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

January 27, 2016

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

SUBJECT: CATAWBA NUCLEAR STATION - NRC INTEGRATED INSPECTION REPORT 05000413/2015004, 05000414/2015004

Dear Mr. Henderson:

On December 31, 2015, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Catawba Nuclear Station Units 1 and 2. On January 12, 2016, the NRC inspectors discussed the results of this inspection with you and other members of your staff. Inspectors documented the results of the inspection in the enclosed inspection report.

NRC inspectors documented one finding of very low safety significance (Green) in this report. This 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 the significance of this 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 20555-001; with copies to the Regional Administrator Region II; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC resident inspector at Catawba. If you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region II, and the NRC resident inspector at Catawba.

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

NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

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

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

Enclosure:
Integrated Inspection Report 05000413/2015004, 05000414/2015004
w/Attachment: Supplementary Information

cc: w/encl: Distribution via ListServ

NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

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

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

Enclosure:
Integrated Inspection Report 05000413/2015004, 05000414/2015004
w/Attachment: Supplementary Information

cc: w/encl: (See page 3)

X PUBLICLY AVAILABLE G NON-PUBLICLY AVAILABLE G SENSITIVE X NON-SENSITIVE
ADAMS: G Yes ACCESSION NUMBER: ML16028A025 X SUNSI REVIEW COMPLETE G FORM 665 ATTACHED

OFFICE	RII:DRP	RII:DRP	RII:DRP	RII:DRS	RII:DRS	RII:DRS	
SIGNATURE	Via Email/RA/GAH2	Via Email/RA/LFP1	JXP1	Via Email/RA/MKM3	Via Email/RA/JMM9	Via Email/RA/MAR1	
NAME	A. Hutto	L. Pressley	J. Parent	M. Meeks	J. Montgomery	M. Riley	
DATE	1/21/2016	1/25/2016	1/26/2015	1/24/2016	1/25/2016	1/21/2016	
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES
OFFICE	RII:DRS	RII:DRP	RII:DRP				
SIGNATURE	Via Email/RA/REW1	FJE /RA/forJGW1	FJE				
NAME	R. Williams	J. Worosilo	F. Ehrhardt				
DATE	1/21/2016	1/27/2016	1/27/2016	2/ /2016	2/ /2016	2/ /2016	2/ /2016
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES

OFFICIAL RECORD COPYDOCUMENT NAME: G:\DRPII\RPB1\CATAWBA\REPORTS\2015 REPORTS\2015004\CATAWBA 2015-004.DOCX

Letter to K. Henderson from Frank Ehrhardt dated January 27, 2016

SUBJECT: CATAWBA NUCLEAR STATION - NRC INTEGRATED INSPECTION REPORT 05000413/2015004, 05000414/2015004

Distribution w/encl:
D. Gamberoni, RII
L. Gibson, RII
OE Mail
RIDSNRRDIRS
PUBLIC
RidsNrrPMCatawba Resource

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.:	50-413, 50-414
License Nos.:	NPF-35, NPF-52
Report No.:	05000413/2015004 and 05000414/2015004
Licensee:	Duke Energy Carolinas, LLC
Facility:	Catawba Nuclear Station, Units 1 and 2
Location:	York, SC 29745
Dates:	October 1, 2015 through December 31, 2015
Inspectors:	A. Hutto, Senior Resident Inspector L. Pressley, Resident Inspector J. Parent, Acting Resident Inspector M. Meeks, Senior Operations Engineer (1R11.3) J. Montgomery, Senior Reactor Inspector (4OA2.3) M. Riley, Reactor Inspector (4OA2.3) R. Williams, Senior Reactor Inspector (1R08)
Approved by:	Frank Ehrhardt, Chief Reactor Projects Branch 1

Enclosure

SUMMARY OF FINDINGS

IR 05000413/2015004; and 05000414/2015004, 10/1/2015 – 12/31/2015; Catawba Nuclear Station, Units 1 and 2; Surveillance Testing.

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. Cross-cutting aspects are determined using IMC 0310, "Aspects within the Cross-Cutting Areas," dated December 4, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy dated February 4, 2015. The NRC's program for overseeing the safe operations of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 5.

NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. A Green self-revealing non-cited violation of Technical Specification (TS) 5.4.1, "Procedures," was identified for the licensee's failure to adequately implement their in-service test procedure for the Unit 1 standby makeup pump (SMP). Operators performed procedure steps out of sequence which resulted in the pump's discharge relief valve lifting, requiring valve replacement. The licensee entered this issue into their corrective action program as nuclear condition report (NCR) 1954266.

  The performance deficiency was considered to be more than minor because it was associated with the equipment performance attribute of the mitigating systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the SMP was unavailable to perform its safety function during unplanned testing and maintenance. The internal events risk contribution was determined by the inspectors to be 3E-7 and thus required a senior reactor analyst to review for external events and large early release frequency (LERF) to ensure the finding was below the Green/White threshold. The external events contribution was determined to be 5E-7 and thus the total risk was 8E-7 and core damage frequency (CDF) was determined to be the limiting metric. Consequently the finding was determined to be of very low safety significance (Green). This finding had a cross-cutting aspect of avoid complacency, as described in the human performance cross-cutting area, because the operators failed to implement appropriate error reduction tools such as formal three-way communications while performing the SMP surveillance procedure. [H.12] (Section 1R22)

REPORT DETAILS

Summary of Plant Status

Unit 1 operated at or near 100 percent rated thermal power (RTP) until November 21, 2015, when the unit was shutdown for a refueling outage. On December 16, 2015, unit startup to Mode 2 was completed following outage activities. Unit 1 was placed on-line on December 18, 2015 and achieved 100 percent RTP on December, 20 2015, and maintained 100 percent 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

Seasonal Extreme Weather Conditions

The inspectors conducted a detailed review of the station's adverse weather procedures written for extreme low 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:

- emergency diesel generators
- safety relief valves and main steam isolation valves
- nuclear service water

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:

- 1B diesel generator (DG) while the 1A DG was out of service (OOS) for maintenance
- 1A diesel generator while the 1B DG was OOS for maintenance
- 1B decay heat removal (ND) train while the 1A ND pump was OOS for maintenance

.2 Complete Walkdown

The inspectors verified the alignment of the 1A DG. 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's outstanding design issues, maintenance work requests (WR), 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 (WO). The inspectors also reviewed periodic reports containing information on the status of risk-significant systems, including maintenance rule reports and system health reports. Documents reviewed are listed in the attachment.

b. Findings

No findings were identified.

1R05 Fire Protection (71111.05AQ)

a. Inspection Scope

Quarterly Inspection

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

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

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

- Unit 1, auxiliary building 577' level, essential switchgear 1ETA, fire area 15
- Unit 1, auxiliary building 577' level, essential switchgear 1ETB, fire area 8
- Unit 1, auxiliary building 543' level, auxiliary feedwater (CA) pump room and motor driven pump pits, fire area 3
- Unit 1, auxiliary building 543' Level, CA turbine driven pump pit, fire area 40
- Unit 0, service building 568' level (instrument air area), fire area 102

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06)

a. Inspection Scope

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 and 2 turbine building flood protection features

b. Findings

No findings were identified.

1R08 Inservice Inspection Activities (71111.08)

a. Inspection Scope

Non-Destructive Examination Activities and Welding Activities

From November 30, 2015, through December 4, 2015, the inspectors conducted an onsite review of the implementation of the licensee's inservice inspection (ISI) program for monitoring degradation of the reactor coolant system boundary, risk-significant piping and component boundaries, and containment boundaries in Unit 1.

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

- ultrasonic examination (UT) of reactor vessel closure studs (eight total), Class 1 (observed)
- liquid penetrant examination (PT) of pipe-to-elbow weld 1ND37-3, Class 1 (reviewed)
- PT of elbow-to-pipe weld 1ND37-4, Class 1 (reviewed)
- PT of elbow-to-pipe weld 1ND37-5, Class 1 (reviewed)
- visual examination (VT-2) of the reactor pressure vessel upper head control rod drive mechanism penetrations (reviewed)
- visual examination (VE) of the reactor pressure vessel bottom-mounted instrumentation penetrations (reviewed)

The inspectors reviewed the following welding activities, qualification records, and associated documents in order to evaluate compliance with procedures and the ASME Code, Section XI and Section IX requirements. Specifically, the inspectors reviewed the work order, repair and replacement plan, weld data sheets, welding procedures, procedure qualification records, welder performance qualification records, and NDE reports.

