



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

January 5, 2017

William R. Gideon
Site Vice President
Brunswick Steam Electric Plant
8470 River Rd. SE (M/C BNP001)
Southport, NC 28461

**SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT – NRC COMPONENT DESIGN
BASES INSPECTION REPORT 05000325/2016007 AND 05000324/2016007**

Dear Mr. Gideon:

On December 15, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Brunswick Steam Electric Plant, Units 1 and 2 and discussed the results of this inspection with Mr. Karl Moser 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, 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 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.: 05000325, 05000324
License Nos.: DPR-71, DPR-62

Enclosure:
Inspection Report 05000325/2016007
and 05000324/2016007
w/Attachment: Supplemental Information

cc: Distribution via Listserv

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ADAMS: Yes ACCESSION NUMBER: _____ SUNSI REVIEW COMPLETE FORM 665 ATTACHED

OFFICE	RII:DRS	RII:DRS	NRR:DSS/SBP	CONTRACTOR	CONTRACTOR	RII:DRS	RII:DRP
SIGNATURE	RNP1 VIA EMAIL	MCG9 VIA EMAIL	VIA EMAIL	VIA EMAIL	VIA EMAIL	EJS2	SDR2
NAME	RPATTERSON	MGREENLEAF	LWHEELER	CBARON	SKOBYLARZ	ESTAMM	SROSE
DATE	1/4/2017	1/3/2017	1/3/2017	12/30/2016	12/30/2016	1/4/2017	1/5/2017
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
OFFICE	RII:DRS						
SIGNATURE	JHB1						
NAME	JBARTLEY						
DATE	1/5/2017						
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

Letter to Mr. William R. Gideon from Mr. Jonathan H. Bartley dated January 5, 2017.

SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT – NRC COMPONENT DESIGN
BASES INSPECTION REPORT 05000325/2016007 AND 05000324/2016007

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**U.S. NUCLEAR REGULATORY COMMISSION
REGION II**

Dockets: 50-325, 50-324

Licenses: DPR-71, DPR-62

Report Nos.: 05000325/2016007, 05000324/2016007

Licensee: Duke Energy Progress, Inc.

Facility: Brunswick Steam Electric Plant, Units 1 & 2

Location: Southport, NC

Dates: November 14, 2016 – December 15, 2016

Team Leader: E. Stamm, Senior Reactor Inspector, Engineering Branch 1

Inspectors: R. Patterson, Reactor Inspector, Engineering Branch 1
M. Greenleaf, Reactor Inspector, Engineering Branch 1
L. Wheeler, Reactor Systems Engineer, NRR

Accompanying Personnel: C. Baron, Contractor, Beckman and Associates
S. Kobylarz, Contractor, Beckman and Associates

Approved By: Jonathan H. Bartley, Branch Chief
Engineering Branch 1

Enclosure

SUMMARY

IR 05000325/2016-007 and 05000324/2016-007; 11/14/2016 – 12/15/2016; Brunswick Steam Electric Plant, Units 1 & 2; Component Design Bases Inspection.

The inspection activities described in this report were performed between November 14, 2016, and December 15, 2016, by three inspectors from the NRC's Region II office, one inspector from the NRC's Office of Nuclear Reactor Regulation, and two NRC contract personnel. The significance of inspection findings are indicated by their color (i.e., greater than Green, or Green, White, Yellow, or Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," (SDP) dated April 29, 2015. Cross-cutting aspects are determined using IMC 0310, "Aspects Within the Cross-Cutting Areas," dated December 4, 2014. All violations of NRC requirements were dispositioned in accordance with the NRC's Enforcement Policy dated February 4, 2015. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 5.

No findings were identified.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R21. Component Design Basis Inspection (71111.21)

1. Inspection Sample Selection Process

The team selected risk-significant components and related operator actions for review using information contained in the licensee's probabilistic risk assessment. In general, this included risk significant structures, systems, and components (SSCs) that had a risk achievement worth factor greater than 1.3 or Birnbaum value greater than 1E-6. The sample included 15 SSCs, 2 SSCs associated with containment large early release frequency (LERF), and 3 operating experience (OE) items.

