



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION II  
245 PEACHTREE CENTER AVENUE N.E., SUITE 1200  
ATLANTA, GEORGIA 30303-1200

July 21, 2022

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

SUBJECT: CATAWBA NUCLEAR STATION – DESIGN BASIS ASSURANCE INSPECTION  
(PROGRAMS) INSPECTION REPORT 05000413/2022010 AND  
05000414/2022010

Dear Mr. Simril:

On June 10, 2022, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Catawba Nuclear Station and 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.

No findings or violations of more than minor significance were identified during this inspection.

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 Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

A handwritten signature in black ink, appearing to read "JB", followed by a horizontal line.

Signed by Baptist, James  
on 07/21/22

James B. Baptist, Chief  
Engineering Branch 1  
Division of Reactor Safety

Docket Nos. 05000413 and 05000414  
License Nos. NPF-35 and NPF-52

Enclosure:  
As stated

cc w/ encl: Distribution via LISTSERV

SUBJECT: CATAWBA NUCLEAR STATION – DESIGN BASIS ASSURANCE INSPECTION  
(PROGRAMS) INSPECTION REPORT 05000413/2022010 AND  
05000414/2022010 DATED JULY 21, 2022

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OFFICE	RII/DRS/EB1	RII/DRS/EB1	NMSS	RIV/NRR	RII/DRS/EB1
NAME	G. Ottenberg	R. Fanner	N. Morgan	J. Zudans	J. Baptist
DATE	7/19/2022	7/11/2022	7/08/2022	7/10/2022	7/21/2022

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**U.S. NUCLEAR REGULATORY COMMISSION**  
**Inspection Report**

Docket Numbers: 05000413 and 05000414

License Numbers: NPF-35 and NPF-52

Report Numbers: 05000413/2022010 and 05000414/2022010

Enterprise Identifier: I-2022-010-0038

Licensee: Duke Energy Carolinas, LLC

Facility: Catawba Nuclear Station

Location: York, SC

Inspection Dates: May 23, 2022, to June 10, 2022

Inspectors: R. Fanner, Reactor Inspector  
N. Morgan, Intergovernmental Liaison Project Manager  
G. Ottenberg, Senior Reactor Inspector  
J. Zudans, Contractor

Approved By: James B. Baptist, Chief  
Engineering Branch 1  
Division of Reactor Safety

Enclosure

## **SUMMARY**

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting a design basis assurance inspection (programs) inspection at Catawba Nuclear Station, in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to <https://www.nrc.gov/reactors/operating/oversight.html> for more information.

### **List of Findings and Violations**

No findings or violations of more than minor significance were identified.

### **Additional Tracking Items**

None.

## INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at <http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

## REACTOR SAFETY

### 71111.21N.02 - Design-Basis Capability of Power-Operated Valves Under 10 CFR 50.55a Requirements

#### POV Review (IP Section 03) (8 Samples)

The inspectors:

a. Evaluated whether the sampled POVs are being tested and maintained in accordance with NRC regulations along with the licensee's commitments and/or licensing bases.

Specific Guidance

b. Evaluated whether the sampled POVs are capable of performing their design-basis functions.

c. Evaluated whether testing of the sampled POVs is adequate to demonstrate the capability of the POVs to perform their safety functions under design-basis conditions.

d. Evaluated maintenance activities including a walkdown of the sampled POVs (if accessible).

- (1) 1KC050A, Auxiliary Building Non-Essential Header Isolation
- (2) 1ND027, 1A Residual Heat Removal (ND) Heat Exchanger Bypass Control
- (3) 2CA050A, Auxiliary Feedwater (CA) Pump 2 Discharge to Steam Generator 2C Isolation
- (4) 1NV010A, Letdown Orifice 1B Outlet Containment Isolation
- (5) 2CA056, CA Pump 2A Flow to Steam Generator 2B
- (6) 2NC035B, Pressurizer Power Operated Relief Valve Isolation
- (7) 2NI173A, ND Header 2A to Cold Legs C & D
- (8) 1CF033, 1A Steam Generator Feedwater Containment Isolation

## INSPECTION RESULTS

No findings were identified.

## EXIT MEETINGS AND DEBRIEFS

The inspectors verified no proprietary information was retained or documented in this report.

- On June 10, 2022, the inspectors presented the design basis assurance inspection (programs) inspection results to Tom Simril and other members of the licensee staff.

## DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.21N.02	Calculations	AD-EG-ALL-1117	U2, 6.9KV, 4.16KV, & 600V Auxiliary Power Systems Safety-Related Voltage Analysis	19
		CNC -1205.19-00-0028	Generic Letter 89-10 MOV Calculations, NC System; 1(2) NC033A, 035B, 1NC031B	11
		CNC -1205.19-00-0029	89-10 Calculation for 1&2 CA038A, 42B, 46B, 50A, 54B, 58A, 62A, 66B	14
		CNC -1205.19-00-0033	Generic Letter 89-10 Calculation For Valves 1 and NI173A and NI178B	4
		CNC -1205.19-00-0110	GL 89-10 Set- Up Calculation for Valves 1KC001A, 1KC002B, 1KC050A, 1KC053B, 2KC001A, AND 2KC002B	3
		CNC -1205.19-00-0195	Required Thrust Calculation for 1(2)NC31B, 33A, 35B (AD/DD PPM); Item NO. 09J-363 & 364	000
		CNC -1205.41-00-0027	1 (2) ND 26, 27, 60, and 61 Fisher Actuator and Margin Capability Calculations	1
		CNC -1206.02-80-2019	KCC - Component Cooling Heat Exchangers 1 A & 1 B to the RHR Heat Exchangers 1A & 1 B. Also to the Inlet of the Letdown & Fuel Pool Heat Exchangers	018
		CNC -1223.11-00-0055	Limiting 1ST Stroke Time for ND26, ND27, ND60 and ND6V	000
		CNC -1381.05-00-0199	U2, 6.9KV, 4.16KV, & 600V AUXILIARY POWER SYSTEMS SAFETY-RELATED VOLTAGE ANALYSIS	19
		CNC 1205.41-00-0018	1 (2) NV 010A, 011A, and 013A Required Thrust Evaluation supporting Air Operated Valve (AOV) Program	2
		CNC-1205.41-00-0001	Air Operated Valve (AOV) Program Scope Calculation	5
		CNC-1205.41-00-0005	FEEDWATER ISOLATION VALVES, 1(2)CF33, 42, 51, AND 60, DESIGN BASIS SIZING CALCULATION	05/03/2022
		CNC-1205.41-00-0016	Catawba Air-operated Valve (AOV) Risk Ranking Calculation	1
		CNC-1205.41-00-	1 (2) NV 010A, 011A, and 013A Required Thrust	2

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		0018	Evaluation supporting Air Operated Valve (AOV) Program	
		CNC-1205.41-00-0022	1(2) CA-040, 044, 056, 060 and 1(2) CA-036, 048, 052, 064 Actuator Capability Evaluation Supporting Air Operated (AOV) Program	1
		CNC-1206.03-00-0181	Doghouse Environmental Temperature Due to Main Steam Line Break	Rev. 3
		CNC-1223.02-00-0023	Inservice Testing (IST) Valve Response Measurement Uncertainty	04/08/2011
		CNC-1223.12-00-0045	Design Parameters for ND Header to Cold Leg Containment Isolation Valves 1 & 2 NI173A, NI178B	4
		CNC-1552.08-00-0390	Long-Term Containment Response - Manual NS Initiation	7
		CNM 1205.00-2182.001	Design/Seismic Report (Weak Link) for 09J-2056, 2", 1500#, SS, Gate Valve	5
		CNM 1205.01-0797.001	Design & Seismic RPT 6J-339	C
	Corrective Action Documents	ARs	02373087, 02294259, 01497427, 02407695, 02294259, 01497427, 02428219, 01898027, 02300922	
	Corrective Action Documents Resulting from Inspection	NCR 02318266	OP-CN-CF-CF lesson plan does not identify the safety related power supply for Feedwater Isolation Valve's	06/24/2022
		NCR 02429804	2022 NRC DBAI POV – 2NI173A Motor Brake Internals	06/02/2022
		NCR 02430135	2022 NRC DBAI POV – 1KC-50A Maximum Transmitted Torque	06/06/2022
		NCR 02430281	2022 NRC DBAI POV - Lesson Plans not revised post Mod	06/07/2022
		NCR 02430301	PT/1/A/4350/002 E enclosure 13.16 could not be located	06/07/2022
		NCR 02430342	2022 NRC POV DBAI – Incorrect Reference in Flowserve Letter	06/07/2022
		NCR 02430464	Obstructions on 522' elevation floor drains	06/08/2022
		NCR 02430567	NRC DBAI POV- EOPs do not align with UFSAR	06/09/2022
		NCR 02430713	2022 NRC DBAI POV – 2NC35B - Actuator Fastener Bolt Preload	06/09/2022
		NCR 02431086	2022 NRC DBAI POV - UFSAR sec.6.2.4.1 incorrect statement	06/14/2022

