



UNITED STATES
NUCLEAR REGULATORY COMMISSION

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

June 2, 2021

Mr. John A. Krakuszeski
Site Vice President
Brunswick Steam Electric Plant
Duke Energy Progress, LLC
8470 River Rd. SE (M/C BNP001)
Southport, NC 28461

SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 & 2 – DESIGN BASIS
ASSURANCE INSPECTION (PROGRAMS) INSPECTION REPORT
05000324/2021011 AND 05000325/2021011

Dear Mr. Krakuszeski:

On April 30, 2021, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Brunswick Steam Electric Plant, Units 1 & 2. On May 27, 2021, the NRC inspectors discussed the results of this inspection with Mr. Jay Ratliff, Plant General Manager, 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,

/RA/

James B. Baptist, Chief
Engineering Branch 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, UNITS 1 & 2 – DESIGN BASIS
 ASSURANCE INSPECTION (PROGRAMS) INSPECTION REPORT
 05000324/2021011 AND 05000325/2021011 dated June 2, 2021

ADAMS ACCESSION NUMBER: ML21154A045

<input type="checkbox"/> SUNSI Review		<input type="checkbox"/> Non-Sensitive <input type="checkbox"/> Sensitive		<input type="checkbox"/> Publicly Available <input type="checkbox"/> Non-Publicly Available	
OFFICE	RII/DRS	RII/DRS	RII/DRS	RII/DRS	
NAME	M. Greenleaf	G. Ottenberg	N. Hansing	J. Baptist	
DATE	5/27/2021	5/27/2021	5/27/2021	6/2/2021	

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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: 05000324/2021011 and 05000325/2021011

Enterprise Identifier: I-2021-011-0009

Licensee: Duke Energy Progress, LLC

Facility: Brunswick Steam Electric Plant, Units 1 & 2

Location: Southport, NC

Inspection Dates: April 12, 2021 to April 30, 2021

Inspectors: M. Greenleaf, Reactor Inspector
N. Hansing, Materials Engineer
G. Ottenberg, Senior Reactor Inspector

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 Brunswick Steam Electric Plant, Units 1 & 2, 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

Type	Issue Number	Title	Report Section	Status
URI	05000325,05000324/20 21011-01	Potential Inappropriate 10 CFR 50, Appendix J, Type C Test Exclusion	71111.21N.02	Open

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.

Starting on March 20, 2020, in response to the National Emergency declared by the President of the United States on the public health risks of the coronavirus (COVID-19), inspectors were directed to begin telework. In addition, regional baseline inspections were evaluated to determine if all or portion of the objectives and requirements stated in the IP could be performed remotely. If the inspections could be performed remotely, they were conducted per the applicable IP. In some cases, portions of an IP were completed remotely and on site. The inspections documented below met the objectives and requirements for completion of the IP.

REACTOR SAFETY

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

POV Review (IP Section 03) (9 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.
- 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) 1-E41-F006, High Pressure Coolant Injection (HPCI) Injection Valve
- (2) 2-E41-F001, HPCI Turbine Steam Supply Valve
- (3) 2-B21-F022A, Inboard Main Steam Isolation Valve 'A'
- (4) 1-E11-F007B, Residual Heat Removal (RHR) Minimum Flow Bypass Valve to Suppression Pool
- (5) 2-E11-F048A, RHR Heat Exchanger '2A' Bypass Valve
- (6) 2-E11-F020B, RHR Pump '2B' & '2D' Suppression Pool Suction Valve
- (7) 1-C41-F004A & B, Standby Liquid Control Explosive Squib Valves
- (8) 1-G31-F001, Reactor Water Cleanup Inlet Line Inboard Isolation Valve
- (9) 1-G16-F020, Drywell Equipment Drain Outboard Isolation Valve

INSPECTION RESULTS

Unresolved Item (Open)	Potential Inappropriate 10 CFR 50, Appendix J, Type C Test Exclusion URI 05000325,05000324/2021011-01	71111.21 N.02
<p><u>Description:</u> An unresolved item (URI) was identified related to the licensee's exclusion of the HPCI injection valves, 1(2)-E41-F006, from local leak rate testing. Engineering Change (EC) 417109, "Evaluation of Penetrations and Valves Eligible for Appendix J Local Leak Rate Testing Exclusion," dated March 2, 2020, evaluated Brunswick's Appendix J program to determine if the exclusion criteria contained in NEI 94-01, "Industry Guideline for Implementing Performance-Based Option of 10 CFR 50, Appendix J," revision 3A, could be applied such that certain valves may be excluded from 10 CFR 50, Appendix J, Type C testing. Among the valves excluded by the EC were the HPCI injection valves, 1(2)-E41-F006, which constitute a portion of the outboard isolation boundary for primary containment penetrations X-9A. The licensee's technical basis for the valves' removal from the Appendix J test program requirements was located in a vendor report, "Local Leak Rate Testing Scope Reduction for HPCI, RCIC, RHR, RCR, CS, RWCU, RCC and RNA Systems Technical Specification 5.5.12, 'Primary Containment Leakage Rate Testing Program' Brunswick Steam Electric Plant, Units 1 and 2," revision 2. Upon review of the vendor's report, the inspectors were uncertain that the conclusion that "1(2)-E41-F006 are primary containment boundaries that DO NOT constitute primary containment atmospheric pathways during and following a DBA" was technically supported.</p> <p>Test procedure OPT-20.3-B21, "Local Leakrate Testing for Feedwater System," revision 13, indicates that 1(2)-E41-F006 were removed from the Appendix J program via PRR# 2362917 following implementation of EC 417109. If the vendor's evaluation was not technically correct, removal of the HPCI valves from the Appendix J testing program by updating the test procedure to remove the HPCI valves, could have constituted a violation of 10 CFR 50, Appendix B, Criterion III, Design Control, which required that, "measures shall be established to assure that applicable regulatory requirements and the design basis, as defined in in § 50.2 and as specified in the license application, for those structures, systems, and components to which this appendix applies are correctly translated into specifications, drawings, procedures, and instructions." The inspectors believed at the time of the inspection that, if inappropriately excluded from the test procedure and if left uncorrected, the removal of the valves from the Appendix J test program could result in the valve seat leakage rate degrading past the point of acceptability.</p> <p>Planned Closure Actions: The inspectors asked the licensee several additional questions to verify the appropriateness of the removal of the HPCI valves from the test program, however, due to resource limitations the questions have not been addressed as of the time of this inspection report issuance. The URI is opened pending determination of whether or not a violation exists. The licensee's response to the inspector questions will assist in this determination.</p> <p>Licensee Actions: If it is determined that the valves should not have been removed from the 10 CFR 50, Appendix J test program, the Unit 1 valve (1-E41-F006) would be due to be tested under OPT-20.3-B21 by March 4, 2022. Therefore, no immediate action for the 1-E41-F006 valve was required. As a result of its removal from the test procedure, the Unit 2 valve (2-E41-F006) was not tested during the most recent refueling outage, B2R25 in 2021, but had been tested every outage prior. The other valves associated with the penetration were local leak rate tested during B2R25 and had acceptable results. In response to the inspector's</p>		