The team performed a margin assessment and a detailed review of the selected risk-significant components and associated operator actions, to verify that the design bases had been correctly implemented and maintained. Where possible, this margin was determined by the review of the design basis, and Updated Final Safety Analysis Report (UFSAR). This margin assessment also considered original design issues, margin reductions due to modifications, or margin reductions identified because of material condition issues. Equipment reliability issues were also considered in the selection of components for a detailed review. These reliability issues included items related to failed performance test results, significant corrective action, repeated maintenance, maintenance rule status, Inspection Manual Chapter (IMC) 0326 conditions, NRC resident inspector input regarding problem equipment, system health reports, industry OE, and licensee problem equipment lists. Consideration was also given to the uniqueness and complexity of the design, OE, and the available defense-in-depth margins. An overall summary of the reviews performed, and the specific inspection findings identified, are included in the following sections of the report.

2. Component Reviews

a. Inspection Scope

SSCs

- Unit 2 main steam safety relief valves
- Residual heat removal motor-operated valve 1-E11-F068B
- Nuclear service water pump strainers
- Residual heat removal motor-operated valves 1-E11-F015A/B
- Unit 1 residual heat removal heat exchangers
- Residual heat removal motor-operated valves 2-E11-F008/9
- Unit 2 conventional service water pumps
- Emergency diesel generator #3 governor
- 2A-2 battery
- 2A-1 battery charger
- Nuclear service water pump 2B breaker E4-AL1

- Unit 2 conventional service water pump motors
- Emergency diesel generator #3 load sequencing timing relays
- Emergency bus undervoltage relays
- 480V motor control centers 2PA and 2XB

Components with LERF Implications

- Unit 2 control rod drive mechanisms
- Avco scram solenoid valves

For the components listed above, the team reviewed the plant technical specifications (TSs), UFSAR, design bases documents, and drawings to establish an overall understanding of the design bases of the components. Design calculations and procedures were reviewed to verify that the design and licensing bases had been appropriately translated into these documents. Test procedures and recent test results were reviewed against design bases documents, to verify that acceptance criteria for tested parameters were supported by calculations or other engineering documents, and that individual tests and analyses served to validate component operation under accident conditions.

Maintenance procedures were reviewed to ensure components were appropriately included in the licensee's preventive maintenance (PM) program. System modifications, vendor documentation, system health reports, preventive and corrective maintenance history, and corrective action program (CAP) documents were reviewed (as applicable), in order to verify that the performance capability of the component was not negatively impacted, and that potential degradation was monitored or prevented. Maintenance Rule information was reviewed to verify that the component was properly scoped, and that appropriate PM was being performed to justify current Maintenance Rule status. Component walkdowns and interviews were conducted to verify that the installed configurations would support their design and licensing bases functions under accident conditions, and had been maintained to be consistent with design assumptions.

Additionally, the team performed the following specific reviews or evaluations:

- The team reviewed the periodic testing of control circuits associated with motor-operated valve 1-E11-F015A to verify that the valve interlocks were fully tested.
- The team reviewed the plant's response to a Mode 3 loss of coolant accident during shutdown cooling operations to verify the response of motor-operated valve 1-E11-F015A as well as plant operating procedures.
- The team reviewed the licensing basis, operating procedures, and accident analysis with regard to small break loss of coolant accident mitigation strategy.
- The team reviewed the plant time critical operator actions procedure to verify that selected information was correctly translated from calculations to the procedure.
- The team reviewed motor control center maintenance procedures and the results of periodic maintenance to verify the adequacy of the cable and conduit seals provided to limit moisture intrusion during design basis environmental conditions at motor control center 2XB.

- The team observed a simulator scenario involving time critical operator actions to manually emergency depressurize the reactor vessel following a reactor scram followed by a complete loss of all high pressure water sources to verify the actions could be accomplished as relied upon in design assumptions and the Probabilistic Safety Assessment.
- The team reviewed local manual actions required to align motor control centers 2XB and 2XB-2 for a postulated fire in the main control room.
- The team observed local manual actions required to transfer direct current (DC) control power during a loss of DC power event.
- The team observed local manual actions required to maximize Unit 2 control rod drive flow with the reactor building accessible in accordance with emergency operating procedures.
- The team observed local manual actions required to vent the Unit 2 scram air header for alternate control rod insertion in accordance with emergency operating procedures.
- The team observed local manual actions required to de-energize the 125 volt DC battery charger 1B-1 in accordance with operating procedures.

b. Findings

No findings were identified.