- WO 02021560-51, EC105829 WU01 Replace Valve 1NV312A, Class 2 Valve

During non-destructive surface and volumetric examinations performed since the previous refueling outage, the licensee did not identify any relevant indications that were analytically evaluated and accepted for continued service; therefore, no NRC review was completed for this inspection procedure attribute.

Pressurized Water Reactor Vessel Upper Head Penetration Inspection Activities

The inspectors verified that for the Unit 1 vessel head, a bare metal visual examination and a volumetric examination were not required during this outage, in accordance with the requirements of ASME Code Case N-729-1 and 10 CFR 50.55a(g)(6)(ii)(D). The inspectors reviewed the calculation of effective degradation years, the previous examination history, and observed the results of the VT-2 examination performed under the vessel head insulation, to verify that the examinations were performed in accordance with the requirements of ASME Code, Section XI, Article IWA-2212 requirements, and the frequency was consistent with the Code Case.

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

Boric Acid Corrosion Control Inspection Activities

The inspectors reviewed the licensee's boric acid corrosion control (BACC) program activities to determine if the activities were implemented in accordance with the commitments made in response to NRC Generic Letter 88-05, "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants," and applicable industry guidance documents. Specifically, the inspectors performed an onsite records review of procedures, and the results of the licensee's containment walkdown inspections performed during the current refueling outage. The inspectors also interviewed the BACC program owner, conducted an independent walkdown of containment to evaluate compliance with licensee's BACC program requirements, and verified that degraded or non-conforming conditions, such as boric acid leaks, were properly identified and corrected, in accordance with the licensee's BACC and corrective action programs (CAP).

The inspectors reviewed the following engineering evaluations, completed for evidence of boric acid leakage, to determine if the licensee properly applied applicable corrosion rates to the affected components; and properly assessed the effects of corrosion induced wastage on structural or pressure boundary integrity in accordance with the licensee procedures.

- Action Request (AR) 01523694, Excessive boron accumulation on 2-NV-VA-439
- AR 01953456, 1-ND-FS-5140 Excessive boron accumulation
- AR 01539802, 2-NB-VA-503 Active boron leak from pipe cap
- AR 01898992, Excessive/active boron accumulation from 2-NI-VA-237 pipe
- AR 01950202, 2-KF-FS-5150 active boron leak from fitting 30-40 dpm
- AR 01539851, 1-NV-PG-5560 active boron leak from test cap
- AR 01520584, Leakage rate increase from 2-FW-VA-27A packing

The inspectors reviewed the following condition reports and associated corrective actions related to evidence of boric acid leakage, to evaluate if the corrective actions completed were consistent with the requirements of the ASME Code and 10 CFR Part 50, Appendix B, Criterion XVI.

- WR 20014176, 4-5 tsps. of dry, white boron found in 1D pump bowl
- WR 20014190, Packing leak identified on 1NV13A
- WR 20014213, 1 Tbsp. of dry, brown boron found on the pipe cap associated with valve 1ND4

Steam Generator Tube Inspection Activities

The inspectors verified that for the Unit 1 steam generator tubes, no inspection activities were required this refueling outage, in accordance with the requirements of the ASME Code, the licensee's Technical Specifications, and Nuclear Energy Institute 97-06, "Steam Generator Program Guidelines."

Identification and Resolution of Problems

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

Documents reviewed are listed in the attachment.

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 October 21, 2015 the inspectors observed an evaluated simulator scenario administered to an operating crew as part of the annual requalification operating test required by 10 CFR 55.59, "Requalification." ASE-56, LOR Active Simulator Exam, was the scenario observed. The scenario included a pressurizer pressure instrument failure, eventual loss of all feedwater pumps, and loss of heat sink.

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 1 startup on December 16, 2015 following a refueling outage.

The inspectors assessed the following:

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

Documents reviewed are listed in the attachment.

.3 Annual Review of Licensee Requalification Examination Results

On August 8, 2015, the licensee completed the annual requalification operating examinations required to be administered to all licensed operators in accordance with Title 10 of the Code of Federal Regulations 55.59(a)(2), "Requalification Requirements," of the NRC's "Operator's Licenses." During the week of December 14, 2015, the inspectors performed an in-office review of the overall pass/fail results of the individual operating examinations and the crew simulator operating examinations in accordance with Inspection Procedure (IP) 71111.11, "Licensed Operator Requalification Program." These results were compared to the thresholds established in Section 3.02, "Requalification Examination Results," of IP 71111.11.