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		NCR 2428952	2022 NRC DBAI POV – 2NC035B High Temp Torque Factor	05/26/2022
		NCR 2430567	NRC DBAI POV- EOPs do not align with UFSAR	06/09/2022
	Drawings	02-403-0012-3	Limiter Valve Control	DI
		40846-08	20"- Class 150 Valve Assembly and Limitorque H2BC-SMB-00-10	DE
		CN -1561-01.00	Flow Diagram of Residual Heat Removal System (ND)	34
		CN -2561-01.00	Flow Diagram of Residual Heat Removal System (ND)	38
		CN -2562-01.01	Flow Diagram, Safety Injection System (NI)	23
		CN -2592-01.01	Flow Diagram Auxiliary Feedwater System (CA)	33
		CN-1573-01.0	Flow Diagram of Component Cooling System (KC)	30
		CN-2499-CA.07-00	Instrument Detail Motor Driven Auxiliary Feedwater Pump to Steam Generator Flow Control	9
		CN-2553-01.01	Flow Diagram of Reactor Coolant System (NC)	20
		CN-2562-01.03	Flow Diagram of Safety Injection System (NI)	28
		CNEE-0247-04.12	Auxiliary Feedwater System (CA) CA Pump No. 2 Disch to S/D 2C Isol. Vlv. 2CA050A	4
		CNEE-0247-04.12-01	Auxiliary Feedwater System (CA) CA Pump No. 2 Disch to S/D 2C Isol. Vlv. 2CA050A Controls	2
		CNEE-0250-01.09	Reactor Coolant System (NC) Pzr Power Operated Relief Isolation Valve 2NC035B	12
		CNEE-0251-01.32	Elementary Diagram Safety Injection System (NI) ND HDR to NC Cold Legs C and D Isolation Valve 2NI173A	6
		CNM 1205.00-0074.001	8"SS Motor Oper Gate Vlv Item 9J211	16
		CNM 1205.00-2181.001	O/L Drawing for 09J-2056, 2", 1500#, SS, Gate Valve	0
		CNM 1205.01-0790.001	4" 1500LB CS EMO DP Gate Valve 6J- 339	H
		CNM 1205.01-0790.002	4" 1500LB CS DP Gate Valve 6J-339	J
		CNM 1205.06-0220.001	O/L, C/S, B/M, OPR, W/D Control Valves 1&2/CA/40 , 44, 56 & 60	J
		W9223811, Sht. 1	3"- 1530 Weld Ends Stainless Steel Double Disc Gate	B



Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Valve for SMB-00-15 Limitorque Actuator	
		W9223811, Sht. 2	3"- 1530 Weld Ends Stainless Steel Double Disc Gate Valve for SMB-00-15 Limitorque Actuator	B
	Engineering Changes	CN 20328	Modify control circuit wiring on 2NI-9A, 10B, 100B, 183B, 162A, 173A, 178B, 184B, 185A, 2NV-89A, 91B, 188A, 189B, 252A, 253B, 312A, and 314B to provide "limit actuated" torque switch bypass contacts which can be adjusted independent of Indication or interlocks.	11/07/1988
		CN 21319	Modify CA Control Valves to Prevent S/G Overfill During SGTR	08/11/1999
		EC 0000106724	Revise MOV Set-Up Sheets to Meet GL 96-05 Requirements for 1KC001A, 002B, 050A	09/07/2012
		EC 0000402775	U-1 AND U-2 NW System Isolation to Specific CIVs	1
	Engineering Evaluations	CNC -1205.19-00-0176-ICC-0003	EC420978 - Revise valve factor for 1(2)NI173A & 1(2)NI178B	000
		CNC -1205.19-00-0179	Kalsi Engineering Report 2919C, GL96-05 Periodic Verification Program for Butterfly Valves with 316 Microseal Bearings {JOG Class D}	0
		CNC -1381.05-00-0199	U2, 6.9KV, 4.16KV, & 600V Auxiliary Power Systems Safety-Related Voltage Analysis	19
		CNC-1205.00-00-0048	GL 95-07 Pressure Locking and Thermal Binding Review of Valves Without an Active to Open Safety Function	1
		CNC-1205.19-00-0170	Operability Evaluation of Rotork Part 21 for Switch Mechanisms	1
		CNM 1205.00-0549.001	ASME Section III Gate Valve Seismic Report	5
		CNM 1205.00-2050.001	Design and Seismic Analysis Report for 3" EMO Gate Valve, Item 9J-364	00C
		CNM 1205.02-0766.001	Weak-Link Report for CNS BFV Item Number 05B-501	0
		CNM 1205.19-0094.001	Stress Report for Westinghouse Class 1 Nuclear Valves-Gate Valves	D3
		CNM 1205.19-099.011	9J-211 Seismic and Weak Link Analysis Report for Westinghouse Class 1 Nuclear Valve	0