3. Results of Reviews for Operating Experience

a. Inspection Scope

The team reviewed three operating experience issues for applicability at the Brunswick Plant. The team performed an independent review for these issues and, where applicable, assessed the licensee's evaluation and disposition of each item. The issues that received a detailed review by the team included:

- NRC Information Notice 2005-30, "Safe Shutdown Potentially Challenged By Unanalyzed Internal Flooding Events And Inadequate Design"
- NRC Information Notice 2008-11, "Service Water System Degradation at Brunswick Steam Plant Unit 1"
- NRC Information Notice 2013-14, "Potential Design Deficiency in Motor-Operated Valve Control Circuitry"

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA6 Meetings, Including Exit

On December 15, 2016, the team presented the inspection results to Mr. Karl Moser and other members of the licensee staff. Proprietary information that was reviewed during the inspection was returned to the licensee or destroyed in accordance with prescribed controls.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

K. Allen, Director, Design Engineering
J. Anderson, Manager, Electrical Design Engineering
S. Boyce, Nuclear Ops Specialist
J. Brady, Nuclear Licensing Consultant
J. Bryant, Senior Nuclear Engineer
T. Byrne, Nuclear Licensing Consultant
K. Call, Manager, Electrical Systems Engineering
R. Gideon, Vice President – BNP
D. Goins, Manager, Mechanical Design Engineering
L. Grzeck, Manager, Nuclear Regulatory Affairs
E. Hoerhke, Plant Operator
D. Kronebusch, Plant Operator
K. Moser, Plant General Manager
J. Nolin, General Manager, Engineering
A. Pope, Director, Organizational Effectiveness
E. Ram, Training Supervisor
W. Richardson, Manager, Mechanical Systems Engineering
M. Roberts, Operations Trainer
W. Rogers, Programs Engineering
T. Sellers, Plant Operator
N. Smith, Manager, I&C Design Engineering
D. Watson, Plant Operator
B. Wooten, Assistant Operations Manager

NRC Personnel

M. Catts, Senior Resident Inspector, Brunswick
M. Schweig, Resident Inspector, Brunswick

LIST OF DOCUMENTS REVIEWED

Calculations

<u>Number</u>	<u>Title</u>	<u>Rev./Date</u>
0B21-0199	ECCS Analysis Results	Rev. 6
0MISCEL-1037	Containment Temperature Response Evaluations	Rev. 3
0RNA-0001	Instrument Air Nitrogen Backup System Volume Requirements	Rev. 3
8S42-P-101	Station Blackout Coping Analysis Report	Rev. 14
BNP-E-2.002	480 Volt AC Safety-Related Motor Operated Valves (MOV's) Electrical Protection	Rev. 9
BNP-E-2.007	Unit 2 480V Vital MCC Calculations	Rev. 14
BNP-E-6.120	125/250 VDC System Battery Load Study	Rev. 8
BNP-E-6.121	Electrical Analysis for Safety Related DC Circuits	Rev. 5
BNP-E-7.002	AC Auxiliary Electrical Distribution System for Voltage/Load Flow/Fault Current Study	Rev. 11
BNP-E-7.010	Emergency Diesel Generator Static & Dynamic Load Study	Rev. 14
BNP-E-7.011	Station Blackout Load Study	Rev. 6
BNP-E-8.010	AC Coordination Study	Rev. 19
BNP-E-8.013	Motor Torque Analysis For AC Motor Operated Valves	Rev. 12
BNP-E-8.014	Motor Torque Analysis For AC Motor Operated Valves	Rev. 11
BNP-MECH-E11-F009	Mechanical Analysis and Calculations for 1/2-E11-F009 Shutdown Cooling Inboard Suction Isolation Valves	Rev. 6
BNP-MECH-RBER-001	Reactor Building Environmental Report	Rev. 1
BNP-PSA-062	PRA Model System Notebooks	Rev. 11
G0050A-10	Unit 1 Service Water Hydraulic Analysis	Rev. 11
G0050A-10	Design Performance Curve, Attachment 13	Rev. 13
G0050A-12	Unit 2 Service Water Hydraulic Analysis	Rev. 9
G0050A-12	BNP Unit No. 2 Service Water Hydraulic Analysis	Rev. 11
M-89-0008	Heat Balance on EDG Jacket Water Cooler	Rev. 2

