



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

October 25, 2016

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

**SUBJECT: MCGUIRE NUCLEAR STATION - NRC EVALUATION OF CHANGES, TESTS,  
AND EXPERIMENTS AND PERMANENT PLANT MODIFICATIONS INSPECTION  
REPORT 05000369/2016008 AND 05000370/2016008**

Dear Mr. Capps:

On September 29, 2016, the U. S. Nuclear Regulatory Commission (NRC) completed an inspection at your McGuire Nuclear Station, Units 1 and 2, and 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 NRC inspectors did not identify any finding or violation of more than minor significance.

This letter and its enclosure 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/**

Jonathan H. Bartley, Chief  
Engineering Branch 1  
Division of Reactor Safety

Docket Nos.: 05000369, 05000370  
License Nos.: NPF-9, NPF-17

Enclosure:  
Inspection Report 05000369/2016008  
and 05000370/2016008 w/Attachment:  
Supplemental Information

cc: Distribution via Listserv

October 25, 2016

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Site Vice President  
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☒ PUBLICLY AVAILABLE ☐ NON-PUBLICLY AVAILABLE

☐ SENSITIVE ☒ NON-SENSITIVE

ADAMS: ☒ Yes ACCESSION NUMBER: \_\_\_\_\_

☒ SUNSI REVIEW COMPLETE ☐ FORM 665 ATTACHED

OFFICE	RII:DRS	RII:DRS	RII:DRS	RII:DRS	RII:DRP	RII: DRS
SIGNATURE	MAR1	RNP1 VIA EMAIL	MCG9 VIA EMAIL	CMF3 VIA EMAIL	FJE	JHB1
NAME	M. RILEY	R. PATTERSON	M. GREENLEAF	C. FRANKLIN	F. EHRHARDT	J. BARTLEY
DATE	10/7/2016	10/10/2016	10/10/2016	10/7/2016	10/ 25/2016	10/25/2016
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

OFFICIAL RECORD COPY DOCUMENT NAME: \\NRC.GOV\NRC\I2\SHARED\DRS NEW\ENG BRANCH 1\BRANCH  
INSPECTION FILES\2014-2015-2016 CYCLE INSPECTION FOLDER FOR ALL SITES\MCGUIRE\MCG 2016 MODS\MCGUIRE 50  
59 AND MODS INSPECTION RPT.DOCX

**U. S. NUCLEAR REGULATORY COMMISSION**

**REGION II**

Docket Nos.: 50-369, 50-370

License Nos.: NPF-9, NPF-17

Report Nos.: 05000369/2016008, 05000370/2016008

Licensee: Duke Energy Carolinas, LLC

Facility: McGuire Nuclear Station

Location: Huntersville, NC 28078

Dates: September 12, 2016, through September 29, 2016

Inspectors: M. Riley, Reactor Inspector (Team Leader)  
R. Patterson, Reactor Inspector  
M. Greenleaf, Reactor Inspector  
C. Franklin (Trainee)

Approved by: Jonathan H. Bartley, Chief  
Engineering Branch 1  
Division of Reactor Safety

Enclosure

## **SUMMARY**

Inspection Report (IR) 05000369/2016008 and 05000370/2016008; September 12 – 29, 2016; McGuire Nuclear Station, Units 1 & 2; NRC Evaluations of Changes, Tests, and Experiments and Permanent Plant Modifications.

This report covers a two-week onsite inspection by four regional reactor inspectors. No findings were identified. The Nuclear Regulatory Commission's (NRC's) program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 5.

## REPORT DETAILS

### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

#### 1R17 Evaluations of Changes, Tests, Experiments and Permanent Plant Modifications (71111.17T)

##### a. Inspection Scope

Evaluations of Changes, Tests, and Experiments: The inspectors reviewed eight safety evaluations performed pursuant to Title 10, *Code of Federal Regulations* (CFR) 50.59, "Changes, tests, and experiments," to determine if the evaluations were adequate and that prior NRC approval was obtained as appropriate. The inspectors also reviewed 18 screenings where licensee personnel had determined that a 10 CFR 50.59 evaluation was not necessary. The inspectors reviewed these documents to determine if:

- the changes, tests, or experiments performed were evaluated in accordance with 10 CFR 50.59 and that sufficient documentation existed to confirm that a license amendment was not required;
- the safety issues requiring the changes, tests or experiments were resolved;
- the licensee conclusions for evaluations of changes, tests, or experiments were correct and consistent with 10 CFR 50.59; and
- the design and licensing basis documentation used to support the change was updated to reflect the change.