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Miscellaneous	DPC 1205.41-00-0001	Evaluation of AOV Issues Needed for Margin Calculations	2
		DPC-1205.00-00-0008	Microseal Bearing Test Report: Kalsi Engineering Document 2800C	0
		[N/A]	OAC Alarm Response Information for loss of SOV Power	
		BACKGROUND INFORMATION FOR WESTINGHOUSE OWNERS GROUP EMERGENCY RESPONSE GUIDELINE	ES-1.3 Transfer to Cold Leg Recirculation HP-Rev. 3	03/31/2014
		CDUK-1205.41-0001.001	Unit 1 and Unit 2 AOV Test Set Up Sheets	7
		CE 0000106724	Revise MOV Set-Up Sheets to Meet GL 96-05 Requirements for 1KC001A, 002B, 050A, AND 053B	09/17/2012
		CN 500404	Allow Replacement of Solenoid Valves w/ New Model	05/17/2005
		CN-11413	De-energize the Hydraulic Solenoids on the Main Feedwater Isolation Valves	08/06/2001
		CNC -1205.19-00-0176-ICC-0004	EC420956- Revise Valve Factor and Functions for CA MOVs	0
		CNM 1205.00-0322.001	I/B Manual M/O Gate Valves & Swing Check Vlvs	D10
		CNM 1205.00-1997.001	EMO Torque Switch Setting Sheets	90
		CNM 1205.00-1997.001	EMO Torque Switch Setting Sheets	90
		CNM 1205.00-2049-001	Instruction Manual Number ET347 for 3" 1530 Class Double Disc Gate Valves with Motor Actuators	10/01/1997
		CNM 1205.02-0762.001	Posi-Seal Butterfly Valve Technical Bulletin Series	0
		CNM 1205.06-	I/M & Parts List for Control Valves and Regulators	42

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		0268.001		
		CNM 1205.19-0001.001	Limiterque Nuclear Qualification Reports	3
		CNM 1205.19-0083.001	Technical Repair Guide for Rotork Valve Actuators "NA" Range Models	9
		CNM 1205.19-0114.001	Rotork Motor Operator Bench Test Certificates	D7
		CNS-1205.00-00-0008	ASME Section 3 Stainless Steel Gate Globe and Check Valves	5
		CNS-1205.06-00-0003	Control Valves to ASME Section III	17
		CNS-1553.NC-00-0001	Reactor Coolant System (NC) Design Basis Specification	50
		CNS-1554.NV-00-0001	Chemical and Volume Control System (NV) Design Basis Specification	53
		CNS-1561.ND-00-0001	Design Basis Specification for The Residual Heat Removal (ND) System	42
		CNS-1562.NI-00-0001	Design Basis Specification For the Safety Injection (NI) System	52
		CNS-1573.KC-00-0001	Component Cooling System (KC) Design Basis Specification	49
		CNS-1591.CF-00-0001	Design Basis Specification for the Feedwater (CF) System	Rev. 034
		CNS-1592.CA-00-0001	Auxiliary Feedwater System (CA) Design Basis Specification	50
		CNS-1592.CA-00-0001	Auxiliary Feedwater System (CA) Design Basis Specification	50
		DPS 1205.00-00-0002	Nuclear Safety Related Carbon and Stainless Steel Forged and Cast Electric Motor Operated Valves	4
		DPS-1205.19-00-0004	Safety Related Rotork Motor Operators and Spare Parts	4
		EQMM-1393.01-Q03-01	Environmental Qualification Maintenance Manual Equipment Type: Solenoid Valve Manufacturer: Valcor Engineering Corporation Model/Series: V70900-65 Series	15