M-89-0011	RHR SW Heat Exchanger Heat Transfer Calculation	Rev. 5
OSW-0096	Calculation for Tube Plugging and Fouling of Service Water Safety Related Heat Exchangers	Rev. 0

Drawings

<u>Number</u>	<u>Title</u>	<u>Rev./Date</u>
0-FP-06842	Double R/L Butterfly Valve	Rev. 0
0-FP-81351	W/S ANSI Class I50 Flanged Valve	Rev. 0
0-FP-86026	Wafer Sphere Butterfly Valve	Rev. 0
1-FP-05889	Elementary Diagram - Core Spray System, Sheet 1	Rev. P
1-FP-05889	Elementary Diagram - Core Spray System, Sheet 2	Rev. Y
1-FP-50017	Elementary Diagram - RHR System, Sheet 4	Rev. S
1-FP-50017	Elementary Diagram - RHR System, Sheet 7	Rev. R
D-02494	Pneumatic Nitrogen System Piping & Instrumentation Diagram	Rev. 9
D-02516	Rx Building CRD Hydraulic System Piping	Rev. 30
D-02517	Rx Building Control Rod Drive System Piping	Rev. 29
D-02521	RB Nuclear Steam Supply System Piping Diagram, Sheet 1A	Rev. 43 & Rev. 52
D-02537-1	Unit 2 Service Water Flow Diagram	Rev. 97
D-02537-2	Unit 2 Service Water Flow Diagram	Rev. 92
D-07007	RB Instrument Air Supply System Piping Diagram	Rev. 35
D-07029	RB Instrument Air Supply System Piping Diagram	Rev. 48
D-07368	RB Instrument Air Backup Nitrogen Backup Piping Diagram	Rev. 19
D-6793	Reactor Building Main Steam Piping Plan	Rev. 4
F-02845	Reactor Building Composite Piping	Rev. 5
F-03043	230KV, 24KV & 4160 Volt Systems Key One Line Diagram	Rev. 39
F-03050	480 Volt System MCC-2XB, 2XB-2, 2XD, 2XF, 2XH, 2XK & 2XM	Rev. 92
F-03053	480 Volt System MCC 2CA, 2CB, 2PA, 2PB & 2SA Auxiliary One Line Diagram	Rev. 71
F-03527	Reactor Building – Unit No. 2 Plan – Trays and Conduits Elevation 20'-0" – East	Rev. 84

LL-09254	Unit No. 2 – MCC “2PA” – Compt. “2-E05” Service Water Conv. Hdr. Pump 2A Strainer 2-SW-2A-CONV-PMP-STR Control Wiring Diagram	Rev. 8
LL-92036	Unit No. 1-MCC “1YA-2 – Compt. “1-DF3” RHR Inboard Valve 1-E11-F015A Control Wiring Diagram, Sheet 57	Rev. 12
LL-92036	Unit 1 1-MCC “1XA” – Compt. “1-DF6” RHR Drywell Spray Inboard Isol. Vlv. 1-E11-F021A Control Wiring Diagram, Sheet 63	Rev. 8
LL-92037	MCC “1XB” Compt. “1-DN1” RHR Contain. Clg. Heat Exch. Disch. Vlv. 1-E11-PDV-F068B Control Wiring Diagram, Sheet 81	Rev. 16
NN-SI3069-500	Wafer Sphere Valve	4/14/1994

Design Basis Documents

<u>Number</u>	<u>Title</u>	<u>Rev./Date</u>
DBD-17	Residual Heat Removal System	Rev. 27
DBD-20	ADS	Rev. 9
DBD-39	Emergency Diesel Generator and Supplemental Diesel Generator Systems	Rev. 20 and Rev. 21
DBD-43	Service Water System	Rev. 16
DBD-50	AC Electrical System	Rev. 15
DBD-51	DC Electrical System	Rev. 12

