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

June 27, 2022

Mr. John A. Krakuszeski
Site Vice President
Duke Energy Progress, LLC
8470 River Road SE
M/C BNP04
Southport, NC 28461-0429

SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT – DESIGN BASIS ASSURANCE INSPECTION (TEAMS) INSPECTION REPORT 05000324/2022010 AND 05000325/2022010

Dear Mr. Krakuszeski:

On May 13, 2022, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Brunswick Steam Electric Plant 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,

Signed by Baptist, James
on 06/27/22

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

Docket Nos. 05000324 and 05000325
License Nos. DPR-62 and DPR-71

Enclosure:
As stated

cc w/ encl: Distribution via LISTSERV

SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT – DESIGN BASIS ASSURANCE INSPECTION (TEAMS) INSPECTION REPORT 05000324/2022010 AND 05000325/2022010

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X SUNSI Review		X Non-Sensitive ☐ Sensitive		X Publicly Available ☐ Non-Publicly Available	
OFFICE	RII/DRS	RII/DRS	RII/DRS	RII/DRS	RII/DRS
NAME	P. Braxton	C. Franklin	L. Haeg	T. Su	J. Baptist
DATE	06/21/2022	06/21/2022	06/21/2022	06/21/2022	06/27/2022

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U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Numbers:	05000324 and 05000325
License Numbers:	DPR-62 and DPR-71
Report Numbers:	05000324/2022010 and 05000325/2022010
Enterprise Identifier:	I-2022-010-0037
Licensee:	Duke Energy Progress, LLC
Facility:	Brunswick Steam Electric Plant
Location:	Southport, NC
Inspection Dates:	April 25, 2022 to May 13, 2022
Inspectors:	P. Braxton, Reactor Inspector C. Franklin, Reactor Inspector L. Haeg, Project Manager T. Su, Reactor Inspector
Approved By:	James B. Baptist, Chief Engineering Br 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 (teams) inspection at Brunswick Steam Electric Plant, 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

71111.21M - Design Bases Assurance Inspection (Teams)

The inspectors evaluated the following components and listed applicable attributes, permanent modifications, and operating experience:

Design Review - Risk-Significant/Low Design Margin Components (IP Section 02.02) (5 Samples)

(1) Unit 2 Emergency Diesel Generator (EDG) Load Timing Relays 2-DG4-STR/2B-3/4
- System transient requirements
- Modification performed affecting Design Basis Functions
- Operating Environment
- Operating Procedures
- Surveillance test procedures and performed procedures
- System health reports

(2) Unit 2 DC Battery/Battery Charger 2-2A-1-125VDC-CHRGR/BAT, 2-2A-2-125VDC-CHRGR/BAT
- Compliance with Updated Final Safety Analysis (UFSAR) and Technical Specifications (TS), and Design Basis Document (DBD)
- Material condition and configuration
- Operating environment
- Consistency between station documentation (e.g. procedures) and vendor specifications
- Maintenance effectiveness
- Designs requirements
- Surveillance testing

(3) Unit 1 Instrument Air N2 Solenoids 1-RNA-SV-5481/5482
- System transient requirements
- Modification performed affecting Design Basis Functions
- Operating Environment
- Operating Procedures
- Backup Nitrogen Surveillance test procedures reviews

(4) Unit 1 High Pressure Coolant Injection (HPCI), Reactor Core Isolation Cooling (RCIC) 1-E41-C001, 1-E51-C001)

- Material condition and configuration (e.g., visual inspection during a walkdown)
- Operating environment
- Design calculations (pump head, capacity, NPSH)
- Consistency among design and licensing bases and other documents/procedures
- Maintenance effectiveness and records, and corrective action history
- Operating procedures
- Surveillance testing and recent test results
- Component health reports

(5) Unit 2 Nuclear Service Water (NSW)/ Common Service Water (CSW) Pumps and Strainers 2-SW-2A-NUC-PMP, 2-SW-2B-NUC-PMP, 2-SW-2C-CONV-PMP

- Material condition and configuration (e.g., visual inspection during a walkdown)
- Operating environment
- Design calculations (pump head, capacity, NPSH)
- Consistency among design and licensing bases and other documents/procedures
- Maintenance effectiveness and records, and corrective action history
- Operating procedures
- Surveillance testing and recent test results
- Component health reports

Design Review - Large Early Release Frequency (LERFs) (IP Section 02.02) (1 Sample)

(1) Unit 2 Residual Heat Removal (RHR) Heat Exchangers (HX) and Bypass Valve 2-E11-B00B1B, 2-E11-F048B