The inspectors used, in part, Nuclear Energy Institute (NEI) 96-07, "Guidelines for 10 CFR 50.59 Implementation," Revision 1, to determine acceptability of the completed evaluations and screenings. The NEI document was endorsed by the NRC in Regulatory Guide 1.187, "Guidance for Implementation of 10 CFR 50.59, Changes, Tests, and Experiments," dated November 2000.

This inspection constituted eight evaluation samples and 18 screening and/or applicability determination samples as defined in Inspection Procedure (IP) 71111.17-04.

Permanent Plant Modifications: The inspectors reviewed 11 permanent plant modifications that had been installed during the last three years. The modifications reviewed are listed below:

- EC 098815, 2ETB8, 2ETB12 & 2ETB13 Relay Setting Changes
- EC 101497, Thermal Barrier Hi Flow Set point Increase
- EC 101499, Revise Rotork Actuator Limit Switch MOV 1ND0058A
- EC 101520, Steam Generator Primary Manway Nut Replacement with Hydra-Nut U1
- EC 103396, Design Change Request for FD, Fuel Oil Transfer Pump Motor, 1.0 H.P. AC Motor MNT Replacement 20/40 Exception
- EC 106365, Replace Panelboard 1EKVA
- EC 106409, Replace DC Converters for EDG 1B Speed Switches
- EC 108642, Replace 1NCLT5170 with a Rosemount 1153HD5RB

- EC 112046, Replace Agastat Time Delay Relay 7022AB with Agastat time delay relay E7022AB004
- EC 106112, Replace SSPS Slave Relays with Cutler-Hammer D26MR802A
- Spec-Ngd-Cgd-2006.10-00-0004-002, Mastergear Model MBF 44/11A Gearbox Piece Parts

The modifications were selected based upon risk significance, safety significance, and complexity. The inspectors reviewed the modifications selected to determine if:

- the supporting design and licensing basis documentation was updated;
- the changes were in accordance with the specified design requirements;
- the procedures and training plans affected by the modification had been adequately updated;
- the test documentation as required by the applicable test programs had been updated; and
- post-modification testing adequately verified system operability and/or functionality

The inspectors also used applicable industry standards to evaluate acceptability of the modifications and performed walkdowns of accessible portions of the modifications. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

On September 29, 2016, the inspectors presented inspection results to Mr. Steven Capps and other members of the licensee's staff. The inspectors verified no proprietary information was retained or documented in this report.

ATTACHMENT: SUPPLEMENTARY INFORMATION

## **SUPPLEMENTARY INFORMATION**

### **KEY POINTS OF CONTACT**

#### **Licensee personnel**

S. Capps, Site Vice President  
S. Snider, Plant Manager  
N. Kunkel, Engineering Manager  
J. Robertson, Regulatory Affairs Manager  
P. Vu, Regulatory Affairs  
B. Richards, Regulatory Affairs  
B. Hutchinson, Mechanical Design Principal Engineer  
B. Underwood, Mechanical Design Senior Engineer  
P. Fuhs, Electrical Design

#### **NRC personnel**

F. Ehrhardt, Chief, Projects Branch 5, Division of Reactor Projects  
A. Hutto, Senior Resident Inspector, Division of Reactor Projects  
R. Cureton, Resident Inspector, Division of Reactor Projects

### **LIST OF REPORT ITEMS**

#### **Opened, Closed, and Discussed**

None

## **LIST OF DOCUMENTS REVIEWED**

### Permanent Plant Modifications

EC 098815, MD201893 - 2ETB8, 2ETB12 & 2ETB13 Relay Setting Changes  
EC 101497, Thermal Barrier Hi Flow Setpoint Increase  
EC 101499, Revise Rotork Actuator Limit Switch MOV 1ND0058A  
EC 101520, Steam Generator Primary Manway Nut Replacement with Hydra-Nut U1  
EC 103396, Design Change Request for FD, Fuel Oil Transfer Pump Motor, 1.0 H.P. AC Motor  
MNT Replacement 20/40 Exception  
EC 106112, Replace SSPS Slave Relays with Cutler-Hammer D26MR802A  
EC 106365, Replace Panelboard 1EKVA  
EC 106409, Replace DC Converters For EDG 1B Speed Switches  
EC 108642, Replace 1NCLT5170 with a Rosemount 1153HD5RB  
EC 112046, Replace Agastat Time Delay Relay 7022AB with Agastat time delay relay  
E7022AB004  
Spec-NGd-Cgd-2006.10-00-0004-002, Mastergear Model MBF 44/11A Gearbox Piece Parts