Procedures

<u>Number</u>	<u>Title</u>	<u>Rev./Date</u>
0AOP-36.1	Loss of Any 4160V Buses or 480V E-Buses	Rev. 69
0ENP-2704	Administrative Control of NRC Generic Letter 89-13 Requirements	Rev. 24
0EOP-01-LEP-01	Alternate Coolant Injection	Rev. 34
0-EOP-02-PCCP	Primary Containment Control	Rev. 12
0-EOP-0-EDP	Emergency Depressurization	Rev. 6
0MST-RHR21Q	Maintenance Surveillance Test	Rev. 7
0MST-RHR22Q	Maintenance Surveillance Test	Rev. 11
0MST-RHR23Q	Maintenance Surveillance Test	Rev. 8
0OI-03.11	Auxiliary Operator U0 Outside Electronic Rounds	Rev. 8
0PIC-TMR009	Calibration of Struthers-Dunn Time Delay Relays	Rev. 3

0PM-BAT004A	125VDC Plant Battery Link Cleaning	Rev. 9
0PM-BAT004B	125VDC Plant Battery Connection Resistance Test	Rev. 1
0PT-01.14A	Equipment and Instrument Checks	3/13/2016
0PT-01.14A	Equipment and Instrument Checks	8/21/2016
0PT-08.1.4A	RHR Service Water System Operability Test - LOOP A	Rev. 85
0PT-08.1.4B	RHR Service Water System Operability Test - LOOP B	Rev. 74
0PT-14.2.1	Single Rod Scram Insertion Times Test	3/21/2016
1-EOP-01-SBO	Station Blackout	Rev. 1
1MST-PCIS43R	PCIS Group 8 Isol Logic Sys Func Test and RHR Assd Test	Rev. 6
1MST-RHR27Q	RHR Shutdown Cooling Rx Press Inst Chan Cal	Rev. 12
1MST-RHR41AR	RHR-LPCI LOOP 'A' Logic Sys Func Test	Rev. 5
1MST-RHR41BR	RHR-LPCI LOOP 'B' Logic Sys Func Test	Rev. 4
1OP-17	LPCI	Rev. 129
1OP-43	Service Water System Operating Procedure	Rev. 125
1PT-24.1-1	Service Water Discharge Valve Operability Test	7/27/2016
1PT-24.1-1	Service Water Discharge Valve Operability Test	1/23/2016
2EOP-01-RSP	Reactor Scram	Rev. 16
2-EOP-01-RVCP	Reactor Vessel Control	Rev. 10
2MST-BAT11AFY	125 VDC Battery 2A-1 Modified Performance Capacity Test	Rev. 5
2MST-BAT11CQ	125 VDC Battery 2A-2 Quarterly Operability Test	Rev. 4
2MST-RHR27R	RHR and CS Time Delay Relays Chan Cal and Functional Test	Rev. 17
2OP-08	Control Rod Drive Hydraulic System Operating Procedure	Rev. 104
2OP-17	Residual Heat Removal System Operating Procedure	Rev. 175
2PT-24.1-2	SWP and Discharge Valve Operability Test	7/8/2011
2PT-24.1-2	SWP and Discharge Valve Operability Test	6/19/2015
AD-EG-ALL-1132	Preparation and Control of Design Change Engineering Changes	Rev. 6
AD-EG-ALL-1176	Preparation of Engineering Documents	Rev. 0
AD-EG-ALL-1202	Preventative Maintenance and Surveillance Testing Administration	Rev. 4
AD-PI-ALL-0400	Operating Experience Program	Rev. 2
AD-PI-ALL-0401	Significant Operating Experience Program	Rev. 3

EGR-NGCC-0156	Environmental Qualification of Electrical Equipment Important to Safety	Rev. SUP
EGR-NGGC-0005	Engineering Change	Rev. 38
EGR-NGGC-0009	Engineering Change Product Selection and Initiation	Rev. 7
EGR-NGGC-0028	Engineering Evaluation	Rev. 2
NGG-PMB-BAT-01	NGG Equipment Reliability Template, Battery – Flooded Lead-Acid and Nickel-Cadmium	Rev. 1
OAP-064	Time Critical Operator Actions	Rev. 0
OPM-MCC002	Preventive Maintenance of GE Motor Control Centers and Switchboards	Rev. 27
OPM-MCC002	Preventive Maintenance of GE Motor Control Centers and Switchboards	Rev. 23
OPM-MCC002	Preventive Maintenance of GE Motor Control Centers and Switchboards	Rev. 14
OPS-NGGC-1314	Standing Instruction 16-034	12/1/2016