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 1, turbine driven CA pump, inadvertent closure of the trip and throttle valve (1SA-145)
- Unit 1, 1B auxiliary building ventilation exhaust fan motor failure, (CR 1969145)

b. Findings

No findings were identified.

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

a. Inspection Scope

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

- Yellow risk condition with 1B DG out of service for maintenance on October 20, 2015
- Independent Review Team Unit 1 Outage Risk Management Plan
- Yellow risk condition with 1B DG out of service for maintenance on November 4, 2015, inspectors reviewed the detailed protection plan
- Emergent Yellow risk with CA pump turbine, inadvertent closure of the trip and throttle valve (1SA-145)
- Unit 1 defense in depth (DID) review for lowered inventory (yellow DID)

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15)

a. Inspection Scope

.1 Operability and Functionality Review

The inspectors selected the five 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.

- 1A DG jacket water (KD) leak of 40 drops per minute on the 6R KD jumper (CR 196145)
- 2B DG lube oil (LD) leakage from left bank rear corner cover (CR 1969121)
- Unit 2 penetration M340 isolated (CR 1967586)
- 1B diesel generator start time following refueling outage 1EOC22 (CR 1982628)
- Unit 1 pressurizer level instrument noise (CR 1985170)

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18)

a. Inspection Scope

The inspectors verified that the plant modification listed below did not affect the safety functions of important safety systems. The inspectors confirmed the modification did not degrade the design bases, licensing bases, and performance capability of risk significant structures, systems and components. The inspectors also verified modifications performed during plant configurations involving increased risk did not place the plant in an unsafe condition. Additionally, the inspectors evaluated whether system operability and availability, configuration control, post-installation test activities, and changes to documents, such as drawings, procedures, and operator training materials, complied with licensee standards and NRC requirements. In addition, the inspectors reviewed a sample of related corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with modifications. Documents reviewed are listed in the attachment.

- EC 400097, Provide Heat Trace for Stagnant DG engine LD System piping on the 1A and 1B DG's

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 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.

- PT/1/A/4350/002 B, "1B DG Operability Test" following planned maintenance
- PT/2/A/4200/007 B, "Centrifugal Charging Pump 2A Performance Test" following pump PMs
- PT/1/A/4350/002 B, "1B DG Operability Test" following outage maintenance
- PT/0/A/4150/001 J, "Zero Power Physics Testing" following Unit 1 core reload
- PT/1/A/4200/010 A, "Residual Heat Removal Pump 1A Performance Test" following mini-flow valve pressure switch resistance checks
- OP/1/A/6250/002, "Auxiliary Feedwater System," CA pump #1 turbine functional test following maintenance

The inspectors evaluated these activities for the following:

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

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

b. Findings

No findings were identified.

1R20 Refueling and Other Outage Activities (71111.20)

a. Inspection Scope

For the Unit 1 refueling outage from November 21, 2015 through December 18, 2015, 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 seven 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/1/A/4350/002 B, “Diesel Generator 1B Operability Test”
- PT/1/A/4200/005 B, “Safety Injection Pump 1B Performance Test”

Ice Condenser Tests

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

Containment Isolation Valve

- PT/0/A/4200/001 I, “As Found Containment Isolation Valve Leak Rate Test,” Enclosure 13.6, “Penetration No. M221 As Found Type C Leak Rate Test”

In-Service Tests (IST)

- PT/0/A/4400/022 B, “Nuclear Service Water Pump Train B Performance Test”
- PT/1/A/4200/007 C, “Standby Makeup Pump #1 Performance Test”

RCS Leakage

- PT/1/A/4150/001 D, “Reactor Coolant (NC) System Leakage Calculation”

b. Findings

Introduction: A Green self-revealing non-cited violation of Technical Specification (TS) 5.4.1, “Procedures,” was identified for the licensee’s failure to adequately implement their in-service test procedure for the Unit 1 standby makeup pump (SMP). Operators performed procedure steps out of sequence which resulted in the pump’s discharge relief valve lifting, requiring valve replacement.