- Material condition and configuration (e.g., visual inspection during a walkdown)
- Operating environment
- Design calculations
- Consistency among design and licensing bases and other documents/procedures
- Maintenance effectiveness and records, and corrective action history
- Operating procedures
- Surveillance testing and recent test results
- Component health reports

Modification Review - Permanent Mods (IP Section 02.03) (6 Samples)

(1) EC297884 – 885 – Replace Unit ½ CST Lo Level Transmitter
(2) EC408563 – 565 – Replace EDG Sync Check Relays
(3) EC418443 –UAT Backfeed breaker Modification
(4) EC295433 – NSW/CSW Pump Replacements
(5) EC296462, 65, 74 – 1C, 2B, 4C EDG Governor Replacement
(6) EC416835 – RWCU Valve 1-G31-F004 Replacement

Review of Operating Experience Issues (IP Section 02.06) (2 Samples)

(1) IN 2021-01 Lessons Learned from POV DBAI
(2) IN 2010-25 Inadequate Electrical Connections

INSPECTION RESULTS

No findings were identified.

EXIT MEETINGS AND DEBRIEFS

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

- On May 13, 2022, the inspectors presented the design basis assurance inspection (teams) inspection results to John A. Krakuszeski and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.21M	Calculations	89-068-2	HPCI Minimum Flow Calculation	Rev. 0
		9527-8-E41-06-F	NPSH Requirements – RCIC and HPSI	Rev. 0
		BNP-E-6.079	Unit 1 & 2 - 125 V DC Battery Charger Sizing Calculation	Rev. 10
		BNP-E-6.083	Unit 2 125/250 VDC Coordination Protection Calculation	Rev. 10
		BNP-E-6.085	Unit 2 125/250 V DC Coordination/Protection Calculation	Rev.8
		BNP-E-6.087	Unit 2 124/250V DC Power Cable Ampacity	Rev. 12
		BNP-E-6.120	125/250V DC System Battery Load Study	Rev.15
		BNP-E-7.002	AC Auxiliary Electrical Distribution System Voltage/ Load Flow/Fault Current Study	Rev. 16
		DBD-51	DC Electrical System	Rev. 16
		G0050A-12	BNP Unit No. 2 SWS Hydraulic Analysis	Rev. 13
		G0050A-18	SW System Instrumentation and Control Setpoint Review	Rev.1
		G0050A-20	Hydraulic Analysis of the Cooling Water Intake Canal and Pump Intake Structure	Rev. 0
		M-89-0021	HPCI/RCIC NPSH with Suction from the CST	Rev. 0
		M-89-0021	HPCI/RCIC NPSH with Suction from the CST	Rev. 0
		OSWB-0006	SW Intake Structure Heat Loads and Ventilation Requirements	Rev.1
		PCN-G0050A-13	NSW and CSW Pressure Switch Setpoints for Pump Auto Start,	Rev. 4
	Corrective Action Documents	717634, 02258503, 02259496, 02261604, 02277159, 02287709, 02343684, 02349302, 02375869, 02380075, 02383437,		

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		02391622, 02411224, 02421361, 96-01675, 02283394, 02337098, 02349404, 02349869, 02354643, 02359058, 02364279, 02396560, AR 106230-10, AR 00697175		
	Corrective Action Documents Resulting from Inspection	2425459	Typographical Error in Calculation PCN-G0050A-13	
		2426668	Pipe Stress Calcs not Analyzed to Maximum Allowed Temperature	
		2427208	Inadequate Documentation - SW Shear Key Failure Evaluations	
		NCR 1676661	Missing Documentation of scaled model testing of the CST	
	Drawings	C24004	Inservice Inspection Isometric for Class II High Pressure Coolant Injection System	Rev. 2
		D-02041	Sht. 2, Piping Diagram, Service Water System	Rev. 67
		D-02041	Sht. 1, Piping Diagram, Service Water System	Rev. 65
		D-02529	Sht. 1, Piping Diagram, Reactor Core Isolation Cooling System	Rev. 62
		D-25023	Reactor Building High Pressure Coolant Injection System Piping Diagram	Rev. 61
		F-03026	Emergency Key One Line Diagram 4160V, 480V, 120/208V, 120/240V AC & 24/48V, 125/250V DC	Rev. 13
		F03006	Single Line Diagram 125/250V DC System Distribution Switchboard 2A & 2B	Rev.39
	Engineering Changes	416835	RWCU Valve 1-G31-F004 Replacement	7
		417289	Valve Data Sheet for 1-G31-F004	0