concern, the licensee reviewed the historical performance of the 2-E41-F006 valve to determine if the allowances of 10 CFR 50, Appendix J, Option B would have been able to be utilized. The licensee determined that the test interval extension criteria in station procedures would have been met and would have allowed for an extension until B2R27 (2025). Therefore, no immediate action for the 2-E41-F006 valve was required.

Corrective Action References: NCR 02384029, "DBAI POV Inspection Unresolved Issue (URI) initiated"

EXIT MEETINGS AND DEBRIEFS

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

- On May 27, 2021, the inspectors presented the design basis assurance inspection (programs) inspection results to Mr. Jay Ratliff, Plant General Manager, and other members of the licensee staff.
- On April 29, 2021, the inspectors presented the initial inspection results to Mr. John Krakuszeski, Site Vice President, and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.21N.02	Calculations	0E41-0003	Seismic Qualification 1/2E41-F006	Rev. 1
		0SLC-0001	SLC Solution Design Requirements	Rev. 4
		2SEIS-0019	Valve #2-B21-F013C, -F022a, -F028A, -F028B, -F028C, -F028D & 2-E41-F002 Interaction Resolution	Rev. 0
		3397C	Justification of Applicability of the EPRI Performance Prediction Methodology to the Sentinel Gate Valve	Rev. 0
		95135-C-104	Design Report and Weak Weak Link Analysis for MOVs E41-F001	Rev. 0
		95135-C-14	Seismic Weak Link Assessment MOV(s) 1/2-G31-F001 & F004	Rev. 4
		95135-C-17	Seismic Weak Link Assessment MOV(s) 1/2-E41-F006	Rev. 1
		95135-C-35	SEISMIC WEAK LINK TORQUE CALCULATION MOV(S) 1 & 2-E1 1-F020A & B	Rev. 1
		BNP-E-5.047	Cable Impedance Calculation for Brunswick Units 1 & 2	Rev. 1
		BNP-E-6.032	Unit 2 DC Valve Overload Relay Heater Sizing	Rev. 10
		BNP-E-6.033	Unit 1 DC Valve Overload Relay Heater Sizing	Rev. 11
		BNP-E-6.109	Unit 1 Stroke Time and Motor Torque Calculation for 250 VDC Safety Related Motor Operated Valves	Rev. 14
		BNP-E-6.110	Unit 2 Stroke Time and Motor Torque Calculation for 250 VDC Safety Related Motor Operated Valves	Rev. 15
		BNP-E-6.120	125/250 VDC System Battery Load Study	Rev. 14
		BNP-E-7.002	AC Auxiliary Electrical Distribution System Voltage / Load Flow/Fault Current Study	Rev. 15
		BNP-E-8.013	Motor Torque Analysis for AC Motor Operated Valves	Rev. 21
		BNP-E-8.014	Motor Torque Analysis for AC Motor Operated Valves	Rev. 22
		BNP-MECH-1-G16-F020-AO	AOV Setup Calculation for 1-G16-F020-AO Drywell Equipment Drain Outboard Isolation Valve	Rev. 0
		BNP-MECH-95-07-A	Initial Screening of BNP Power-Operated Valves in Accordance with Generic Letter 95-07	Rev. 1
		BNP-MECH-95-07-B	Review of the Potential for Pressure Locking or Thermal Binding of BNP Gate Valves in Accordance with Generic	Rev. 4

