



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION II
245 PEACHTREE CENTER AVENUE N.E., SUITE 1200
ATLANTA, GEORGIA 30303-1200

September 26, 2022

Ms. Nicole Flippin
Site Vice President
Duke Energy Progress, LLC
3581 West Entrance Road
RNPA11
Hartsville, SC 29550

SUBJECT: H.B. ROBINSON STEAM ELECTRIC PLANT – DESIGN BASIS ASSURANCE
INSPECTION (TEAMS) INSPECTION REPORT 05000261/2022010

Dear Ms. Flippin:

On August 12, 2022, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at H.B. Robinson 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,

A handwritten signature in black ink, appearing to read "JB", with a horizontal line extending to the right.

Signed by Baptist, James
on 09/26/22

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

Docket No. 05000261
License No. DPR-23

Enclosure:
As stated

cc w/ encl: Distribution via LISTSERV

SUBJECT: H.B. ROBINSON STEAM ELECTRIC PLANT – DESIGN BASIS ASSURANCE
INSPECTION (TEAMS) INSPECTION REPORT 05000261/2022010 dated
September 26, 2022

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OFFICE	RII/DRS	RII/DRS	RII/DRS	RII/DRS	RII/DRS
NAME	T. Fanelli	C. Franklin	P. Braxton	J. Baptist	T. Su
DATE	9/26/2022	9/26/2022	9/26/2022	9/26/2022	9/26/2022

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

Docket Number: 05000261

License Number: DPR-23

Report Number: 05000261/2022010

Enterprise Identifier: I-2022-010-0049

Licensee: Duke Energy Progress, LLC

Facility: H.B. Robinson Steam Electric Plant

Location: Hartsville, SC

Inspection Dates: July 25, 2022 to August 12, 2022

Inspectors: P. Braxton, Reactor Inspector
T. Fanelli, Senior Reactor Inspector
R. Fanner, Reactor Inspector
C. Franklin, Reactor Inspector
W. Sherbin, Contractor
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 H.B. Robinson 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) (6 Samples)

- (1) Boron Injection Valves SI-870A & SI-870B
 - Design bases documents, system descriptions, and training documents
 - Primary design calculations
 - Normal, Abnormal, and Emergency Operating Procedures
 - Surveillance Test Procedures and Recent Results
 - Material Condition of Valves and Associated Equipment
 - Vendor Instruction Manuals
 - Corrective Action History and System Health Reports
 - Condition reports associated with component
 - Local Leak Rate Test Procedure and Recent Results

- (2) 480V-E1, 480V-E2, MCC-9
 - Compliance with UFSAR, TS and TS Bases
 - Material Condition and Configuration
 - Design Requirements
 - Environmental Conditions
 - Maintenance and Surveillance Test reviews
 - Protective relay setting and calibration

- (3) 125 VDC (Distribution Panel D-3) (Batteries or Inverters or Chargers)
 - verified adequacy of battery capacity
 - Verified short circuit calculations and protection capacity
 - Verified voltage drop calculations

- (4) Unit Service Water (SW) System, Including SW Pumps, Ultimate Heat Sink (UHS), and Deep Well Pump

For SW Pumps:

- Normal and Emergency Operating Procedures
- Surveillance Test Procedures and Recent Results
- Inservice Test Procedures and Recent Results
- Basis for Pump Test Acceptance Criteria, Including Instrument Uncertainty
- System Hydraulic Calculations Indicating Required SW Flow Criteria to Safety Related Heat Exchangers are Met
- Material Condition of Pumps and Associated Equipment
- Corrective Action History

For UHS (Lake Robinson):

- Calculation for Determining the Volume of Water Available to the SW Pumps for the Licensing Basis Time Requirement (22 Days)
- Technical Specification for Lake Level Requirement to Ensure SW Pumps' Suction Bell Submergence is Sufficient to Prevent Vortexing
- Discussions With Staff to Ensure Water Quality is Maintained

For Deep Well Pump:

- Procedure Used to Align Deep Well Pump in the Event That Lake Robinson Water Level is Lost
- Pump Surveillance Test Procedures and Recent Results