### 10 CFR 50.59 Evaluations

EC 097370, SR/IR Replacement  
EC 101080, "B" Train RN to CA Suction Relocation - Unit 1  
EC 101081, "B" Train RN to CA Suction Relocation - Unit 2 Phase 2  
EC 103951, Replace Main Power Relays to Maintain GCB Functionality  
EC 107118, Replace Unit 2 MSU Transformer 2A  
EC 109071, Assured CA Suction for Extended SBO Per NRC Order Ea-12-049 Unit 1  
EC 113050, RN A Train Manway Wet Tap  
EC 113220, DRPI I/O Controller Replacement

### 10 CFR 50.59 Screenings

EC 098517, Remove Internals and Add New Valve. – MNT  
EC 098748, MD101882 - 1ETA10 Relay Setting Changes – Mod  
EC 100612, Install High Pt Vents On ND for GL 08-01 U1 Mod  
EC 102477, RN Strainer Backwash Pump – 1A Mod  
EC 103921, Actuator Change (And Wiring Reversal)  
EC 103927, Actuator Replacement  
EC 104506, EDG 2B Voltage Regulator Design Change  
EC 105885, U1 Measurement Uncertainty Recapture (Mur) Power Uprate Supports 10 CFR 50  
Appendix K  
EC 107213, Junction Box Cover Replacement  
EC 107768, Change Breaker Size for U1 VE Heater Circuits From 50A To 60A  
EC 108639, Revise RN, NM, NV, VE and VI System Tac Sheet Valve Stroke Times  
EC 108772, OBDN Resolution Support For RN A Train Suction Pipe from SNSWP (RN  
Manway)  
EC 111274, Install Ca System Tees (Ec103963 Pre-Implementation) Supports CA Pumps  
Assured Minimum Flow Paths EC - Unit 2  
EC 112364, Fuel Oil Booster Pump Motor Setpoints for Starting Resistor  
EC 112805, Change the Running Overload Heater for 2emxb-1 Compt 6C - Valve 2NI-183b  
EC 113861, Rosemount Transmitter Replacement  
EC 403610, Revise Mctc-1561-Nd.V009-01 to Provide Compensatory Action for Valve Failed  
Open  
Procedure Change AP/1/A/5500/20, OBDN



Licensing Bases Documents

SER and Supplements

TRM, Current

TS, Current

UFSAR, Current

Calculations

MCC-1223.42-00-0026, CA Valve Design Basis and GL 89-10 Response, Rev. 19

MCC-1205.19-00-0003, 1CA-42, 46, 58, 62 Design Calculation, dated 8/5/97

DPC-1381.05-00-0009, Qualified Life of Agastat E7000 Series Timing Relays, Rev. 3

MCC-1381.05-00-0194-ICC-0002, Allow Replacing SSPS Slave Relays with Cutler-Hammer D26MR802A, Rev. 0

DPC-1381.05-00-0006, Duke Power Company – Shelf Life and Storage, Rev. 2

MCS-1240.03-00-0001, McGuire Nuclear Station Plant Environmental Qualification and Parameters, Rev. 9

MCC-1381.05-00-0094-ICC-0001, NV and KF 50/51 Relay Setting Changes, dated 11/19/13

MCC-1381.05-00-0007, Cable Ampacities and Impedances to be Used in Cable Sizing, Rev. 13

MCC-1381.05-00-0335-ICC-0001, Change Breaker Size for U1 VE Heater Circuits, Rev. 0

MCC-1381.06-00-0094, FMEA for MSU-2A EC 107118, Rev. 1

MCC-1381.16-00-0433, Design Input Calculation for EC 107118 Replace 2A MSU Transformer, Rev. 3

DPC-1381.05-00-0053, 120V AC Panel Fuse Sizing Calculation (EPF and EPG) for McGuire and Catawba, Rev. 0

MCC-1381.06-00-0007, Symmetrical Short Circuit MVA on Generator Breaker During Bolted 3-Phase Fault on Low Side (24kV) Terminals on Main Step-Up Transformer, Rev. 16