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Rev./Date</u>
2045	System Health Report - Residual Heat Removal	Q2 - 2016
3250	System Health Report - ADS/Safety Relief Valves	Q3 - 2016
598294	Root Cause Evaluation Report	Rev. 3
0BNP-M-0019	Control Rod Drive System Hydraulic Control Unit SCRAM Solenoid Pilot Valves (SSPV's)	Rev. 2
0CM-VSR509	Main Steam Relief Valve Target Rock Model 7576 Air Operator and Pilot Assembly, Inspection, and Reassembly	Rev. 21
0-FP-03102	Data Sheet No. 9527-01-128-4, Sh. 0001	Rev. 2
0PT-01.14A	Equipment and Instrument Channel Checks	Rev. 31
0PT-11.1.2	Automatic Depressurization System and Safety Relief Valves Operability Test Unit 1	4/5/2015
0PT-11.1.2	Automatic Depressurization System and Safety Relief Valves Operability Test Unit 2	3/24/2016
0PT-19.5	Nuclear Steam System Safety/Relief Valve Testing Unit 1	7/14/2014
0PT-19.5	Nuclear Steam System Safety/Relief Valve Testing Unit 2	4/4/2015
0PT-19.5	Nuclear Steam System Safety/Relief Valve Testing Unit 2	6/1/2015
0PT-19.5	Nuclear Steam System Safety/Relief Valve Testing Unit 1	8/30/2016

5095/5100	System Health Report - Emergency Diesel Generators and Auxiliaries	Q2 - 2016
AD-TQ-ALL-0320	Development of Simulator Training and Evaluation Guides	Rev. 1
AD-TQ-ALL-0430	Development and Administration of Job Performance Measures	Rev. 0
ANP-3369NP	AREVA- Brunswick Unit 2 Cycle 22 Reload Safety Analysis	Rev. 0
AR 01988822	2016 BNP Component Design Basis Inspection (CDBI) Readiness Assessment	8/18/2016
AR-224408	Adverse Condition Investigation	Rev. 0
BNP-PSA-034	PRA Model Human Reliability Analysis	Rev. 14
BSEP 16-0014	Request for License Amendment – Reactor Protection System (RPS) Electrical Protection Assembly (EPA) Electric Power Monitoring Surveillance Requirements (SR) 3.3.8.2.2 and 3.3.8.2.3	N/A
BWROG-TP-07-019	Guide for HCU Preventative Maintenance	Rev. 1
BWROG-TP-08-019	Standard for Selecting CRDS During Refueling	Rev. 2
CR737292	Apparent Cause Evaluation Report, BNP Unit 2 Cycle 21 SRV's did not Meet TSSR 3.4.3.1	Rev. 0
DR-296	Nuclear Environmental Qualification Test Report for Automatic Valve (AV) SCRAM Solenoid Pilot Valves - Model Number B7122-145	Rev. 0
EC 279468	EDG Governor Replacement Modification	Rev. 36
EC 286413	EDG Margin Improvement Plan – Relay and Timing Upgrades	Rev. 59
EC 294459	Evaluation of Input Voltages for Station Battery Chargers (Ref. AR 634054)	Rev. 0
EC 295433	SW Pump Replacement Change	Rev. 4
EC 403788	Failure of a Single 27E1 or 27E2 E-Bus Undervoltage Relay Effects on Operability	Rev. 0
EC 406855	NSW Pump 2A Allowance for DP Limits	Rev. 0
EGR-NGGC-0006	CRDM Vendor Manual	Rev. 3
ESR 96-00112	Eval. Installation of SRV Pilot Valves with Modified Disks	Rev. 0
ESR 98-00061	Conduit Hubs Used In Top of MCC's	Rev. 0
FA-351025504-1	Failure Analysis for Duke Energy – Brunswick Nuclear Plant NCN-17 Battery	Rev. 0
FP-3808	Charger - Battery	Rev. H

