



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

November 16, 2017

Mr. Robert T. Simril  
Site Vice President  
Duke Energy Carolinas, LLC  
Catawba Nuclear Station  
4800 Concord Road  
York, SC 29745-9635

**SUBJECT: CATAWBA NUCLEAR STATION – NUCLEAR REGULATORY COMMISSION  
TEAM INSPECTION REPORT 05000413/2017010 AND 05000414/2017010**

Dear Mr. Simril:

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

The inspection examined activities conducted under your license as they relate to the implementation of mitigation strategies and spent fuel pool instrumentation orders (EA-12-049 and EA-12-051) and Emergency Preparedness Communication/Staffing/Multi-Unit Dose Assessment Plans, your compliance with the Commission's rules and regulations, and with the conditions of your operating license. Within these areas, the inspection involved examination of selected procedures and records, observation of activities, and interviews with station personnel.

The NRC inspectors did not identify any finding or violation 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/*

Shane Sandal, Chief  
Reactor Projects Branch 6  
Division of Reactor Projects

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

Enclosure:  
IR 05000413/2017010, 05000414/2017010  
w/Attachment: Supplemental Information

cc Distribution via ListServ

R. Simril

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**ADAMS Accession No. ML 17320A365**

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**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION II**

Docket No.: 50-413, 50-414

License No.: NPF-35, NPF-52

Report No.: 05000413/2017010, 05000414/2017010

Licensee: Duke Energy Carolinas, LLC

Facility: Catawba Nuclear Station, Units 1 and 2

Location: York, SC 29745

Dates: October 16 – 19, 2017

Inspectors: R. Rodriguez, Senior Project Engineer (Team Leader)  
R. Taylor, Senior Project Engineer  
M. Toth, Project Engineer  
J. Kent, Construction Inspector

Approved by: Shane Sandal, Chief  
Reactor Projects Branch 6  
Division of Reactor Projects

Enclosure

## **SUMMARY**

IR 05000413/2017010, 05000414/2017010; 10/16/2017 – 10/19/2017; Catawba Nuclear Station, Units 1 and 2; Temporary Instruction 2515/191, “Inspection of the Implementation of Mitigation Strategies and Spent Fuel Pool Instrumentation Orders and Emergency Preparedness Communication/Staffing/Multi-Unit Dose Assessment Plans”

The inspection covered a one-week inspection by two senior project engineers, one project engineer, and one construction inspector. No NRC-identified or self-revealing findings were identified. The NRC’s program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, “Reactor Oversight Process,” Revision 6.

No findings were identified.

## REPORT DETAILS

### 4. OTHER ACTIVITIES

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, and Emergency Preparedness

#### 4OA5 Other Activities (TI 2515/191)

The objectives of Temporary Instruction (TI) 2015/191, "Inspection of the Implementation of Mitigation Strategies and Spent Fuel Pool Instrumentation Orders and Emergency Preparedness Communication/Staffing/Multi-Unit Dose Assessment Plans," were to verify that the licensee has adequately implemented the mitigation strategies as described in the licensee's Final Integrated Plan, which was described in letters February 15, 2016, (ADAMS Accession No. ML16049A041), March 31, 2016, (ADAMS Accession No. ML16095A208) and September 27, 2016, (ADAMS Accession No. ML16273A303) and the NRC's plant safety evaluation (ADAMS Accession No. ML16277A404), to verify that the licensee installed reliable water-level measurement instrumentation in the spent fuel pools. The purpose of this TI was also to verify the licensee has implemented Emergency Preparedness (EP) enhancements as described in the site-specific submittals and the NRC's safety assessments, including multi-unit dose assessment capability and enhancements to ensure that staffing was sufficient and communications can be maintained during such an event.

The inspection verified that plans for complying with NRC Orders EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond- Design-Basis External Events," (ADAMS Accession No. ML12054A736) and EA-12-051, "Order Modifying Licenses With Regard to Reliable Spent Fuel Pool Instrumentation," (ADAMS Accession No. ML12054A679) were in place and were being implemented by the licensee. Additionally, the inspection verified implementation of staffing and communications information provided in response to the March 12, 2012, request for information letter and multiunit dose assessment information provided per COMSECY-13-0010, "Schedule and Plans for Tier 2 Order on Emergency Preparedness for Japan Lessons Learned," dated March 27, 2013, (ADAMS Accession No. ML12339A262).