Description: On September 16, 2015, operators were performing a surveillance test for the Unit 1 SMP, PT/1/A/4200/007 C, “Standby Makeup Pump #1 Performance Test,” when steps were performed out of sequence while the pump was being aligned for recirculation. The operations test group (OTG) supervisor was in the standby shutdown facility (SSF) control room monitoring a 10 minute flush prior to aligning the pump to recirculation. After 10 minutes of flushing the system, the OTG supervisor communicated to the test coordinator stationed at the SMP that the flush time requirement was met. Subsequently, the OTG supervisor overheard the test coordinator give the instruction to open the recirculation valve and assumed that the action was complete. Without verifying the action through formal three-way communication, the OTG supervisor instructed the operator in the SSF control room to shut the SMP discharge flush path isolation valve. As a result, the discharge path was isolated prior to establishing the recirculation flow path and the discharge relief valve lifted. The pump was secured and tagged out to perform inspections to ensure the pump was not damaged and to replace the discharge relief valve. The pump was unavailable for approximately 67 hours.

Analysis: The inspectors determined that performing the SMP surveillance test procedure steps out of sequence was a performance deficiency (PD). The PD was considered to be more than minor because it was associated with the equipment performance attribute of the mitigating system cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the SMP was unavailable to perform its safety function during unplanned testing and maintenance. The finding was screened using Inspection Manual Chapter (IMC) 0609 Appendix F, “Fire Protection Significance Determination Process (SDP),” issued September 20, 2013, because the SMP was credited for post-fire safe shutdown for certain fire areas. The finding was determined to require a Phase 2 analysis as it affected the ability to reach and maintain a stable plant condition within 24 hours of a fire event, and resulted in a piece of equipment required for safe shutdown not being available. The SMP was also credited to mitigate certain external events and station

blackout. Therefore, the inspectors also determined that a detailed risk evaluation was required per IMC 0609 Appendix A, "Significance Determination Process for Findings At-Power," Exhibit 2, "Mitigating Systems Screening Questions," issued June 19, 2012, as the finding represented an actual loss of function of one or more non-technical specification trains of equipment, designated as high safety-significant in accordance with the licensee's maintenance rule program, for greater than 24 hours.

The internal events risk contribution was determined by the inspectors to be 3E-7 and thus required a senior reactor analyst to review for external events and large early release frequency (LERF) to ensure the finding was below the Green/White threshold. The external events contribution was determined to be 5E-7 and thus the total risk was 8E-7 and core damage frequency (CDF) was determined to be the limiting metric. Consequently the finding was determined to be of very low safety significance (Green).

This finding had a cross-cutting aspect of avoid complacency (H.12), as described in the human performance cross-cutting area, because the operators failed to implement appropriate error reduction tools such as formal three-way communications while performing the SMP surveillance procedure.

Enforcement: TS 5.4.1, "Procedures," required that procedures shall be established, implemented and maintained covering all programs specified in TS Section 5.5, which included Section 5.5.8, "In-service Testing Program." Contrary to the above, on September 16, 2015, the licensee failed to adequately implement their in-service test procedure for the Unit 1 SMP. This resulted in 67 hours of unplanned unavailability to replace the SMP discharge relief valve. Because the finding was of very low safety significance and has been entered into the licensee's corrective action program (NCR 1954266), this violation is being treated as a NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. NCV 05000413/2015004-01: "Failure to Adequately Implement In-service Test Procedure for the Unit 1 Standby Makeup Pump."

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation (71114.06)

a. Inspection Scope

The inspectors observed the emergency preparedness drills conducted on October 1, 2015, and October 8, 2015. The inspectors observed licensee activities in the simulator and technical support center to evaluate implementation of the emergency plan, including event classification, notification, and protective action recommendations. The inspectors evaluated the licensee's performance against criteria established in the licensee's procedures. Additionally, the inspectors attended the post-exercise critique for the October 1, 2015, drill to assess the licensee's effectiveness in identifying emergency preparedness weaknesses and verified the identified weaknesses were entered in the corrective action program. Documents reviewed are listed in the attachment.

b. Findings

No findings were identified.