FP-3902	Battery - Stationary	Rev. M
FP-81098	Valves - Solenoid Operated	Rev. X
FP-82223	Valves, Butterfly and Actuators	Rev. R
FP-86584	Relays - Control and Time Delay	Rev. A
FP-8842	Motor Control Centers GE 7700 Line GEH-2614F	Rev. F
IN 88-30	Target Rock Two Stage SRV Setpoint Drift	5/25/1988
JPM- AOT-OJT- JP-302-G01	Loss of DC Power – Transfer DC Control Power	Rev. 5
JPM AOT-OJT- JP-304-20	Align MCC 2XB and 2XB-2 per Assd-02 (U2 RB MCC Operator)	Rev. 0
JPM- AOT-OJT- JP-510-A04	De-Energizing 125 VDC Battery Charger 1(2) B01	Rev. 6
JPM-AOT-OJT- JP-300-J05	Alternate Control Rod Insertion – LEP-02, Venting the Scram Air Header	Rev. 8
JPM-AOT-OJT- JP-300-K01	SEP-09 CRD Flow Maximization – Reactor Building Accessible	Rev. 2
JPM-AOT-OJT- JP-303-14	Energizing E7 from E8 Cross-tie with Breaker Failure (AP)	Rev. 2
JPM-AOT-OJT- JP-304-24	Stop and Prepare DG4 for Start per 0ASSD-02 with Failed Breaker (AP)	Rev. 3
LER2006-004- 001	As-Found Valves for Safety/Relief Valve Lift Setpoint Outside TS Allowed Tolerance	11/17/2006
LER2007-003- 001	As-Found Valves for Safety/Relief Valve Lift Setpoint Outside TS Allowed Tolerance	10/18/2007
LER2008-002-00	Manual Reactor Scram Due to Spurious Safety Relief Valve Opening	1/7/2009
LER2008-005- 001	As-Found Valves for Safety/Relief Valve Lift Setpoint Outside TS Allowed Tolerance	9/10/2008
LER2013-003-00	Machining Surface Leads to Setpoint Drift in Main Steamline Safety/Relief Valves	7/22/2013
LER2014-005-00	Setpoint Drift in Main Steam Line Safety/Relief Valves Resulting in Two Valves Inoperable	7/21/2014
LER2015-02-01	Setpoint Drift in Main Steam Line Safety/Relief Valves Resulting in Three Valves Inoperable	6/26/2015
LOI-CLS-LP-20	Lesson Plan - Automatic Depressurization System	Rev. 5
LOI-CLS-LP-25	Lesson Plan - Main Steam System	Rev. 9
LORX-006	Loss of UPS, Turbine High Vibration, ATWS, Loss of Power to EHC	Rev. 18

LORX-143	2B SLC Breaker Failure, CSW Rupture to TBCCS, Loss of 4KV Buses 2C and E4, Medium Break LOCA, Emergency Depressurization	Rev. 4
LOT-DAS-006	Simulator Exercise Guide	Rev. 3
PCHG-EVAL	Engineering Change 97997	Rev. 1
QDP 32A	Target Rock Model 1/2-SMS-S-02-4 Solenoid Valves	7/13/2016
QDP-93B	Qualification Package for Scram Solenoid Pilot Valve (SSPV)	Rev. 3
Target Rock Report 5074	Target Rock 1/2-SMS-02 Three-Way Solenoid Valve	9/25/1991
Test Report 41923-1	Nuclear Environmental Test Program on Struthers-Dunn 219BBX222NE Relays	Rev. A
Test Report 42261-1	Seismic Simulation Test Program on GNB Type NCX-1200 Stationary Battery Cells	11/12/1991
Test Report 48725-1	Seismic Simulation Test Program on Six Naturally Aged NCX 1680 and Three Naturally Aged NCX 510 Battery Cells and Two Battery Racks	4/17/1987
TSTF-561-T	Bracket LCO 3.5.1 LCO Note in ISTS	Rev. 0
WR 20054090	PMAD – Critical HFA Relay Replacement PMR 02067630	10/5/2016
Wyle Report 40951-00	Nuclear Environmental Assessment Report on Viton, Silicone and EPR O-Rings for Target Rock Corporation	9/25/1991

Corrective Action Documents

97745	175716	224408	497761	550618
598294	626122	627708	628132	630553
630922	630993	631376	651976	651977
678222	681070	685025	691834	691922
695469	701179	712319	724239	742405
747185	1943442	1959617	1982336	1984990
2024939	2066035	2067630	2072420	2081124
2082458				