MCC-1223.42-00-0053, Suction Transfer Analysis, Rev. 4

MCC-1223.42-00-0037, Inadvertent Autoswap Evaluation, Rev. 12

MCC-1205.19-00-0003, 89-10 Valve Calculation for CA Valves, Rev. 44

MCC-1206.02-74-0012, Seismic Analysis Calculation, Rev. 0

MCC-1121.00-00-0007, Accumulator Seismic Analysis Calculation, Rev. 10

MCC-1201.05-00-0006, Rerate Qualification for AuxFeed Pump, Rev. 1

MCM-1218.02-0023.001, Seismic Calculation for RN Strainer Valves, Rev. 4

Procedures

AP-1-A-5500-020, Loss of RN, Rev 33

AP-1-A-5500-019, Loss of ND or ND System Leakage, Rev. 28

PT-1-A-4200-002 C, Containment Closure, Rev 87

AD-EG-ALL-1133, Preparation and Control of Equivalent Change Engineering Changes, Rev. 0

IP/0/A/3090/002, Instrument and Electrical Configuration Control, Troubleshooting and Corrective Maintenance, Rev. 64

173-9230092-005, Commercial Grade Dedication Plan Duke Specific Dedication Plan for D26 Relays, Rev. 5

OP/1/A/6100/010L, Annunciator Response for Panel 1AD-11

AD-EG-ALL-1202, Preventative Maintenance and Surveillance Testing Administration, Rev. 3

IP/1/A/4971/001, Brown Boveri ITE 50 and ITE 51 Relay Test, Rev. 17

IP/2/A/4971/001, Brown Boveri ITE 50 and ITE 51 Relay Test, Rev. 16

TE-MN-ALL-0202, Transformer and Apparatus Testing, Rev. 0

IP/0/B/2007/005, Oil Filled Transformer Inspection and Maintenance, Rev. 7

PT/2/A/4252/003B, CA Train B Valve Stroke Timing – Quarterly TDAFW Flowpath, Rev. 27

PT/2/A/4252/002B, CA Valve Stroke Timing – Quarterly 1B MDAFW Flowpath, Rev. 47

PT/2/A/4252/002A, CA Valve Stroke Timing – Quarterly 1A MDAFW Flowpath, Rev. 43  
 EP/1A/5000/E-1, Emergency Operating Procedure, Rev. 17  
 EP/1A/5000/ES-1.2, Emergency Operating Procedure, Rev. 18  
 AP/1A/5500/034, Abnormal Operating Procedure, Rev. 23  
 EP/1A/5000/034, Emergency Operating Procedure, Rev. 39  
 PT/2/A/4403/007, RN Train 2A Flow Balance, Rev. 96  
 PT/2/A/4200/038, Venting of CA System Suction Piping, Rev. 45  
 IP/1/A3090/021KC, KC Loop Claibration And Operational Test, Rev. 28  
 IP/0/A3066/013B, Testing Kerotest Valves Using VIPER, Rev. 14

#### Completed Procedures

PT/1/A/4350/002B, Diesel Generator 1B Operability Test, dated 2/18/16  
 TT/1/A/EC106365/001, Post Modification Testing of 120 VAC Vital Power Panelboard 1EKVA, dated 4/11/16

#### Drawings

MCFD-1561-01.00, Flow diagram Residual Heat Removal System (ND), Rev. 23  
 MCFD-1574-01.00, Flow diagram of Nuclear Service Water System (RN), Rev. 31  
 MCFD-1574-01.01, Flow diagram of Nuclear Service Water System (RN), Rev. 36  
 MCFD-1574-02.00, Flow diagram of Nuclear Service Water System (RN), Rev. 35  
 MCFD-1574-02.01, Flow diagram of Nuclear Service Water System (RN), Rev. 12  
 MCFD-1574-03.00, Flow diagram of Nuclear Service Water System (RN), Rev. 37  
 MCFD-1574-03.01, Flow diagram of Nuclear Service Water System (RN), Rev. 11  
 MCFD-1574-04.00, Flow diagram of Nuclear Service Water System (RN), Rev. 20  
 MCFD-1574-05.00, Flow diagram of Nuclear Service Water System (RN), Rev. 7  
 MCFD-2562-03.01, Flow Diagram of Safety Injection System (NI), Rev. 15  
 MCEE-0147-33.00, Elementary Diagram Aux. Feedwater System (CA) Valve 1CA0162B, Rev. 4  
 MC-1705-01.00, One Line Diagram 125 VDC / 120 VAC Vital Instrument and Control PWR. SYS, Rev. 110  
 MCSRD-CAA-001, Composite DWG SYS CA, Rev. 6