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 October 1, 2014 and September 30, 2015 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: Initiating Events

- unplanned scrams per 7000 critical hours

Cornerstone: Mitigating Systems

- safety system functional failures

Cornerstone: Barrier Integrity

- reactor coolant system leak rate

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152)

.1 Routine Review

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

.2 Semi-Annual Trend Review

a. Inspection Scope

The inspectors reviewed issues entered in the licensee's corrective action program and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors focused their review on repetitive equipment issues and human performance trends, but also considered the results of inspector daily problem identification program report screenings, licensee trending efforts, and licensee human performance results. The review nominally considered the 6-month period of July 2015 through December 2015 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.

.3 Annual Followup of Selected Issues

a. Inspection Scope

The inspectors conducted a detailed review of the following three problem identification program reports:

- PIP C-14-4480, Existing Cutler Hammer breaker KB-225A (located at SDSD-F03B) has an interrupting rating lower than the available fault current
- PIP C-14-6852, While performing the FEA/PSA Group NFPA 805 review of EC110958 for the Calculation CNC-1381.05-00-0251, it was revealed that the existing HFB breakers are under-rated for the available fault current
- PIP C-15-01921, NFPA 805 Review of EC110962

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

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

- completion of corrective actions in a timely manner

Documents reviewed are listed in the attachment.

b. Findings

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 January 12, 2016, the resident inspectors presented the inspection results to Mr. Kelvin Henderson 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: SUPPLEMENTARY INFORMATION

SUPPLEMENTARY INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel
S. Andrews, Regulatory Affairs Specialist
T. Arlow, Emergency Planning Manager
M. Carwile, Chemistry Manager
C. Fletcher, Acting Organizational Effectiveness Director
C. Fletcher, Regulatory Affairs Manager
B. Foster, Operations Manager
K. Henderson, Site Vice-President
T. Jenkins, Maintenance Manager
L. Keller, General Manager Nuclear Engineering
B. Leonard, Training Manager
K. Phillips, Work Management Manager
T. Simril, Plant Manager
J. Smith, Radiation Protection Manager
J. Schell, Corporate Nuclear Engineering
S. West, Director, Nuclear Plant Security

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000413/2015004–01	NCV	Failure to Adequately Implement In-service Test Procedure for the Unit 1 Standby Makeup Pump [Section 1R22]

Attachment

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

AD-WC-ALL-0230, "Seasonal Readiness"
OP/0/B/6700/015, "Weather Related Activities"
PT/0/B/4700/038, "Cold Weather Protection"
Cold Weather Protection Action Item Register, 11/05/2015 and 11/19/2015 updates

Section 1R04: Equipment Alignment

Clearance PRT-1-15-1BDGOOS-0105, 1B D/G OOS Protected Equipment Plan
Unit 1 EDG System Health Report
EDG system Reliability Improvement Action Plan
OP/1/A/6350/002, "Diesel Generator Operation"
PT/1/A/4350/002 A, "Diesel Generator 1A Operability Test"
CN-1561-01.01, "Flow Diagram of Residual Heat Removal System"

Section 1R05Q: Fire Protection

AD-EG-ALL-1520, "Transient Combustible Control"
Fire Brigade Response Strategies for Safety Related Areas
Fire Strategy Fire Area 15, Unit 1, auxiliary building 577' level, essential switchgear 1ETA
Fire Strategy Fire Area 8, Unit 1, auxiliary building 577' level, essential switchgear 1ETB
Fire Strategy Fire Area 3, Unit 1, auxiliary building 543' level, auxiliary feedwater (CA) pump room and motor driven pump pits
Fire Strategy Fire Area 40, Unit 1, auxiliary building 543' Level, CA turbine driven pump pit
Fire Strategy Fire Area 102, Unit 0, service building 568' level (instrument air area)

Section 1R06: Flood Protection Measures

UFSAR Section 3.6.1, "Postulated Piping Failures in Fluid Systems Inside and Outside Containment"
CNS-1465.00-00-0020, "Design Basis Specification for Flooding from Internal Sources"
CNS-1565.WL-00-0001, "Design Basis Specification for the Liquid Waste (WL) System"

Section 1R08: Inservice Inspection Activities

Procedures:
AD-EG-PWR-1611, "Boric Acid Corrosion Control Program – Implementation"
MP/0/A/7650/040, "Inspection, Assessment and Cleanup of Boric Acid on Plant Materials"
NDE-25, "Magnetic Particle Examination"
NDE-35, "Liquid Penetrant Examination"
PD-EG-PWR-1611, "Boric Acid Corrosion Control Program"
PDI-UT-5, "Generic Procedure for the Ultrasonic Examination of Studs and Bolts"
PT/1/A/4150/001 H, "Inside Containment Boric Acid Check"