Work Orders (WOs)

00062364-01	00393667-01	00414370-01	00838763-01	00951148-01
01047536-01	01089663-01	01106900-01	01323985-01	01372348-01
01423005-01	01424879-01	01582378-01	01582391-01	01926377-01
01939172-01	01939172-02	01952712-01	01967918-01	02005510-01

02076464-01	02083639-01	02108664-02	02177938-01	02239937-01
02270236-01	11599451-01	11834210-01	11944656-01	12041913-01
12067299-01	12123121-01	13345271-01	13363887-01	13363889-01
13369844-02	13385838-01	13385839-01	13388302-01	13400350-01
13422646-01	13443815-01	13469934-01	13476516-01	13500399-01
13527520-01	20047677-01	20114773-02		

Corrective Action Documents Written Due to this Inspection

<u>Number</u>	<u>Title</u>	<u>Date</u>
AR 2077566	No PMR Generated for DG	11/10/2016
AR 2078954	2016 CDBI Time Critical Action Documentation Improvement	11/15/2016
AR 2079133	Error in Training Material	11/15/2016
AR 2079450	2016 NRC CDBI Inspection - BNP PSA Calc Vagueness	11/16/2016
AR 2079536	Painted Insulation on EDG Gen Outboard Bearing	11/16/2016
AR 2079897	2016 BNP CDBI Inspection, NRC Identified - 0AP-064	11/17/2016
AR 2079942	2016 BNP CDBI Inspection: Valve Low Margin Condition	11/17/2016
AR 2080950	Inaccurate Abnormal Temperature in QDP 93B	11/21/2016
AR 2081124	CDBI Review of NSW Pump 2A Restoration Tracking	11/22/2016
AR 2082003	2016 BNP CDBI Inspection – Seismic Test Report Not Available	11/28/2016
AR 2082285	2016 BNP CDBI - 50.73 Reporting Process for Offsite Testing	11/29/2016
AR 2082458	NCON, CORR and EC Improperly Closed	11/29/2016
AR 2082640	2016 BNP CDBI Inspection – Battery Conn Resistance/Torque	11/30/2016
AR 2082685	2016 BNP CDBI Inspection – Battery Bolt Lubrication	11/30/2016
AR 2082973	0EOP-01-SEP-09	12/1/2016
AR 2083072	BNP 2016 CDBI Inspection: Enhancement to Surveillance Basis	12/1/2016
AR 2083904	2016 BNP CDBI Inspection LPCI Operability in Mode 3 (SDC)	12/5/2016
AR 2084337	2016 CDBI Inspection: Adequacy of BWROG Generic EOP Guidance	12/6/2016
AR 2085737	UFSAR and Tech Spec Bases Versus EOP Use of ADS	12/13/2016
AR 2085820	2016 BNP CDBI Inspection Item Dwg F-03043 is incorrect	12/13/2016

AR 2085994	2016 CDBI Battery Inter-cell Connector Resistance Concern	12/13/2016
AR 2086053	2016 BNP CDBI LOCA Analysis in Mode 3	12/16/2016
AR 2086499	2016 NRC CDBI Inspection – Failure to Document PM Changes	12/14/2016
AR 594568	Revise and change AOT-OJT-JP-304-20	11/29/2016
PRR 02085514	OPT-01.14B - Test annunciator	12/12/2016
PRR 02085517	OPT-14.1A - Test annunciator	12/12/2016
PRR 02085521	OPT-18.1 - Test annunciator	12/12/2016
PRR 02085526	OPT-18.4 - Test annunciator	12/12/2016
PRR 02085614	OFH-11 - Test annunciator	12/13/2016
PRR 02086075	1OI-03.1 - Test annunciator	12/13/2016
PRR 02086076	2OI-03.2 - Test annunciator	12/13/2016
WR 20052562	2016 CDBI Inspection: 2B NSW Pump Bowl Overflowing	11/16/2016
WR 20052583	DG3 Governor Panel Lower Bolt Not Fully Engaged	11/16/2016
WR 20052700	2016 CDBI Investigation: Missing Conduit Cover	11/17/2016
WR 20054090	2016 BNP CDBI 2XB Cable Penetration Putty Peeling/Lifting	11/29/2016