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Letter 95-07	
		BNP-MECH-AOV-DP-MS	Functional Evaluation of 1/2-B21-F022A-D-AO and 1/2-B21-F028A-D-AO Main Steam Isolation Valves	Rev. 2
		BNP-MECH-AOV-SCOPE	BNP AOV PROGRAM SCOPE	Rev. 3
		BNP-MECH-E11-F007A/B	Mechanical Analysis and Calculations for 1 & 2-E11-F007A/B RHR Minimum Flow Valves	Rev. 8
		BNP-MECH-E11-F020A/B	MECHANICAL ANALYSIS AND CALCULATIONS FOR 1/2-E11-F020A/B RHR PUMP SUPPRESSION POOL SUCTION VALVES	Rev. 7
		BNP-MECH-E11-F048A/B	Mechanical Analysis and Calculations for 1 & 2-E11-F048A/B RHR Heat Exchanger Bypass	Rev. 6
		BNP-MECH-E41-F001	MECHANICAL ANALYSIS AND CALCULATIONS FOR 1/2-E41-F001 HIGH PRESSURE COOLANT INJECTION TURBINE STEAM ADMISSION VALVE	Rev. 008
		BNP-MECH-E41-F006	MECHANICAL ANALYSIS AND CALCULATIONS FOR 1/2-E41-F006 HIGH PRESSURE COOLANT INJECTION VALVE	Rev. 008
		BNP-MECH-G31-F001	MECHANICAL ANALYSIS AND CALCULATIONS OF 1 & 2 G31-F001 RWCU INBOARD ISOLATION VALVES	Rev. 9
		BNP-MECH-MOV-DP	Mechanical Analysis and Calculations for Differential Pressure Calculations for all GL 89-10 and GL 96-05 MOVs	Rev. 9
		BNP-MECH-MOV-ROL	Review of BNP "As Tested" ROL Data & Determination of ROL Values to Be Used for GL 98-10 Motor-Operated Valves	Rev. 3
		BNP-MECH-MOV-SF	Review of BNP Test Data to Establish Bounding Stem Factors for BNP GL 89-10 Motor-Operated Valves	Rev. 4
		BNP-MECH-MOV-TRANSIENT THERMAL	Determination of Transient Thermal Response for BNP GL 89-10 & GL 96-05 Motor-Operated Valves	Rev. 1
		BNP-MECH-MOV-UNW	Review of BNP "As Tested" Unwedging Data & Validation of EPRI Unwedging PPM Models BNP GL 89-10 Motor-	Rev. 0

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Operated Valves	
		BNP-MECH-MOV-VF	Review of BNP "As Tested" Valve Factors & Determination of VF Values to be Used for BNP GL 89-10 Motor-Operated Valves	Rev. 7
		BNP-PSA-104	BNP Air-Operated Valve, Motor-Operated Valve, and Check Valve PRA Risk Significance	Rev. 000
		DPC-1381.05-00-0109	Thermal Analysis of the Steady-State Heat Rise Inside Limatorque Actuator Limit Switch Compartments Considering Energized Resistance Heaters – A Finite Element Study for Brunswick Nuclear Plant	Rev. 0
		DR 83.010	Anchor/Darling Valve Analysis	11/14/1983
	Corrective Action Documents	PRR 02362917, NCR 738146, NCR 02073255, NCR 02061877, NCR 02008039, LTAM BNP-14-0079, NCR 677459, OCR 677459, AR 592594-04, NCR 1952454, NCR 1953768, NCR 2010083, NCR 2323669, NCR 2377405, AR 102321, NCR 2281433, NCR 02073255, NCR 02188317, NCR 02281433, NCR 02291385, NCR 02291132		
	Corrective Action	AR 0050917 Task	Evaluat SLD for ball screw stems	04/26/2021

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Documents Resulting from Inspection	46		
		NCR 02378217	2021 POV: Source for Wedge Angle Not Sited (sic) in Calculations	04/13/2021
		NCR 02379355	IST Program Classification of Valves	04/21/2021
		NCR 02379361	2021 POV: Incorrect Angle Assumption in BNP-MECH-G31-F001	04/21/2021
		NCR 02379828	2021 POV: BNP-MECH-G31-F001(4) Not in Compl. w/ AD-EG-1415	04/26/2021
		NCR 02379927	POV Inspection - MOV Program documentation error on JOG Class	04/26/2021
		NCR 02380090	2021 POV: BNP-E-8.013 and 8.014 Torque Calculation Error	04/27/2021
		NCR 02380224	DBAI POV UFSAR not Updated for AST	04/28/2021
		NCR 02380258	2021 POV: Stem Lub. Degradation Term Requires Change	04/28/2021
		NCR 02380339	2021 POV: NRC POV DBAI SLC Sys Inclusion in EQ Prog	04/28/2021
		NCR 02384029	DBAI POV Inspection Unresolved Issue (URI) initiated	05/26/2021
	Drawings	0-FP-05101	Isolation Valve Primary Steam	Rev. B
		0-FP-06006	24" - 150# GATE VALVE MOTOR OPERATED	Rev. C
		0-FP-06094	Unit 1 & 2 Philadelphia Gear Corp Limatorque Valve Control	Rev. C
		0-FP-06152	Anchor 4" 300# Gate Valve	Rev. M
		0-FP-06156	20" 300# Bolted Globe Valve	Rev. J
		0-FP-06894	3"-150# GATE VALVE C.S.	Rev. D
		0-FP-82679 Sheet 1	14"-900 Weld Ends Carbon Steel Double Disc Gate Valve with Limatorque SB-2-60 Actuator with Ballscrew Assembly	Rev. B
		0-FP-82805 SHT 1	Units 1 & 2 Anchor/Darling Valve Company 6"-900 Double Disc Gate Valve	Rev. A
		0-FP-85548 SH0001	20 X 5 MSIV ACTUATOR	Rev. 00E
0-FP-85548 SHT 2	20 x 5 MSIV Actuator	Rev. C		