Calculations:
CNC-1201.01-00-0022, "Determination of Periodic Inspection Requirements for the Reactor Vessel Head and Reactor Vessel Head Inspection Documentation"

Drawings
7320-0-0006, "Reactor Vessel Calibration Stud Block No. 50501"

Work Orders/Work Requests:
WO 0206560, 2FW-27A: I/R Dry Boron Buildup on Stem Not Active (A TRN)

Condition Reports:
AR 01502915
AR 01541487
AR 01980661
AR 01980797
AR 01980861
PIP G-13-253

Miscellaneous Documents:
BOP-VT-12-415, Visual Examination for Boric Acid Detection
Catawba 1, Fourth Interval (EOC-22) Inservice Inspection Program Plan Report
Catawba Unit 1 Steam Generator 1EOC22 Skipped Inspection Cycle Outage Review
Certificate of Calibration for Infrared Thermometer MCNDE40193
Certificate of Certification for Spotcheck Developer SKD-S2 Batch No. 11H07K
Certificate of Certification for Spotcheck Penetrant SKL-SP2 Batch No. 11H06K
Certificate of Certification for Spotcheck SKC-S Batch No. 13D03K
Certified Test Report for Ultragel II-12125
CISI-1462.10-0030-AUGISI-U1&U2
CISI-1462.20-0040-PTPLAN, Fourth Inspection Interval Inservice Inspection Pressure Test Plan
Day & Zimmermann Certification Record for Examiners: M. Hill and T. Walkowiak
EPRI Performance Demonstration Initiative Qualification Records for Examiners: C. T. Goldsmith and G. Ransom
ESD Boric Acid Corrosion Control Program, Catawba Nuclear Station, Units 1 and 2 Augmented Inservice Inspection Plan and Schedule
G-ENG-SA-14-15, Boric Acid Corrosion Control Program – Effectiveness of Selected Program Elements
Liquid Penetrant Examination Report No. PT-15-563
Ultrasonic Instrument Linearity Report No. L-15-271
URS Certificate of Method Qualification for Examiners: S. Foss
UT Calibration/Examination Report Nos. UT-15-1254, UT-15-1255, UT-15-1256, UT-15-1257, UT-15-1258, UT-15-1259, UT-15-1260, and UT-15-1261
Visual Examination for Boric Acid Detection Report Nos. VT-15-1316 and VT-15-1321

Section 1R11: Licensed Operator Requalification
ASE-56, LOR Active Simulator Exam
AP/1/A/5500/006, “Loss of S/G Feedwater”
AP/1/A/5500/011, “Pressurizer Pressure Anomalies”
EP/1/A/5000/E-0, “Reactor Trip or Safety Injection”
EP/1/A/5000/FR-H.1, “Response to Loss of Secondary Heat Sink”

Section 1R12: Maintenance Effectiveness
NEI 99-02, “Regulatory Assessment Performance Indicator Guideline”
AD-EG-ALL-1210, “Maintenance Rule Program”
NCR 01973530, I/R CAPT #1 Trip and Throttle Valve Closed
MR Evaluation for NCR 01973530-2

Engineering Abstract on event documented in AR 01973530
MSPI Derivation Reports for Heat Removal System for Unit 1, Nov. 2015
MSPI Margin Reports for Heat Removal System
DWG CNEE-0147-04.22, "Elementary Diagram CA System, SSF"
DWG CNEE-0147-04.23, "Elementary Diagram CA System"
DWG CNEE-0147-04.23-01, "Elementary Diagram CA System"
DWG CNEE-0147-04.23-02, "Elementary Diagram CA System"
DWG CNEE-0147-04.24, "Elementary Diagram CA System, Control Room"
Quick Cause Evaluation for 1B auxiliary building ventilation exhaust fan motor failure (CR 1969145)

