teal Outage Risk Review Report

Section 1R22: Surveillance Testing
CR02125013, NC Flow Xmtr Procedure Revision
CR02130910, 1KC-C37A Failed to Open Automatically as Required
CR02128750, U1 Loose Parts Alarm Channel 3 and Channel 15
CR1460984, At DC Cook WCAP-8110
CR2124262, Light ice baskets
CR2112219, Preconditioning evaluation for 1(2)/PT/A/4400/014
CN-1574-02.05, Flow Diagram of Nuclear Service Water System (RN), Rev.58
AD-EG-ALL-1450, Preconditioning of Structures, Systems and Components, Rev.0
EC112278, Remove Strainer 1CASTY01
PT/2/A/4200/059, RN to CA Suction Piping Flush
PT/1/A/4200/014A, Ice Condenser Intermediate Deck Door and Inlet Door Position Monitoring System Inspection

Section 2RS1: Radiological Hazard Assessment and Exposure Controls
Procedures, Guidance Documents and Manuals
AD-PI-ALL-0100, Corrective Action Program, Rev. 7
AD-NE-ALL-1120, Radiation Safety for Industrial Radiography, Rev. 1
AD-RP-ALL-2000, Preparation and Management of Radiation Work Permits (RWP), Rev. 3
AD-RP-ALL-2001, Taking, Counting, and Recording Surveys, Rev 2
AD-RP-ALL-2002, SRD Alarms, Rev.2
AD-RP-ALL-2005, Posting of Radiological Hazards, Rev. 1
AD-RP-ALL-2009, Personnel Contamination Monitoring and Reporting, Rev. 2

AD-RP-ALL-2017, Access Controls for High, Locked High, and Very High Radiation Areas, Rev. 2
AD-RP-ALL-2022, Radiation Protection Radiography Responsibilities, Rev. 1
AD-RP-ALL-3001, Control of Radioactive Material and Use of Radioactive Material Labels, Rev. 1
AD-RP-ALL-3002, Unconditional Release of Material, Rev. 0
HP/0/B/1004/036, Radioactive Sources, Rev. No. 002
NSD-501, Temporary Storage of Radioactive Material in the Spent Fuel Pool, Rev. No. 008
RA/0/1100/002, Tool, Equipment, and Area Decontamination, Rev. No. 000
RA/0/1700/003, Issuance and Return of Radioactive Sources, Rev. No. 001

Records and Data
Duke Energy Boundary Guard Awareness Training, Rev. 6
Gamma Spectrum Analysis, Sample IDs: CN17050800051, 1NI-60 Breach, RWP1142 PWR-VISOR, 05/08/17; and CN17050800052, 1NI-60 Breach (Cont), RWP1142 Blue Ckd, Water Ckd, 05/08/17
HP/0/B/1004/036, Radioactive Sources, Rev. No. 002, 11/22/16; 01/16/17; and 04/18/17
Intrastation Letter, Catawba Nuclear Station, Material Stored in Spend Fuel Pools-2016, File No.: CN-750.00, 12/28/16
NSTS Annual Inventory Reconciliation Confirmation, Confirmation of Annual Inventory Reconciliation, 01/09/17
Radiation Work Permit (RWP) No. 1426, ISI Work – Excludes ISI on Flange (U/C), Rev. 25
RWP No. 1142, High Radiation Area – 1NI 60 Check Valve Inspection/Repair (LC/Annulus/AB), Rev. 05
RWP No. 1456, Core Exit Thermocouples (CET) Support, Rev. 03
RWP No. 1666, Self Brief Entry to Low Dose Open Areas of
Aux Building, Rev. 0
VSDS Standard Map Survey Report, Catawba Nuclear Station, Survey Nos.:
CNS-M-20170429-1, U1 Rx Bldg\B-C Side Pipe Chase\240 Degree A Sump, 04/29/17 00:04; CNS-M-20170429-5, U1 Rx Bldg\U1 Lower Cont\Pipechase Downgrade, 04/29/17 00:17; CNS-M-20170429-6, U1 Rx Bldg\U1 Pipechase 565 Elevation, 04/29/17 00:21; CNS-M-20170429-9, U1 Rx Bldg\U1 Lower Cont\U1 Downgrade 1, 04/29/17 01:51; CNS-M-20170429-10, U1 Rx Bldg\U1 Lower Cont\U1 Downgrade 1, 04/29/17 01:56; CNS-M-20170508-19, Inspection of 1NI 60 Valve, 05/08/17 14:45; CNS-M-20170510-1, Aux Bldg\560 Elevation\Room 318 & 318A, 05/10/17 00:56; CNS-M-20170510-2, Aux Bldg\577 Elevation\Room 476 & 477, 05/10/17 00:25; CNS-M-20170511-1, U1 Rx Bldg\U1 Upper Containment no missile shields, 05/11/17 02:35; CNS-M-20170512-6, Turbine & service Bldg\1EOC23 TB Basement RT, 05/12/17 04:57