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		0-FP-85548 SHT 3	20 x 5 MSIV Actuator Ralph A. Hiller Company	Rev. B
		0-FP-85548 SHT 4	20 x 5 MSIV Actuator	Rev. C
		0-FP-85548 SHT 5	20 x 5 MSIV Actuator	Rev. C
		0-FP-85548 SHT 6	20 x 5 MSIV Actuator	Rev. C
		0-FP-87720 SH0001	Crane 10 x 8 x 10 Sentinel Gate Valve 1-E41-F001/ 2-E41-F001	Rev. B
		0-FP-87747 SHT 1	Limatorque Actuator Model No. SMB-2	Rev. A
		0-FP-88781 SH0001	PILOT CONTROL THREE VALVE MANIFOLD	Rev. 00A
		1-FP-50017	Residual Heat Removal System Elementary Wiring Diagram - Sht. 16	Rev. 27
		1-FP-55109 SHT 7	NUCLEAR STEAM SUPPLY SHUT OFF SYSYTEM ELEMENTARY DIAGRAM	Rev. M
		1-FP-55109, SH 14	ELEM DIAG NUCLEAR STEAM SUPPLY SHUTOFF SYS UNIT 1	Rev. M
		1-FP-81745	Reactor Building High Pressure Coolant Inject Limatorque Valve Control-SMB-3 Unit No 1	Rev. 0
		2-FP-50056	Unit 2 Nuclear Steam Supply Shutoff System Elementary Diagram	Rev. J
		2-FP-55013 SHT 2	Unit 2 Rockwell International Mainsteam Isolation Valve	Rev. C
		2-FP-55013 Sht 3	Unit 2 Rockwell International Mainsteam Isolation Valve List of Material	Rev. B
		2-FP-81134	MSIV Limit Switch Bracket Detail	Rev. A
		BN-19.0.1	High Pressure Coolant Injection (HPCI) System	Rev. 04
		D-02040 SH0001A	CONDENSATE DEMINERALIZED WATER TRANSFER SYSTEMS PIPING DIAGRAM	Rev. 041
		D-02521 SH0001B	Reactor Building Nuclear Steam Supply System Piping Diagram	Rev. 052

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		D-02523 SH0002	REACTOR BUILDING HIGH PRESSURE COOLANT INJECTION SYSTEM PIPING DIAGRAM	Rev. 054
		D-02523 SHT 1	REACTOR BUILDING HIGH PRESSURE COOLANT INJECTION SYSTEM PIPING DIAGRAM	Rev. 59
		D-02525 SH0001B	REACTOR BUILDING RESIDUAL HEAT REMOVAL SYSTEM PIPING DIAGRAM	Rev. 72
		D-02526 SH0002A	REACTOR BUILDING RESIDUAL HEAT REMOVAL SYSTEM PIPING DIAGRAM	Rev. 57
		D-02526 SH0002B	REACTOR BUILDING RESIDUAL HEAT REMOVAL SYSTEM PIPING DIAGRAM	Rev. 84
		D-02700	Reactor Building Instrument Air System Plan at 20' - 0" & Sections - Sheet No. 2 Unit No. 2	Rev. 17
		D-04219	Nuclear Safety Capability Assessment High Press. Coolant Injection System (HPCI)	Rev. 14
		D-07007	Reactor Building Instrument Air Supply System Piping Diagram	Rev. 35
		D-25021 SH0001C	Reactor Building Nuclear Steam Supply System Piping Diagram	Rev. 48
		D-25023-SH0001	Reactor Building High Pressure Coolant Injection System Piping Diagram	Rev. 61
		D-25023-SH0002	Reactor Building High Pressure Coolant Injection System Piping Diagram	Rev. 54
		D-25026	Reactor Building Residual Heat Removal System Piping Diagram - Sht. 0002B	Rev. 72
		D-25026	Reactor Building Residual Heat Removal System Piping Diagram - Sht. 2A	Rev. 63
		D-25027 SH0001B	UNIT NO. 1 REACTOR BUILDING REACTOR WATER CLEAN-UP SYSTEM PIPING DIAGRAM	Rev. 47
		D-25045 SH0003A	REACTOR BUILDING DRYWELL DRAINS PIPING DIAGRAM	Rev. 42
		D-25047	Reactor Building Standby Liquid Control System Piping Diagram	Rev. 34
		D-70029 SH0002A	Reactor Building Instrument Air Supply System Piping Diagram	Rev. 38