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		EC 054587	HPCI CST Vortexing Update	05/11/2007
		EC 055880	Evaluate LL3 Avoidance with RCIC Operation Post Scram	Rev.1
		EC 074364	RCIC Pump Performance Criteria Revision to OPT-10.1.1	Rev. 0
		EC 286411	Jet Air Assist Upgrades	Rev. 56
		EC 286413	Relay and Timing Upgrades	Rev. 62
		EC 295433,	Service Water Pump Replacement Master	Rev. 16
		EC 296794	Replace CST Low Water Level Transmitters	Rev. 8
		EC 400469	Service Water Pump Replacement Child EC	Rev. 5
		EC 408563	Emergency Diesel Generator No. 1 Sync Check Relay	Rev. 0
	Engineering Evaluations	8001818-ER-1	Evaluation of the Flywheel 2301A Governor Upgrade on Nordberg Model FS-1316-HSC EDG	02/08/2013
	Miscellaneous	AR 02144470	For Master EC 295433 – SW Pump Replacements	08/17/2017
		BN-16.0.1	RCIC System	Rev. 5
		CSD-EG-DEP-0106	AC and DC Overcurrent Protection and Coordination	0
		DBD-19	High Pressure Coolant Injection System	Rev. 27
		DBD-39	Emergency Diesel Generator and Supplemental Diesel Generator System	Rev. 28
		DBD-43	Service Water System	Rev.18
		DBD-46	Instrument Air & Service Air Systems	Rev. 19
		FP-3808	Battery Charger Manual	Rev. H
		FP-3902	Stationary Battery Manual	Rev. M
		PGB005-PR-01	Diesel Generator Governor Replacement Study for the Brunswick Nuclear Plant	8/13/2008
		QCE 02061145-01	1A NSW Pump Strainer Shear Pin Sheared	10/20/2016
		SD-43	Service Water System	Rev. 27
		Time Critical Operator Action Validation ASSD 1	RCIC In Service and Injecting into Reactor Pressure Vessel	11/25/2017
		Time Critical Operator Action	Battery Chargers are Re-Energized	09/25/2016

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		Validation SBO 2		
	Procedures	0AOP-18.0	NSW System Failure	Rev. 34
		0AOP-19.0	Conventional Service Water System Failure	030
		0AOP-19.0,	CSW System Failure	Rev. 30
		0AOP-20.0	Pneumatic (Air/Nitrogen) System Failures	Rev. 52
		0AOP-39.0	Loss of DC Power	052
		0ASSD-01	Alternative Safe Shutdown Procedure Index	41
		0ASSD-02	Control Building	60
		0EOP-01-ATWS	ATWS	000
		0EOP-01-FSG-16	Loss of All AC and DC Powered Injection	004
		0EOP-01-SBO-10	Battery Load Stripping	002
		0PT-08.2.2B	LPCI/RHR System Operability Test Loop B	03/22/2022
		0PT-09.2	HPCI System Operability Test	04/05/2022
		0PT-09.8	HPCI System Coupled Overspeed Trip Test	02/17/2020
		0PT-10.1.1	RCIC System Operability Test	04/05/2022
		0PT-10.1.3	RCIC System Operability Test Flowrates at 150 psig	04/03/2022
		0PT-10.1.8	RCIC System Valve Operability Test, Rev. 45,	01/12/2022
		0SMP-GOV001	Governor Dynamic Tunning	Rev. 2
		1EOP-01-SBO	Station Blackout	004
		1OP-16	RCIC System Operating Procedure	Rev. 93
		2OP-43	SWS Operating Procedure	Rev. 175
		2PT-24.1-2	SW Pump and Discharge Valve Operability Test, Rev. 89	03/17/22
		2PT-24.1-2	SW Pump and Discharge Valve Operability Test, Rev. 89	03/17/2022
		AD-OP-ALL-0205	Time Critical Actions/Time Sensitive Actions	2
		AD-PI-ALL-0100	Corrective Action Program	Rev. 26
		AD-PI-ALL-0400	Operating Experience Program	11
		AS-OP-BNP-0205	BNP Time Critical Actions/Time Sensitive Actions Supplement	0
		FP-61761	Valves and operators	AG
		OPT-51.7	RCIC System EOP Component Functional Test, Rev. 4	03/16/2020
	Work Orders	20066716-01, 20386029-02, 13527308-01,		

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		20410987-43, 20397484-05, 20397484-06, 20397581-05, 20411001-01, 20437889-03, 20465428-01, 20465428-02, 20483386-01, 20483386-02, 20495775-01, 20499261-01, 20499261-02, 20512084-01		