(5) Steam Driven Auxiliary Feedwater Pump

- Normal and Emergency Operating Procedures
- Surveillance Test Procedures and Recent Results
- Inservice Test Procedures and Recent Results
- Basis for Pump Test Acceptance Criteria, Including Instrument Uncertainty
- CST Level Instrumentation Setpoints Which Actuate Alarms to Notify Operators to Transfer AFW Suction Source from CST to Service Water
- Vortex Calculation for Pump Suction from CST
- Seismic Qualification of preferred AFW pump suction water source (CST)
- Material Condition of Pump and Associated Equipment
- Modification Performed to Install CST Bladder
- Corrective Action History

(6) Emergency Diesel Generator (EDG) Room Ventilation System

- Normal and Emergency Operating Procedures
- Surveillance Test Procedures and Recent Results
- EDG Room Heat Load Calculation Which Determines Ventilation Air Flow
- Ventilation Supply and Exhaust Fan Specifications
- Surveillance Test Procedures and Recent Results Which Verify Fan Operation During EDG Operation

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

- (1) Service Water Booster Pump A
 - Compliance with the Update Final Safety Analysis Report and the Technical Specifications
 - Primary design calculations
 - Normal, Abnormal, and Emergency Operating Procedures
 - Material condition and configuration
 - Surveillance test procedures and recent results
 - System health report
 - Normal and emergency operating procedures

Modification Review - Permanent Mods (IP Section 02.03) (4 Samples)

- (1) EC 277392, Modify SI-869, Si-870A/B To Conform to GL96-05 And the Jog
- (2) EC 0000402563 002, Provide Selective Coordination of 125VDC Power Supplies to Support NFPA 805 LAR
- (3) EC 407275 007, Child 3 of EC 284187 4kv bus 3 and 480V E2 Bus Outage
- (4) EC 417357/417864, EDG Day Tank Level Switches Design Change

Review of Operating Experience Issues (IP Section 02.06) (3 Samples)

- (1) Information Notice 2021-01 Lessons Learned from NRC Inspections of Design-Basis Capability of Power- Operated Valves at Nuclear Power Plants
- (2) Part 21 2019-11-00, 2021-07-00 and 01, AMETEK Solid state Controls Notification of Potential Defect
- (3) Information Notice 2016-09, Recent Issues Identified When Using Reverse Engineering Techniques in the Procurement of Safety-Related Components

INSPECTION RESULTS

No findings were identified.

EXIT MEETINGS AND DEBRIEFS

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

- On August 12, 2022, the inspectors presented the design basis assurance inspection (teams) inspection results to Nicole Flippin and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.21M	Calculations	16-025	NFPA 805 RNP Coordination Study	Rev.1
		52212-C-020	A-46 Relays Requiring System Consequence Review	Rev. 0
		52213-C-066	Atmosphere Storage Tanks-CST	Rev. 0
		84065-M-06-F	New Basis for CST Level Indication for CST Repair and Restoration - HBR Unit 2	Rev. 0
		HBR2-11260 SH00004	Zone Map for Environment Parameters Reactor Aux Bldg. EL. 242`-6" and 246`-0"	Rev. 5
		RNP-C/FLEX-0052	Seismic Fragility Analysis of the CST	Rev. 1
		RNP-E-2.009	Overcurrent Protection Emergency Bus E1 and E2 Emergency Supply	Rev. 3
		RNP-E-2.010	Overcurrent Protection Emergency Bus E1 and E2- Normal Supply	Rev. 3
		RNP-E-5.031	Cable Sizing for Battery Charger A-1	Rev. 0
		RNP-E-6.004	Short Circuit Calculation	Rev. 9
		RNP-E-6.005	Overcurrent Protection and Coordination of the 125 VDC Distribution System (Trains A and B)	Rev. 4
		RNP-E-8.002	AC Auxiliary Electrical Distribution System Voltage/Load Flow/Fault Current Study	Rev.10
		RNP-I/INST-1015	CST Level Uncertainty	Rev. 8
		RNP-M/HVAC-1064	A & B EDG Room Steady State Temperature	Rev. 1
		RNP-M/MECH-1461	Minimum SDAFW Pump Suction Pressure vs. CST Level	Rev. 0
		RNP-M/MECH-1424	Set Up Calculation for MOV SI-870A	Rev. 14
		RNP-M/MECH-1429	Set Up Calculation for MOV SI-870B	Rev. 14
		RNP-M/MECH-1519	Service Water System Operation with One Pump	Rev. 0
RNP-M/MECH-1645	Availability of Lake Robinson to Provide Ultimate Heat Sink Cooling	Rev. 13		
RNP-M/MECH-	Service Water System Hydraulic Evaluation	Rev. 4		