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		F-02993	Unit 2 Reactor Building E.Q. Zone Maps - Sht. 1	Rev. 3
		F-02993	Reactor Building E.Q. Zone Maps - Sht. 2	Rev. 6
		F-07268	Reactor Building Instr. Air Piping Installation Detail Sheet 2	Rev. 9
		F-29093	Unit 1 Reactor Building E.Q. Zone Maps - Sht. 4	Rev. 2
		F-29093	Unit 1 Reactor Building E.Q. Zone Maps - Sht. 3	Rev. 2
		F-7212	Reactor Building Instrument Air Piping Primary Containment Plan Below Elev. 38' - 4 & 45' - 0 Unit No. 2 Sheet No. 3	Rev. 8
		FS DW-25078 SHT 4	Piping Isometric- BLDG: Reactor System: Reactor Water Cleanup Elev: 50'-0"	Rev. 4
		LL-09236	RHR Heat Exchanger "2A" Bypass Valve 2-E11-F048A Control Wiring Diagram - Sht. 75	Rev. 7
		LL-09237 SHT 91	MCC "2XB"- COMPT. "2-DN6" RHR Suppression Pool Suction Valve 2-E11-F020B Control Wiring Diagram	Rev. 15
		LL-09237 SHT 91A	MCC "2XB"- COMPT. "2-DN6" RHR Suppression Pool Suction Valve 2-E11-F020B Control Wiring Diagram	Rev. 3
		LL-09272 SHT 31	MCC "2XDA" - COMPT. "2-B21" HPCI Steam Supply Valve to Turbine 2-E41-F001 Control Wiring Diagram	Rev. 13
		LL-92037	MCC "1XB" Compt. "1-DL3" RHR Pump 1B Minimum Flow Bypass Valve 1-E11-F007B Control Wiring Diagram - Sht. 48	Rev. 11
		LL-92038 SHT 46	Unit No. 1' MCC "1XC" COMPT "1-DT9" RWCU Inboard Isol Valve 1-G31-F001 Control Wiring Diagram	Rev. 12
		LL-92043	MCC "1XG" - Compartment "1-EG6" Standby Liquid Control Pump 1A - 1-C41-C001A Control Wiring Diagram - Sht. 18	Rev. 7
		LL-92072 SH. 23	Unit No. 1 MCC "1XDA" Compt "B17" HPCI Pump Discharge Valve 1-E41-F006 Control Wiring Diagram	Rev. 13
		Engineering Changes	EC 250516	Unit 1 SLC Boron Concentration Change for EPUR
EC 250522	SLC Squib Valve Shelf Plus Service Life Extension		Rev. 0	
EC 290843	Flowserve Anchor Darling Double-Disc Gate Valve wedge pin		Rev. 0	
EC 294179	Replace E41-F001 with Crane Sentinel Valve		Rev. 3	

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		EC 295980	Change MSIV Function to Require Both Air and Spring to Close	Rev. 0
		EC 296885	HPCI Valve Replacement	Rev. 4
		EC 401998	Acceptability of Reducing Stroke Length of 2-E11-F020B	Rev. 0
		EC 407614	Acceptability of Reducing Stroke Length of E11-F020 Valves	Rev. 0
		EC 417109	EVALUATION OF PENETRATIONS AND VALVES ELIGIBLE FOR APPENDIX J LOCAL LEAK RATE TESTING EXCLUSION	Rev. 0
		EC 50522	SLC Squib Valve Shelf Plus Service Life Extension	Rev. 0
		EC 59983	MSIV accumulator system upgrade to safety-related	Rev, 0
		ESR 9500589	LIMIT SEAT VALVES TO IMPROVE LLRT REPEATABILITY	Rev. 0
		ESR 98-00069	Replace Motor 1-G31-F001 to Increase Torque	Rev. 1
	Engineering Evaluations	0BNP-TR-003	Motor Operated Valve (MOV) Scoping GL 89-10 And GL 96-05	Rev. 3
		0BNP-TR-006	Motor Operated Valve (MOV) Design Basis Information GL 89-10 & GL 96-05	Rev. 8
		2-B21-F022A PTE 2015	Post Test Evaluation of AOV Diagnostics for 2-B21-F022A, Test Date 3/19/15	04/15/2015
		DR-227	Environmental Qualification Service Conditions	Rev. 21
		ESR 97-00604	Resolution of Open Items from EQ DR 227	Rev. 0
		ESR-96-00709	Q-Class A Components Excluded from the EQ Program	Rev. 0
	Miscellaneous		BNP AOV Calculation Basis Document	Rev. 1
		1-E41-F006 B120R1 PTE	MOV Post-Test Data Review Worksheet for 1-E41-F006 Test Date 03/08/14	03/31/14
		2-B21-F022 CofC	Certificate of Compliance from Rockwell	12/15/1970
		2-E41-F001 Certificate	Certification to Contract Specifications from Anchor Valve Company for 2-E41-F001	Undated
		2-E41-F001 PTE	MOV Post-Test Data Review Worksheet for 2-E41-F001 Test Date 03/24/19	03/29/19
		248-118	GATE, GLOBE AND CHECK VALVES	Rev. 5
		248-163	PROCUREMENT OF MAIN STEAM ISOLATION VALVES	Rev. 003

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		50-325/00-02 and 50-324/00-02	NRC Integrated Inspection Report Nos. 50-325/00-02 and 50-324/00-02	04/25/2000
		93164-01	Motor Operated Valve (MOV) Structural & Weak Link Evaluation - Methodology	Rev. 0
		9811020153	Generic Letter 96-05, "Periodic Verification of Design Basis Capability of Safety-Related Motor-Operated Valves" Commitment to Topical Report NEDC-32719, Revision 2	10/27/1998
		BSEP 01-0009	Generic Letter 89-10 Motor-Operated Valve Program Status After Completion of Commitments	01/15/2001
		BSEP 01-0063	Request for License Amendments Alternative Radiological Source Term	08/01/2001
		BSEP 01-0166	Response to Request for Additional Information Regarding Request for License Amendments - Extended Power Uprate	03/12/2002
		BSEP 06-0051	Response to the NRC Generic Letter 95-07, "Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves"	02/13/1996
		BSEP 16-0056 (ML16257A418)	Request for License Amendment Regarding Core Flow Operating Range Expansion	09/06/2016
		BSEP 97-0408	Generic Letter 89-10 Motor-Operated Valve Program Status	10/02/1997
		BSEP 98-0058	Generic Letter 89-10 Motor-Operated Valve Program Commitments Related to Program Closure	02/20/1998
		BSEP-00-0194	Response to Request for Additional Information Regarding Generic Letter 96-05, "Periodic Verification of Design-Basis Capability of Safety-Related Power-Operated Valves"	12/20/1999
		BWROG-8727	GE Licensing Topical Report NEDE-31096-P-A and NEDE-31096-A, "Anticipated Transients Without SCRAM Response to NRC ATWS Rule, 10CFR50.62", Dated February 1987	06/12/1987
		CSD-EG-BNP-1720	BNP IST Program Plan - 5th Interval	Rev. 2