CAP Documents
NCR 02066312
NCR 02066315
NCR 02067673
NCR 02069037
NCR 02073302

Section 2RS8: Radioactive Material Processing and Transportation
Procedures, Instructions, and Reports
AD-PI-ALL-0100, Corrective Action Program, Rev. 7

AD-RP-ALL-5000, Preparation and Shipment of Radioactive Waste, Rev. 0
AD-RP-ALL-5001, Preparation and Shipment of Radioactive Material, Rev. 0
AD-RP-ALL-5002, 10 CFR 61 Radioactive Waste Classification, Rev. 0
MP/0/A/7550/011, Energy Solutions 8-120B Cask Handling, Loading, and Unloading, Rev. 043
Radioactive Waste Process Control Program Manual, Appendix C, Catawba Nuclear Station, Process Control Program, Rev. No. 13
Radioactive Waste Process Control Program Manual, Appendix H, Revision Summary – Licensee Initiated Changes, Rev. 10
Radioactive Waste Process Control Program Manual, Corporate Process Control Program, Rev. No. 15

Shipping Records and Radwaste Data
10 CFR 61 Review, Dry Active Waste Stream, 11/30/16
10 CFR 61 Review, Fuel (FK) Filter Site Std Stream, 07/21/16
10 CFR 61 Review, Primary Filter Site Std Stream, 04/13/16
10 CFR 61 Review, Radwaste Filter Surrogate Crud Stream, 04/13/16
10 CFR 61 Review, RBT Resin Stream, 05/13/16
Annual Radioactive Effluent Release Report, Catawba Nuclear Station, 2015 and 2016
Customer Monthly Report, #408 Catawba Nuclear Station, Energy Solutions Burial and Return Summary, 2015-2016
Radioactive Shipment Records (RSRs) No. 15-0016, 15-0017, 16-001, 16-0025, 17-005, and 17-009
RSR Shipment Logs, 2015-2017
Training Records – 49CFR172 Hazardous Material Training Documentation for selected Radioactive Material Control shipping staff
UFSAR Change Package, C-14-09687, Chapter 11 Revisions, 04/06/15

CAP Documents
2016-CNS-RP-01, Nuclear Oversight, Audit Radiation Protection, Rad Effluents, 05/12/16
CR 01934045
CR 01935324
CR 01957440
CR 01970826
CR 01978931
CR 01980957
CR 01990885
CR 01998411
CR 02008072
CR 02015534
CR 02066565
CR 02073724

Section 4OA1: Performance Indicator Verification
Documents
Unit 1 station logs covering period of April, 2016 through March, 2017
Unit 2 station logs covering period of April, 2016 through March, 2017

Procedures
AD-PI-ALL-0100, Corrective Action Program, Rev. 7
AD-LS-ALL-0004, NRC Performance Indicators & Monthly Operating Reports, Rev. 1

Records and Data
Documentation of Performance Indicator data from April 1, 2016, through March 31, 2017 for emergency AC power system, high pressure injection system, heat removal system.

Corrective Action Program Documents
WO 20057250, 1NI-103A Perform Limited Rotork PM
WO 20060523, 1EQD: Exercise Frequency MOP in SSF D/G Control Panel
WO 20065505, 1CA-174: Replace Gauge on VI Regulator
WO 20114053, PT/2/A/4200/07B IWP NV Pump 2B
WO 20126404, 2NI-103A Perform Limited Rotork PM
CR02128859, U2 NCS Unidentified Leakage Rate Action Level 3
CR02128844, Unit 1 Increased Unidentified Leakage
CR02131627, Unit 1 NCS Unidentified Leakage Greater than Limit 2, Action Level 3

Section 4OA2: Problem Identification and Resolution
AD-PI-ALL-1000, Corrective Action Program
Performance Improvement Matrix, Dated 5/24/17
CR 2092709, Engineering Trend on initiation on engineering changes