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Valves	
		OEDB Number: 92-12415	LIMITORQUE TECHNICAL UPDATE #92-O1 Kalsi Engineering Document #1707-C, Rev. o (11- 25-91) Thrust Rating Increase SMB-OOO, SMB-OO, SMB-O & SMB-1 Actuators	01/06/1992
		OP-CN-CF-CF	Feedwater System Lesson Plan	04/07/2014
		OP-CN-EP-INTRO	Emergency Procedures Intro Lesson Plan CNOB50	11
		System Health Report	KC - Component Cooling System	04/19/2022
		System Health Report	ND – Residual Heat Removal System	04/19/2022
		System Health Report	CA - CNS   Unit 2   CA - Auxiliary Feedwater System	04/19/2022
		Torque and Margin for 1ND27	As Left C1R26	10/23/2021
		Westinghouse Guideline Document	ES-1.3 Transfer to Cold Leg Recirculation HP-Rev 3	03/31/2014
	Procedures	AD-EG-ALL-1432	Air Operated Valve Design Basis Review	1
		AD-EG-ALL-1433	Air Operated Valve Testing Requirements	2
		AD-OP-ALL-0105	Operability Determinations	6
		AD-OP-ALL-0205	Time Critical Actions/Time Sensitive Actions	2
		CNC-1205.19-00-0176	JOG Classification of Catawba's GL96-05 MOV Population	9
		DPS-1205.19-00-0002	Guideline for Performing Motor Operated Valve Reviews and Calculations (For Engineering use only)	4
		EP/2/A/5000/E-3	CNS Steam Generator Tube Rupture	41
		EP/2/A/5000/ES-1.3	Transfer to Cold Leg Recirculation	31
		IP/0/A/3820/004 Q	MOV Diagnostic Testing	13
		IP/0/A/3820/004 Q	MOV Diagnostic Testing	13
		IP/0/A/3820/034	Removal/Restoration of Interferences and Packing Re-Torque on Air Operated Valves (AOVs)	43
		IP/0/A/3820/047	AOV Diagnostic Testing using the QUIKLOOK3 System	5

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		OP/1/A/6100/010K	Annunciator Response for Panel 1AD-10	21
		OP/1/B/6100/010 X	Annunciator Response for Radiation Monitoring Panel 1RAD-1	67
		OP/1/B/6100/010 Z	Annunciator Response for Radiation Monitoring Panel 1RAD-3	25
		PD-EG-ALL-1430	Air Operated Valve Program	2
		PT/0/A/4700/061	Time Critical Actions/ Time Sensitive Actions	9
		PT/1/A/4200/021 A	KC Valve Inservice Test (QU)	79
		PT/2/4/4200/013 G	NI Valve Inservice Test (UNK)	41, completed 04/11/2021
		PT/2/A/4200/0	CA Valve Inservice Test (QU)	13E
		PT/2/A/4200/013 E	CA Valve Inservice Test (QU)	66
		PT/2/A/4200/023	NC Valve Inservice Test (QU)	21, completed 03/22/2022
		PT/2/A/4200/079	Auxiliary Feedwater Flow Control Valve Air Accumulator Leakage Test	11
		PT/I/A/4200/001 T	Containment Penetration Valve Injection Water System Performance Test	76
		PT/I/A/4200/013 I	NV Valve Inservice Test	49
		SI/0/A/5200/006	MOV Actuator Lubrication and Inspection	33
	Work Orders	WO 1899772	ASSIST THE C.C.I. TECH IN REASSEMBLING THE C.F.I.V. VALVES	12/16/2009
		WO 20338520 01	1. Duke_WorkOrderPackage_Rpt_B 1CF - REPLACE HYDRAULIC FLUID/INSPECT DESICCANT FOR CFIV 2. IP/0/A/3010/024 MAIN FEEDWATER (CF) SYSTEM FEEDWATER ISOLATION	05/17/2020
		WOs	02050985, 20341710 01, 20436333 01, 20444997 02, 20204646 01, 02119855 01, 20407902 01, 20380724 01	