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		DBD-05	Standby Liquid Control System	Rev. 14
		DBD-12	PRIMARY CONTAINMENT ISOLATION SYSTEM	Rev. 9
		DBD-17	Residual Heat Removal System	Rev. 29
		DBD-19	High Pressure Coolant Injection System	Rev. 027
		DBD-23	CONTAINMENT PENETRATIONS SYSTEM	Rev. 9
		Design Report Nos. 12 and 13	Design Basis for Engineered Safety Features and Generation and Consequences of Turbine Missiles	03/29/1972
		DR 17.1	Qualification of EA740 Series Limit Switches for Use in Nuclear Power Plants in Compliance with IEEE Standards 323-1974, 382-1972 and 344-1975	Rev. 0
		DR 17.4	Supplement 02 to QTR111 Generic Qualification of Series EA740 Limit Switches: Qualification By Similarity Presentation to Support the Change of Contact Block/Carrier Material	Rev. 0
		DR 257	LIMITORQUE CORPORATION REPORT No. B0212 NUCLEAR POWER STATION QUALIFICATION TYPE TEST FOR LIMITORQUE VALVE ACTUATORS WITH TYPE LR MOTOR FOR WESTINGHOUSE PWR	Rev. 0
		DR 265	General Electric Test Report No. NEDC-31344 Environmental Qualification Report on MSIV Limit Switches for Nine Mile Point Nuclear Station Unit 2	Rev. 0
		DR 274	General Electric Report No. NEDC 32370P Environmental Qualification Report for Carolina Power & Light Brunswick Unit 1 & 2 Main Steam Isolation Valve (MSIC) Solenoid Valve Cluster Assembly (SVCA) with Automatic Valve Corp (AVC) Solenoid Valves	Rev. 1
		DR 4.3	Final Report on the Evaluation of the Qualification of the Limatorque SMB Series MOV with Class B or Better AC or DC Motors with Melamine or Phenolic Switches in the BSEP Reactor Building Provided by the Limatorque Corporation for Use in Carolina Power and Light Company's Brunswick Steam Electric Plant	Rev. A
		DR 80.1	NAMCO REPORT QTR 140-GENERIC QUALIFICATION OF SERIES EA 740 SWITCHES (WITH SUPPLEMENT)	Rev. 002

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		DR 80.9	NAMCO TEST REPORT NO. QTR 180: GENERIC QUALIFICATION OF EA 740-SERIEW LIMIT SWITCHES FOR USE IN NUCLEAR POWER PLANT CLASS 1E APPLICATIONS	Rev. 001
		DR-259	General Electric Test Report NEDC-31051 River Bend Station Unit 1 Environmental Qualification Report (NUREG 0588, Category 1) Volumes 1 & 2	Rev. 0
		EPRI TR-103232	EPRI MOV Performance Prediction Program Stem Thrust Prediction Method for Anchor/Darling Double Disc Gate Valves	dated November 1994
		FP-20243	Valve Operators	Rev. 0AD
		FP-50554	Valves, Main Steam Isolation	Rev. AB
		FP-61761	VALVES AND OPERATORS	Rev. 0AF
		FP-82621	ACTUATORS, VALVE	Rev. 00M
		FP-82808	SWING CHECK, GATE VALVES; SINGLE & DOUBLE DISC VALVES	Rev. G
		FP-87721	CRANE SENTINEL BOLTED BONNET GATE VALVE	Rev. A
		GE 21A9230	Procurement and Design Specification GE Main Steam Isolation Valves	Rev. 2
		LDCR 03FSAR-040	E41-F042 PCIV Function Update	dated 02/04/2004
		M20205F215	Response to Request for Additional Information Regarding Generic Letter 95-07, "Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves" (TAC Nos. M93439 and M93440)	03/31/1999
		ML003711034	Safety Evaluation of Licensee Response to Generic Letter 96-05, Brunswick Steam Electric Plant, Unit Nos. 1 and 2 (TAC M97023 and M97024)	05/03/2000
		ML003712627	Brunswick 1 and 2 - Completion of Licensing Action for Generic Letter 96-05, "Periodic Verification of Design-Basis Capability of Safety-Related Motor-Operated Valves" (TAC Nos. M97023 and M97024)	05/08/2000
		ML14178B034	Revised Date for Completion of NEI Initiative Addressed in NE 96-05	04/10/1997