Section 1R13: Maintenance Risk Assessments and Emergent Work Control
Tagout ID 15-00950, 1A CA OOS for R&R 15-00950
Protection scheme for 1A CA OOS for R&R 15-00432
Complex Activity Plan for 1B D/G Mid-Cycle Work
Tagout ID 15-01042, 1B D/G and 1B RN OOS
Tagout ID 15-01063, 2A1 KC Pump OOS per 15-00893
NSD 417, "Generation Risk Management Process"
Clearance PRT-1-15-1BDGOOS-0105, 1B D/G OOS Protected Equipment Plan
IRT Outage Risk Review Report

Section 1R15: Operability Evaluations
AD-OP-ALL-0105, "Operability Determinations and Functionality Assessments"
USFAR, Chapter 8.3, "Onsite Power Systems"
CR 196145, 1A DG jacket water (KD) leak of 40 drops per minute on the 6R KD jumper
CR 1969121, 2B DG lube oil (LD) leakage from left bank rear corner cover
CR 1967586, Unit 2 penetration M340 isolated
CR 1982628, 1B diesel generator start time following refueling outage 1EOC22
CR 1985170, Unit 1 pressurizer level instrument noise
CNC-1223.02-00-0016, "Evaluation of Containment Isolation Overpressure Protection Features"

Section 1R18: Plant Modifications
AD-LS-ALL-0007, "Applicability Determination Process"
AD-LS-ALL-0008, "10 CFR 50.59 Review Process"
AD-EG-ALL-1132, "Preparation and Control of Design Change Engineering Changes"
NEI 96-07, Revision 1, "Guidelines for 10 CFR 50.59 Implementation"
A/R 01945401, 50.59 Screening
EC 400097, Provide Heat Trace for Stagnant DG engine lube oil (LD) System piping on the 1A and 1B DG's

Section 1R19: Post-Maintenance Testing
PT/2/A/4450/005 A, "Containment Air Return Fan 2A and Hydrogen Skimmer Fan 2A Performance Test"
PT/1/A/4200/004 B, "Containment Spray Pump 1A Performance Test"
PT/0/A/4200/017 A, "Standby Shutdown Facility Diesel Test"
PT/2/A/4200/005 B, "Safety Injection Pump 2B Performance Test"
PT/1/A/4350/002 B, "Diesel Generator 1B Operability Test"
OP/1/A/6250/002, Auxiliary feedwater system

WO 02200906, 1CATD Functional

Section 1R20: Refueling and Other Outage Activities
IRT Outage Risk Review Report

Section 1R22: Surveillance Testing
PT/1/A/4350/002 B, "Diesel Generator 1B Operability Test"
PT/0/A/4400/022 B, "Nuclear Service Water Pump Train B Performance Test"
PT/0/A/4200/086, "Ice Bed Analysis Periodic Test"
PT/1/A/4150/001 D, "NC System Leakage Calculation"

Section 1EP6: Drill Evaluation
ERO Drill Scenario: Drill 15-4
EP Drill 15-4 Emergency Notification Forms, messages 1-4
ERO Drill Scenario: Drill 15-5
EP Drill 15-5 Emergency Notification Forms, messages 1-5
RP/0/A/5000/001, "Classification of Emergency"

Section 4OA1: Performance Indicator Verification
NSD 225, "NRC Performance Indicators"
NEI 99-02, "Regulatory Assessment Performance Indicator Guideline"
Catawba Master File CN: 854.03-2, "Reactor Coolant System Identified Leakage Rate"

Section 4OA2: Problem Identification and Resolution
Calculations
CNC-1381.05-00-0251, "U1/2 NFPA 805 Circuit Breaker and Fuse Coordination Study"

Corrective Action Documents
Horizons Investment ID CN002BZ
Horizons Investment ID CN0045B
PIP C-15-01921, NFPA 805 review of EC110962, 3/4/15

Miscellaneous
Issuance of Amendments Catawba Nuclear Station Unit 1 and Unit 2 (TAC NOS. M96568 and M96569), dated 9/28/1996
MCC 1EMXA Load List

Corrective Action Documents Written Due to this Inspection
AR 01960264, Feeder cable (3/C #6) is not adequately protected by the HFB breaker, dated 10/1/15

Procedures:
CNS-1390.01-00-0018, CNS Separation Requirements, Rev. 38

Section 4OA5: Other Activities
PT/0/A/4550/015 A, "Inventory of Fuel Special Nuclear Material," completed on February 27, 2014