The team discussed the plans and strategies with plant staff, reviewed documentation and, where appropriate, performed plant walkdowns to verify that the strategies could be implemented as stated in the licensee's submittals and the NRC staff prepared safety evaluation. For most strategies, this included verification that the strategy was feasible, procedures and/or guidance had been developed, training had been provided to plant staff, and required equipment had been identified and staged. Specific details of the team's inspection activities are described in the following sections.

#### 1. Mitigation Strategies for Beyond-Design Basis External Events

##### a. Inspection Scope

The team examined the licensee's established guidelines and implementing procedures for the beyond-design-basis mitigation strategies. The team assessed how the licensee coordinated and documented the interface/transition between existing off-normal and

emergency operating procedures with the newly developed mitigation strategies. The team selected a number of mitigation strategies and conducted plant walkdowns with licensed operators and responsible plant staff to assess: (1) the adequacy and completeness of the procedures; (2) the familiarity of operators with the procedure objectives and specific guidance; (3) the staging and compatibility of equipment; and (4) the practicality of the operator actions prescribed by the procedures, consistent with the postulated scenarios. The team verified that a preventive maintenance program had been established for the Diverse and Flexible Coping Strategies (FLEX) portable equipment and that periodic equipment inventories were in place and being conducted. Additionally, the team examined the introductory and planned periodic/refresher training provided to the Operations and Security staff most likely to be tasked with implementation of the FLEX mitigation strategies. The team also reviewed the introductory and planned periodic training provided to the Emergency Response Organization personnel. Documents reviewed are listed in the Attachment.

b. Assessment

Based on samples selected for review, the inspectors verified that the licensee satisfactorily implemented appropriate elements of the FLEX strategy as described in the plant specific submittals and the associated safety evaluation and determined that the licensee was generally in compliance with NRC Order EA-12-049. The inspectors verified that the licensee satisfactorily:

- Developed and issued FLEX Support Guidelines (FSG) to implement the FLEX strategies for postulated external events.
- Integrated the FSGs into existing plant procedures such that entry into and departure from the FSGs were clear when using existing plant procedures.
- Protected FLEX equipment from site-specific hazards.
- Developed and implemented adequate testing and maintenance of FLEX equipment to ensure its availability and capability.
- Trained the staff to assure personnel proficiency in the mitigation of beyond-design-basis events.
- Developed means to ensure that the necessary off-site FLEX equipment would be available from off-site locations.

The inspectors verified that noncompliances with the current licensing requirements, and other issues identified during the inspection, were entered into the licensee's corrective action program.

c. Findings

No findings were identified.

## 2. Spent Fuel Pool Instrumentation

### a. Inspection Scope

The team examined the licensee's newly installed spent fuel pool instrumentation. Specifically, the inspectors verified the sensors were installed as described in the plant-specific submittals and the associated safety evaluation and that the cabling for the power supplies and the indications for each channel were physically and electrically separated. Additionally, environmental conditions and accessibility of the instruments were evaluated. Documents reviewed are listed in the Attachment.

### b. Assessment

Based on samples selected for review, the inspectors determined that the licensee satisfactorily installed and established control of the spent fuel pool (SFP) instrumentation as described in the plant specific submittals and the associated safety evaluation and determined that the licensee is generally in compliance with NRC Order EA-12-051. The inspectors verified that the licensee satisfactorily:

- Installed the SFP instrumentation sensors, cabling and power supplies to provide physical and electrical separation as described in the plant specific submittals and safety evaluation.
- Installed the SFP instrumentation display in the location, environmental conditions and accessibility as described in the plant specific submittals.
- Trained their staff to assure personnel proficiency with the maintenance, testing, and use of the SFP instrumentation.
- Developed and issued procedures for maintenance, testing, and use of the reliable SFP instrumentation.

The inspectors verified that noncompliances with the current licensing requirements, and other issues identified during the inspection, were entered into the licensee's corrective action program.

### c. Findings

No findings were identified.

## 3. Staffing and Communication Request for Information

### a. Inspection Scope

Through discussions with plant staff, review of documentation and plant walkdowns, the team verified that the licensee had implemented required changes to staffing, communications equipment, and facilities to support a multi-unit extended loss of offsite power scenario as described in the licensee's staffing assessment and the NRC safety assessment. The team also verified that the licensee had implemented dose assessment (including releases from spent fuel pools) capability using the licensee's site-specific dose assessment software and approach as described in the licensee's multi-unit dose assessment submittal. Documents reviewed are listed in the Attachment.

b. Assessment

The inspectors reviewed information provided in the licensee's multi-unit dose submittal and in response to the NRC's March 12, 2012, request for information letter and verified that the licensee satisfactorily implemented enhancements pertaining to Near-Term Task Force Recommendation 9.3 response to a large scale natural emergency event that resulted in an extended loss of all alternating current power (ELAP) to the site and impedes access to the site. The inspectors verified the following:

- Licensee satisfactorily implemented required staffing change(s) to support an ELAP scenario.
- EP communications equipment and facilities were sufficient for dealing with an ELAP scenario.
- Implemented dose assessment capabilities (including releases from spent fuel pools) using the licensee's site-specific dose assessment software and approach.