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		ML14188A815	Supplemental Response to Generic Letter 89-10: Clarifications on Motor-Operated Valve Program	06/06/1991
		ML20014D829	Second Request for Additional Information - Generic Letter 95-07, "Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves," Brunswick Steam Electric Plant, Units 1 and 2 (TAC Nos. M93439 and M93440)	12/04/1998
		ML20065S582	Response to NRC Generic Letter 89-10, Supplement 3	12/17/1990
		ML20072N412	Generic Letter 89-10: Motor-Operated Valves	08/23/1994
		ML20073M613	US NRC Inspection Report Nos. 50-325/94-20 and 50-324/94-20	09/21/1994
		ML20076M985	Supplemental Response to NRC Generic Letter 89-10, Supplement 3	03/20/1991
		ML20077G551	Request for Additional Information Re: Generic Letter (GL) 89-10, Supplement 3, "Consideration of the Results of NRC-Sponsored Tests of Motor-Operated Valves" - Brunswick Steam Electric Plant, Units 1 and 2 (TAC Nos. 77768 and 77769)	06/25/1991
		ML20086P598	Inspection Report: 50-325/91-31 and 50-324/91-31	12/12/1991
		ML20091B821	Response to NRC Request for Additional Information Regarding CP&L Response to NRC Generic Letter 89-10, Supplement 3	07/29/1991
		ML20092M512	File: B09-12510C, Response to NRC Inspection 91-31	02/24/1992
		ML20093K310	Response to the NRC Staff Request for Information Regarding NRC Generic Letter 95-07, "Pressure Locking and Thermal Binding of Safety-Related Power Operated Gate Valves"	10/16/1995
		ML20095C924	Response to the NRC Staff Request for Information Within 180 Days for NRC Generic Letter 95-07, "Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves"	12/06/1995
		ML20107L516	Response to the NRC Generic Letter 95-07, "Pressure Locking and Thermal Binding of Safety-Related Motor-Operated Gate Valves"	04/26/1996

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		ML20113B086	Response to NRC Generic Letter 95-07, "Pressure Locking and Thermal Binding of Safety-Related Motor-Operated Gate Valves"	06/20/1996
		ML20117G371	Request for Additional Information - Generic Letter 95-07, "Pressure Locking and Thermal Binding of Safety-Related Motor-Operated Gate Valves," Brunswick Steam Electric Plant, Units 1 and 2 (TAC Nos. M93439 and M93440)	05/16/1996
		ML20134N054	Response to Generic Letter 96-05, "Periodic Verification of Design-Basis Capability of Safety-Related Valves"	11/18/1996
		ML20136H370	Request of Additional Information Regarding Generic Letter 96-05 Program at Brunswick (TAC Nos. M97023 and M97024)	02/25/1999
		ML20137C040	Response to NRC Generic Letter 96-05, "Periodic Verification of Design-Basis Capability of Safety-Related Motor-Operated Valves"	03/17/1997
		ML20198L044	Request for Additional Information Regarding Generic Letter 95-07, "Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves" - Brunswick Steam Electric Plant, Unit No. 1 and 2 (TAC Nos. M93439 and M93440)	12/21/1998
		ML20199C227	NRC Integrated Inspection Report Nos. 50-325/97-11 50-324/97-11 Notice of Violation	10/27/1997
		ML20202E432	1998 BSEP Generic Letter 89-10 Motor-Operated Valve Program "End-of-Year" Status	01/27/1999
		ML20216H288	NRC Integrated Inspection Report Nos 50-325/98-03, 50-324/98-03	04/13/1998
		ML993160030	Response to Request for Additional Information Regarding Generic Letter 95-07, "Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves" (TAC Nos. M93439 and M93440)	11/03/1999
		ML993250087	Safety Evaluation of Licensee Response to Generic Letter 95-07, "Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves," Brunswick Steam Electric Plant, Units 1 and 2 (TAC Nos. M93340 and	11/10/1999

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			M93440)	
		ML993410457	Safety Evaluation of Response to Generic Letter 95-07, "Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves," Brunswick Steam Electric Plant, Units 1 and 2 (TAC Nos. M93439 and M93440)	12/03/1999
		MOV Stem Lubricant Aging Research	INEEL Presentation	dated 01/15/2003
		NUREG/CP-0152, Volume 5	EPRI MOV Stem Lubricant Test Program, Frictional Performance of Exxon Nebula and MOV Long Life in a Stem Lubrication Application, John Hosler	NUREG/CP-0152, Volume 5
		QDP 103	MAIN STEAM ISOLATION VALVE (MSIV) SOLENOID VALVE CLUSTER ASSEMBLY WITH AVC SOLENOID VALVES	Rev. 011
		QDP 29B	LIMITORQUE MOTOR OPERATED VALVES (MOVS) WITH CLASS H (TYPE RH) INSULATED DC MOTORS	Rev. 14
		QDP 48	NAMCO EA740 SERIES LIMIT SWITCHES	Rev. 016
		RA-17-0053	Anchor Darling Double Disc Gate Valve Information and Status	12/20/2017
		RAL-1029	Design Report for Carolina Power and Light Co. Brunswick Units 1 and 2 Size 24 x 20 x 24 Fig. 1612 JMMNY Main Steam Isolation Valve	Rev. 4
		Rate of Loading Flowserve Test Program	2003 MUG Presentation	dated 2003
		SD-19	HIGH PRESSURE COOLANT INJECTION (HPCI) SYSTEM	Rev. 025
	Procedures	0AP-019	Licensing Document Changes	Rev. 5
		0BNP-TR-008	Inservice Inspection/ Testing Guideline	Rev. 13
		0CM-AO519	MILLER FLUID POWER VALVE OPERATORS, MODEL A61-B	Rev. 3
		0CM-MO500	Repair Instructions for Model SMB-5T Limitorque Motor Operator	Rev. 15
		0CM-MO501	Limitorque Model Numbers SMB-0 Through 4, SMB-4T,	Rev. 28