#### Miscellaneous Documents

00813-0100-4388, Rosemount 1153 Series D Alphaline Nuclear Pressure Transmitters, Rev. BA  
 AB2, Operator Rounds for CA-162B, Rev. 21  
 Addendum 1, Rev. 1 to Qualification Report No. 828, Class 1E Qualification of 201592 Cables For McGuire Nuclear Station Unit 1 and 2, Rev. 2  
 CGD-2006.10-00-004, Mastergear Model MBF 44/11A Gearbox and Piece Parts, Rev. 2  
 DPM-1391.01-0003, Environmental Qualification Package for Amerace Corporation (Agastat) E7000 Series Pneumatic Timing Relays Model Nos. E7012, E7022, and E7024 and 7000 Series Pneumatic Timing Relay 7032ACC, Rev. D11  
 EC 097370, Replacement of Source Range and Intermediate Range Excore Detectors and Electronics, Rev. 8  
 EC 101520, S/G Primary Manway Nut Replacement with Hydra-Nut U1 Mod, Rev. 0  
 EC 101545, 1B RN Strainer Backwash Inlet Valve Assured Air Supply, Rev. 13  
 EC 103921, Change Actuator on 2NI0185A from 90NA2-86 to 90NA1E-86, Rev. 2  
 EC 103927, Change Actuator on 2RN-299A from NA2 to NA1E, Rev. 2  
 EC 106112, Allow Replacing SSPS Slave Relays with Cutler-Hammer D26MR802A, Rev. 1  
 EC 107213, Evaluate Use of New Gammametrics Junction Box Covers, Rev. 0  
 EC 108642, Replace 1NCLT5170 with a Rosemount 1153HD5RB, Rev. 0  
 EC 112046, Agastat Time Delay Relay 7022AB is Obsolete. Allow Agastat Time, Rev. 0

EC 113861, Replace 1NCLT5160 with a Rosemount Model 3154, Rev. 0  
 EQMM-1393.01-F04-00, Environmental Qualification Maintenance Manual, Rev. 7  
 McGuire Nuclear Station, Unit 1 and 2, Issuance of Amendments Regarding Measurement Uncertainty Recapture Power Uprate (TAC NOS. ME8213 and ME8214), dated 5/16/13  
 MCM 1201.05-0479, Westinghouse Motor Company Induction Motor Starting Characteristics, Rev. 3  
 MCM 1205.19-0066.001, Electrical Data for Rotork Actuators, Rev. D4  
 MCM-1346.23-0009.002, Qualification Test Report for the Neutron Flux Monitoring System, Rev. 2  
 MCS-1240.03-00-0001, McGuire Nuclear Station Plant Environmental Qualifications and Parameters, Rev. 9  
 MCTC-1562-NI-V025-01, ND Valve Design Criteria/Operability Requirements and Compensatory Measures, Rev. 10  
 MCTC-1573-KC.V050-01, Testing and Acceptance Criteria for KC Valves, Rev. 0  
 MCTC-1592-CA.I001-01, SR Pressure Switch Setpoints TAC, Rev. 5  
 MCTC-1592-CA.I003-01, ELAP Pressure Switch Setpoints TAC, Rev. 5  
 NP-5024, Seismic Ruggedness of Aged Electrical Components, January 1987  
 QTR-040, Gamma-metrics RCS Series Neutron Flux Monitoring System Qualification Test Report No. 040, Rev. 3  
 Seismic Qualification Review of SuperPipe for Valve 1CA-116B  
 WCAP-15977-P, Reliability Assessment of Cutler-Hammer D26MR802A Relays Used as SSPS Slave Relays, Rev. 1

#### Corrective Action Documents

01665889	01961266
01901577	02018668
01690806	02018758
01906316	M-14-02167
01943497	
01943678	

#### Work Orders

02129016-28  
 20006261-01  
 20011688-03  
 20013005-01  
 20016801-01  
 20068249-01

#### Condition Reports generated as a result of the inspection

2061357, Commercial Grade Dedication  
 2061662, Fuel Leak at 1FDPT5010  
 2061860, Oil Leak noted during Walk-down of 2A MSU Transformer  
 2061892, Housekeeping Issues During Walk-down  
 2062089, EC 98815 Mod Test Plan  
 2062265, 1NCLT5170 Harsh Environment Qualification  
 2062307, EC 112406 Agastat Shelf Life/PM Generating  
 2062972, Create PMs for Timing Relays  
 2063246, 2RN-299A Actuator Nameplate Discrepancy  
 2063262, EC97370 O-ring replacement PM

2063615, SR/IR Detector Junction Box O-ring Total Life  
2064684, Agastat Relay Change from Equipment Reliability Class ER-1 to ER-3  
2065517, 2CATE7630 Wiring Degradation  
2065528, Housekeeping Issues in U2 CA Pump Room  
2065807, Revision of Agastat E7000 Relay Qualified Life Calculation