The inspectors verified that noncompliances with the current licensing requirements, and other issues identified during the inspection, were entered into the licensee's corrective action program.

c. Findings

No findings were identified.

4OA6 Exit

Exit Meeting Summary

On October 19, 2017, the inspectors presented the inspection results to Mr. R. T. Simril and other members of the site staff. The inspectors confirmed that proprietary information was not provided or examined during the inspection.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### Licensee personnel:

C. Curry, Plant Manager  
C. Fletcher, Regulatory Affairs Manager  
T. Simril, Site Vice-President  
T. Owusu, Regulatory Affairs  
B. Price, Catawba Fukushima Response  
D. Davies, FLEX Program Engineer  
S. Andrews, Senior Engineer Operations

### **LIST OF REPORT ITEMS**

#### Opened and Closed

None

#### Discussed

None

#### Complete

TI-2515/191, Appendix A, Mitigating Strategies for Beyond Design Basis Events  
TI-2515/191, Appendix B, Spent Fuel Pool Instrumentation  
TI-2515/191, Appendix C, Staffing and Communications Request for Information

## LIST OF DOCUMENTS REVIEWED

### Procedures

AD-EP-ALL-0202, Emergency Response Offsite Dose Assessment, Rev. 3  
AD-WC-CNS-0420, Catawba Nuclear Station Shutdown Risk Management, Rev. 1  
AD-EG-ALL-1132, Preparation and Control of Design Change Engineering Changes, Rev. 8  
IP/1/B/3140/005, Calibration Procedure for Auxiliary Feedwater System Non-Safety Related Instrumentation, Rev. 66  
IP/2/B/3140/005, Calibration Procedure for Auxiliary Feedwater System Non-Safety Related Instrumentation, Rev. 61  
EP/1/A/5000/ECA-0.0, Loss of All AC Power, Rev. 050  
FG/1/A/CFLX/FSG-02, Alternate TDCA Pump Suction Source, Rev. 001  
FG/1/A/CFLX/FSG-04, ELAP DC Bus Management, Rev. 000  
FG/0/A/CFLX/FSG-05, Initial Assessment and Flex Equipment Staging, Rev. 5  
FG/2/A/CFLX/FSG-08, Alternate NC System Boration, Rev. 004  
FG/2/A/CFLX/FSG-11, Alternate Spent Fuel Pool Makeup and Cooling, Rev. 2  
FG/0/A/CFLX/FSG-21, Flex Raw Water Distribution, Rev. 5  
FG/0/A/CFLX/FSG-22, Flex Sump Pumps Operation, Rev. 3  
FG/1/A/CFLX/FSG-13, Transition from FLEX Equipment, Rev. 000  
PT/0/A/4400/002 L, Flex Dome Monthly Rounds, Rev. 0006  
PT/0/B/4600/005A, Monthly Communications Verification, Rev. 029 dated 10/17/2017  
PT/0/B/4600/123, Surveillance of Emergency Equipment for Backup Communications and Rechargeable FLEX Equipment, Rev. 002 dated 9/25/2017

### Drawings and Calculations

CNM-1336-04-0005-001, Catawba Nuclear Station Unit 1 Vega Waveguide Isometric (Northwest SFP Corner), Rev. 001  
CNM-2336-04-0005-001, Catawba Nuclear Station Unit 2 Vega Waveguide Isometric (Southwest SFP Corner), Rev. 002  
CN-1499-01.10-00, Instrument Locations Reactor Building El. 565F-3" & Below, Rev. 051  
CN-2499-01.10-00, Instrument Locations Reactor Building El. 565F-3" & Below, Rev. 043  
CN-1200-11.02, Auxiliary Building Fuel Building Unit 1 General Arrangement/Architectural Plan at EL. 605' + 10", Rev. 19  
CN-1200-12.02, General Arrangement Fuel Building Unit 2 Plan at EL. 605' + 10", Rev. 15  
AM/0/A/5100/011, Maintenance Support Procedure for FLEX Strategies, Rev. 002  
IP/1/B/3111/009, Calibration/Functional Test of Spent Fuel Pool Air Radar Level Instrumentation, Rev. 001  
IP/2/B/3111/009, Calibration/Functional Test of Spent Fuel Pool Air Radar Level Instrumentation, Rev. 000  
IP/1/A/3120/031, Calibration of Unit 1 Backup Spent Fuel Pool Level Instrumentation, Rev. 003  
IP/2/A/3120/031, Calibration of Unit 2 Backup Spent Fuel Pool Level Instrumentation, Rev. 001  
IP/0/A/3817/013K, Calibration and Maintenance Procedure for Rosemount Model 3154 Series Transmitters, Rev. 002  
CN-1574-01.01, Nuclear Service Water (RN), Rev. 62  
CN-1570-01.00, Spent Fuel Cooling System, Rev. 26  
CNEE-0147-01.07, Auxiliary Feedwater System Transfer of CA Suction to CCW, Rev. 2  
CNEE-0147-04.20, Auxiliary Feedwater System Rx to CA Suction Isolation Valve 1CA175, Rev. 5