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		1653		
		RNP-M/MECH-1655	AFW ProtoFlow Model	Rev. 2
		RNP-M/MECH-1769	Deep Well Pump D Thermal Hydraulic Analyses	Rev. 4
		RNP-M/MECH-1802	Safety Related Pump Minimum Performance Requirements	Rev. 12
		RNP-M/MECH-1905	EPRI PPM Analysis For SI-869 SI-870A/B	Rev. 1
		RNP_E-6.020	Load Profile and Battery Sizing Calculation for Battery B	Rev. 9
	Corrective Action Documents	AR 02268696	AMETECK Solidstate Controls Inc. (Part 21) - Vendor Notification #53993, Part 21 Report - Overheating And Failure Of Transformers	04/23/2019
		AR 02391622	Unresolved Items on Battery Chargers	10/26/2021
		AR00423985, 02340607, 02342647, 02346091, 02401058, 02410961		
	Corrective Action Documents Resulting from Inspection	CAP 02436847	2022 DBAI: Errors in RNP-E/ELEC-1220 and RNP-E-5.031	08/04/2022
		CR 02437413	2022 DBAI: Error in Single Line Depiction for Calculation RNP-E-6.005, R4	08/09/2022
	Drawings	5379-01082 SH 1 - 5	Safety Injection System Flow Diagram	Rev. 50
		5379-05374	480V One Line Diagram	Rev. 32
		5379-2762	Diagrams - AUX. Feedwater Pump Start-Up	Rev. 15
		862-M-2005	CST Details, Bladder	Rev. C
		G-190197	Feedwater, Condensate, and Air Evacuation System	Rev. 75
		G-190199	Service and Cooling Water System	Rev. 87
		G-190199 SH7	Service And Cooling Water System Flow Diagram	Rev. 41
		G-1902040	Fuel Oil System	Rev. 1
	G-190304	HVAC-Turbine, Fuel, Aux., Reactor, & Radwaste Buildings	Rev. 66	

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		G-190626	125 V DC & Vital AC One Line Diagram	Rev. 27
		G-190626, Sheet 3	125V DC & 120V AC One Line Diagram	Rev. 25
		HBR2-11260	Zone Map for Environmental Parameters , Reactor Aux Bldg EL 242'6" and 246'-0", Sheet 4	Rev. 5
	Engineering Changes	EC 277392	Modify SI-869, SI-870A/B to Conform to GL 96-05 and the JOG	Rev. 13
		EC 402563	Provide Selective Coordination of 125VDC Power Supplies to Support NFPA 805 LAR	Rev. 2
		EC 417357	Replace EDG Day Tank "B" Level Control Switches	Rev. 3
		EC 90617	Connect FLEX Diesel to 125 VDC Battery Chargers	Rev. 51
		ESR # 95-00266	Replace EDG Day Tank "A" Level Control Switches	Rev. 1
		Mod 680	CST Sealing Bladder	04/08/85
	Miscellaneous	727-909-91	Gate and Globe Valve	Rev. 11
		728-562-71	SMB Valve Controls	Rev. 43
		728-812-46	Velan Valve Instruction Manual for Manual Valves: Installation, Operation, and Maintenance	Rev. 12
		738-523-20	Breakers, 480V, MCC Westinghouse	Rev.10
		762-209-181	Ametek Solidstate Controls Instruction Technical Manual 300 amp Battery Charger	Rev. 3
		AR 02377519-01	AMETEK Part 21 Notice for TVA Diodes	04/21/2021
		DBD/R87038/SD02	Design Basis Document Safety Injection System	Rev. 24
		DBD/R87038/SD16	SYS DBD- Electrical Power Distribution System	13
		DBD/R87038/SD32	SYS DBD - Auxiliary Feedwater System	Rev. 12
		LP-027	Feedwater System	Rev. 09
		ML13252A243	First Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses With Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)	08/28/2013
		ML14063A238	Second Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses With Regard to Requirements for Mitigation Strategies for	02/24/2014