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			and SB-0 Through SB-4	
		0CM-MO502	Repair Instructions for Limitorque Motor Operators Model Number SMB-000	Rev. 24
		0CM-MO503	Limitorque Motor Operators Model Number SMB-00 and SB-00	Rev. 19
		0CM-MO506	Limitorque Operator Types HBC-0 Through HBC-6	Rev. 20
		0CM-MO507	Removal and Installation of SMB/SB Type Limitorque Operators	Rev. 24
		0ENP-16.8	Containment Leakage Tracking	Rev. 31
		0ENP-646	Post Test Evaluation and AOV Diagnostics	Rev. 3
		0PLP-20	Post-Maintenance Testing Program	Rev. 53
		0PM-AO014	Air Operated Valve Diagnostic Testing	Rev. 4
		0PM-MO009	AC and DC Limitorque Motor Operated Valve Preventative Maintenance Procedure	Rev. 21
		0PM-MO504	Mechanical Inspection and Lubrication of Limitorque Operators	Rev. 46
		0PT-06.1	Standby Liquid Control System Operability Test	Rev. 89
		0PT-08.2.2B	LPCI/RHR System Operability Test - Loop B	Rev. 109
		0PT-09.7	HPCI System Valve Operability Test	Rev. 039
		0PT-11.3	DRYWELL DRAINS SYSTEM VALVE OPERABILITY TEST	Rev. 32
		0PT-12/1A 006A	No. 1 Diesel Generator LOOP/LOCA Loading Test	Rev. 0
		0PT-14.6	REACTOR WATER CLEANUP SYSTEM OPERABILITY TEST	Rev. 33 completed 03/12/2020
		0PT-20.3-B21	Local Leakrate Testing for Feedwater System	Rev. 13
		0PT-25.1	Nuclear Steam Supply System Main Steam Isolation Valve Operability Test	Rev. 038
		0PT-40.2.8	Main Steam Isolation Valve Closure Test	Rev. 035
		AD-EG-ALL-1013	Conduct of Plant Engineering	Rev. 4
		AD-EG-ALL-1107	Quality Classifications	Rev. 5
		AD-EG-ALL-1110	Design Review Requirements	Rev. 9
		AD-EG-ALL-1117	Design Analyses and Calculations	Rev. 8

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		AD-EG-ALL-1202	Preventive Maintenance and Surveillance Testing Administration	Rev. 10
		AD-EG-ALL-1415	Motor Operated Valve Performance Prediction, Actuator Settings, and Diagnostic Test Data Reconciliation	Rev. 0
		AD-EG-ALL-1431	Air Operated Valve Scope and Categorization	Rev. 2
		AD-EG-ALL-1432	Air Operated Valve Design Basis Review	Rev. 1
		AD-EG-ALL-1433	Air Operated Valve Testing Requirements	Rev. 2
		AD-EG-ALL-1434	Air Operated Valve Tracking and Trending Requirements	Rev. SUP
		AD-EG-ALL-1450	Preconditioning of Structures, Systems and Components	Rev. 0
		AD-EG-ALL-1612	Environmental Qualification (EQ) Program	Rev. 7
		AD-LS-ALL-0005	UFSAR Updates	Rev. 8
		AD-LS-ALL-0018	Evaluating and reporting of Defects and Noncompliance in Accordance with 10 CFR 21	Rev. 2
		AD-PI-ALL-0100	Corrective Action Program	Rev. 25
		BNP-PSA-104	BNP Air-Operated Valve, Motor-Operated Valve, and Check Valve PRA Risk Significance	Rev. 0
		CSD-EG-BNP-1720	BNP IST Program Plan - 5th Interval	Rev. 2
		CSD-EG-DEP-0101	Electrical Calculation of Motor Output Torque for AC and DC Motor Operated Valves (MOVs)	Rev. 0
		CSD-EG-DEP-0359	Motor Operated Valve Structural Evaluation	Rev. 0
		EGR-NGGC-0101	Electrical Calculation of Motor Output Torque for AC and DC Motor Operated Valves (MOVs)	Rev. 4
		MNT-NGGC-0010	Installation and Use of Teledyne/ Quiklook Equipment for MOV Diagnostic Testing	Rev. SUP
		OENP-646	POST TEST EVALUATION OF AOV DIAGNOSTICS, 1-G16-F020 B1R23 (2020)	Rev. 3, completed 03/30/2020
		OPT-08.2.28	LPCI/RHR SYSTEM OPERABILITY TEST - LOOP 8	Rev. 109 completed 12/31/2020
		PD-EG-ALL-1430	Air Operated Valve Program	Rev. 2
		TE-EG-ALL-1413	MOV Design Database Control, Calculation and	Rev. 1

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Diagnostic Test Instruction Development, and Test Data Evaluation/Trending	
		TE-MN-ALL-0100	Installation and Use of Teledyne / Quiklook Equipment for MOV Diagnostic Testing	Rev. 1
		TE-MN-ALL-0101	Installation of Teledyne Quikstem Sensors (QSS), Smartstems and Easy Torque Thrust Sensors (ETT)	Rev. 1
	Work Orders	WO 20026517, WO 12299262, WO 20456657-01, WO 20137934-01, WO 20255313 02, WO 20347641-05, WO 20067488-06, WO 20017784, WO 2075075-01, WO 20017784-21, WO 20193678-01, WO 1596071, WO 11596071, WO 12280049, WO 20193678-01, WO 20071746-01, WO 13384285-01, WO 2075944-01, WO 20243017-09, WO 20219747-01, WO 20219747-03, WO 20219747-		

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		10, WO 20029439 -01, WO 20176606, WO 20340163, WO 20438847		