Condition Reports Reviewed

1983194	1983218	1983228	1983714	1983246
2151774	2155965	2151770	2107494	2068437
2049758	2047655	2047653	2044138	1981024

Work Orders/Work Requests:

20180415-01 20106528-01  
 20170440-01 20100123-01  
 20163880-01 20093841-01  
 20156749-01 02194684-01  
 20149925-01 02156010-02  
 20143139-01 20033704-01  
 20139137-01 20069994  
 20132753-01 20069989  
 20121431-01 20069993  
 20115518-01 20083876

Condition Reports Generated as part of the Inspection

2159470, FLEX Dome PM not Performed  
 2159460, 230kV Power Line Question  
 2158845, FLEX Dome Tamper Seals  
 2159171, Portable Mixing Pools  
 2159944, PM Changes and DBD Updates  
 2159986, Non Conservative Assumptions in Calc

Other

CNS FG/0/A/CFLX/FSG-20, FLEX Electrical Distribution, Rev. 05  
 CNS-1465.00-00-0022, Design Basis Specification FLEX Program for NRC Order EA-12-049,  
 Rev. 002  
 CN-1612.03, FLEX Strategy Timing Study, 20 July 2017  
 CNEA68-N, FLEX Actions for CNS NSC ERO Personnel, 14 Feb 2016  
 OP-CN-FSP-01, Fukushima/FLEX Response Strategy Overview, Rev. 001  
 OP-CN-FSP-02, Fukushima/FLEX Support GUIDELINES, Rev. 003  
 OP-CN-FSP-05, Fukushima/FLEX Support Response Enclosures AO Training, Rev. 4  
 OP-CN-FSP-06, Fukushima/FLEX Response AO Training/500KW-600VAC DIESEL  
 GENERATOR, Rev. 002  
 OP-CN-PFAM-FLEX-03, FLEX Cat 600v Generator, Rev. 01  
 OP-CN-FSP-17, Fukushima Differences in FLEX Strategies from Unit 2 to Unit 1, Rev. 2  
 TTC1426-N, FLEX ERO-Specific Training, Rev. 6  
 Flex Safety Evaluation related to NRC Orders EA-12-049 and EA-12-051  
 CNC-1381.05-00-0140, 125 VDC Vital Instrumentation and Control Power System – Hydrogen  
 Generation by Batteries, Rev. 3  
 CNC-1223.42-00-0080, Determination of CATDP Operating Duration before Flooding from  
 Normal Sump Input Leads to Pump Failure as a Result of ELAP, Rev. 0  
 CNC-1223.02-00-0025, Flow Model of SNSWP to CA Connections for Phase 2 Flex Strategies,  
 Rev. 0  
 CNC-1211.00-06-0005, Seismic Evaluation of Flex Deployment Paths, Rev. 0

GSP05/10/20 Sub-Prime Electronic Submersible Pumps Specification Sheet  
CNS-1465-00-00-0022, Design Basis Document for Flex Strategies, Rev. 2  
Catawba Nuclear Station Units 1 & 2 NEI 12-01 Phase 2 Extended Loss of AC Power (ELAP)  
ERO Staffing Analysis Report  
Records of Flex Dome monthly walkdowns, Operator Rounds, May-October 2017  
Flex Strategy Timing Validation, Plan #9, CAPT Sump Pump  
Flex Strategy Timing Validation, Plan #15, Install Portable Fans in Control Room  
Flex Strategy Timing Validation, Plan #16, Low Pressure Pump  
Flex Strategy Timing Validation, Plan #17, SFP Doors  
Flex Strategy Timing Validation, Plan #28, Installing 600V Sump Pump on 522' Elevation