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Beyond-Design-Basis External Events (Order Number EA-12-049)	
		ML16075A377	H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2 SAFETY EVALUATION REGARDING IMPLEMENTATION OF MITIGATING STRATEGIES AND RELIABLE SPENT FUEL INSTRUMENTATION RELATED TO ORDERS EA-12-049 AND EA-12-051 (CAC NOS. MF0720 AND MF0793)	03/31/2016
		RNP-E-2.019	MCC 5,6,9, and 10 Protective Devices	Rev. 14
		RNP-F/PSA-0133	Robinson Operator Action Risk Ranking	Rev. 000
		RNP2-E-0007	Specification for 125 Volt Battery Charger	Rev. 1
		RNPD/85-907	H. B. Robinson Region II Inspection Report	05/02/1985
		SD-016	480/120VAC Electrical Systems	Rev. 12
		SD-042	Auxiliary Feedwater System	Rev. 11
		SP-1609	FUKUSHIMA FLEX 4.2 DIESEL GENERATOR 1A AND 1B SITE ACCEPTANCE TEST	Rev. 2
		UFSAR	Updated Final Safety Analysis Report	Rev. 30
	Procedures	728-800-16	Worthington Co. Instructions for Installation & Operation of Centrifugal Pumps	Rev. 7
		AD-EG-ALL-1011	Engineering Technical Task Rigor: Pre-Job Brief, Risk Management and Post-Job Critique	Rev. 8
		AD-EG-ALL-1202	Preventive Maintenance and Surveillance Testing Administration	Rev. 11
		AD-OP-ALL-0204	Plant Status Control	Rev. 5
		AD-PI-ALL-0100	Corrective Action Program	Rev. 27
		CSD-EG-DEP-0106	AC and DC Overcurrent Protection and Coordination	Rev. 0
		EDP-001	4160 VAC Buses	Rev 11
		EDP-002	480 VAC Buses	Rev 19
		EDP-003	MCC Buses	Rev. 97
		EDP-006	Lighting Panels	Rev. 92
		EGR-NGGC-0106	AC and DC Overcurrent Protection and Coordination	Rev. 5

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		EOP E-0	Reactor Trip or Safety Injection	Rev. 11
		EPP-28	Loss of Ultimate Heat Sink	Rev. 22
		FSG-004	ELAP DC Load Shed/Management	Rev. 1
		OP-402	Auxiliary Feedwater System	Rev. 112
		OST-151-1	Safety Injection System Components Test Pump 'A'	Rev. 46
		OST-151-2	Safety Injection System Components Test Pump 'B'	Rev. 42
		OST-151-3	Safety Injection System Components Test Pump 'C'	Rev. 43
		OST-151-4	Comprehensive Flow Test for Safety Injection Pump 'A'	Rev. 30
		OST-151-5	Comprehensive Flow Test for Safety Injection Pump 'B'	Rev. 28
		OST-151-6	Comprehensive Flow Test for Safety Injection Pump 'C'	Rev. 26
		OST-154	Safety Injection System High Head Check Valve Test	Rev. 53
		OST-160	Pressure Isolation Check Valve Back Leakage Test	Rev. 53
		OST-303-1	Service Water Booster Pump A Test	Rev. 29
		OST-453	Fukushima FLEX 4.2 Diesel Generator 1A and 1B Surveillance Test	Rev. 9
		PIC-805	Westinghouse Type CV-7 Undervoltage Relays	Rev. 19
	Work Orders	20106087, 20327494, 20145768-01, 20152000-01, 20182465-01, 2021243-01, 20370563-01, 20371486-01, 20410693-01, 20416978-03, 01800271, 2051481101, 204851145, 011180093		
		WO 20072906 01	Clean/Inspect MCC-6(10C) (SDAFW Pump Aux Oil Pump)	01/30/2018
		WO 20321807 01	Megger Motor From MCC-6(10C) (SDAFW Pump Aux Oil Pump)	11/12/20

