



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

November 7, 2019

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 – INTEGRATED INSPECTION
REPORT 05000324/2019003 AND 05000325/2019003**

Dear Mr. Krakuszeski:

On September 30, 2019, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Brunswick Steam Electric Plant. On November 7, 2019, the NRC inspectors 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.

One finding of very low safety significance (Green) is documented in this report. This finding involved a violation of NRC requirements. One Severity Level IV violation without an associated finding is documented in this report. We are treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest the violations or significance or severity of the violations documented in this inspection report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement; and the NRC Resident Inspector at Brunswick.

If you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; and the NRC Resident Inspector at Brunswick.

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/

Bradley J. Davis, Chief
Reactor Projects Branch 4
Division of Reactor Projects

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

Enclosure:
As stated

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SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT – INTEGRATED INSPECTION
REPORT 05000324/2019003 AND 05000325/2019003

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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: 05000324/2019003 and 05000325/2019003

Enterprise Identifier: I-2019-003-0025

Licensee: Duke Energy Progress, LLC

Facility: Brunswick Steam Electric Plant

Location: Southport, NC

Inspection Dates: July 1, 2019 to September 30, 2019

Inspectors: J. Austin, Senior Resident Inspector
B. Collins, Reactor Inspector
M. Endress, Senior Resident Inspector
T. Fanelli, Senior Reactor Inspector
C. Fontana, Emergency Preparedness Inspector
A. Patz, Resident Inspector
N. Peterka, Fuel Facility Inspector
S. Sanchez, Senior Emergency Preparedness Insp
M. Schwieg, Reactor Inspector
G. Smith, Senior Resident Inspector
J. Steward, Resident Inspector
J. Walker, Emergency Response Inspector

Approved By: Bradley J. Davis, Chief
Reactor Projects Branch 4
Division of Reactor Projects

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting an integrated 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

Failure to Maintain the Effectiveness of the Emergency Plan			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Emergency Preparedness	Green NCV 05000325,05000324/2019003-01 Open/Closed	[H.3] - Change Management	71114.04
<p>The inspectors determined that the licensee's failure to maintain their Emergency Plan was a performance deficiency. Specifically, from May 2004 to July 2018, the licensee failed to maintain the correct site-specific delta-T value used in their dose assessment process. Delta-T is the difference in temperature measurements taken at two different heights on the meteorological (MET) tower. At Brunswick, the MET tower high temperature sensor is at about 103 meters from ground level and the low temperature sensor is at about 10 meters above the ground; therefore, the delta-T (the difference between the upper and lower temperature sensors) is about 93 meters. Having an incorrect delta-T value used in the dose assessment software could have caused a dose assessor to determine an incorrect stability class in a limited number of cases. This issue is not an immediate safety concern because the site-specific delta-T value (~ 93 m) is now being used and procedures are in place to prevent choosing the incorrect stability class that could have resulted in an inaccurate dose assessment.</p>			

Failure to Adequately Document the Basis for a Change to an Emergency Plan Implementing Procedure			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Not Applicable	NCV 05000325,05000324/2019003-02 Open/Closed	Not Applicable	71114.04
<p>The inspectors identified a Severity Level IV (SL-IV) non-cited violation (NCV) (NRC identified) of Title 10 of the Code of Federal Regulations, Part 50.54(q)(3), for changes made to the Brunswick Steam Electric Plant (BNP) Radiological Emergency Plan (E-Plan) that failed to demonstrate the changes would not reduce the effectiveness of the E-Plan. Specifically, the licensee did not provide an adequate analysis to demonstrate that the changes made to the delta-T value used in their dose assessment process was not a reduction in effectiveness of the BNP E-Plan.</p>			

Additional Tracking Items

None.

PLANT STATUS

Unit 1 began the inspection period in Mode 1 at 100 percent rated thermal power (RTP) and continued to operate there until September 5, when the unit was taken offline due to impending hurricane force winds expected on site due to the approach of Hurricane Dorian. The reactor was maintained in Mode 3 (Hot Shutdown) until September 9, when conditions permitted reactor power to be raised to approximately 22 percent RTP and the turbine generator was synchronized to the grid. Power ascension continued in a controlled manner over the next several days pausing on several occasions to perform control rod improvements, and on September 13, the unit reached 100 percent RTP, where it continued to operate for the remainder of the inspection period.

Unit 2 began the inspection period in Mode 1 at 100 percent RTP, and continued to operate there until September 5, when the unit was taken offline due to impending hurricane force winds expected on site due to the approach of Hurricane Dorian. The reactor was maintained in Mode 3 until September 7, when conditions permitted reactor power to be raised to approximately 22 percent RTP, where the main generator output breaker was closed. Power ascension was commenced and 100 percent RTP was achieved on September 8. On September 10, reactor power was lowered from 79 percent power to 60 percent power to perform a control rod improvement. Following completion of the rod improvement, a power ascension was commenced and 100 percent RTP was achieved on September 10, where it continued to essentially operate for the remainder of the inspection period.

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 performed plant status activities described in IMC 2515 Appendix D, "Plant Status" and conducted routine reviews using IP 71152, "Problem Identification and Resolution." 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

71111.01 - Adverse Weather Protection

Seasonal Extreme Weather Sample (IP Section 03.02) (1 Sample)

- (1) The inspectors evaluated readiness for seasonal extreme weather conditions prior to the onset of seasonal hot temperatures for the following systems:
 1. Unit 2 Reactor Building (RB) ventilation system and supply fans
 2. Emergency Diesel Generator (EDG) Building ventilation system

Impending Severe Weather Sample (IP Section 03.03) (1 Sample)

- (1) The inspectors evaluated readiness for impending adverse weather conditions for Hurricane Dorian on September 5, 2019.

71111.04Q - Equipment Alignment

Partial Walkdown Sample (IP Section 03.01) (4 Samples)

The inspectors evaluated system configurations during partial walkdowns of the following systems/trains:

- (1) EDG-3 while EDG-4 out-of-service (OOS) for a planned maintenance outage on July 17, 2019
- (2) Nuclear Service Water (NSW) and Conventional Service Water (CSW) system following maintenance on the system on July 19, 2019
- (3) Unit 1 'B' train Standby Liquid Control (SLC) system while 'A' train SLC train was OOS for planned maintenance on July 25, 2019
- (4) Unit 2 'B' train Residual Heat Removal (RHR) system during an 'A' train RHR maintenance outage on August 27, 2019

71111.05Q - Fire Protection

Quarterly Inspection (IP Section 03.01) (6 Samples)

The inspectors evaluated fire protection program implementation in the following selected areas:

- (1) EDG Building 50' elevation on July 3, 2019
- (2) EDG Cell No.1 (23' elevation) on July 18, 2019
- (3) EDG Cell No.4 (23' elevation) on July 31, 2019
- (4) Unit 2 RB (20' and 50' elevation) on August 8, 2019
- (5) EDG Cell No. 2 (23' elevation) on August 22, 2019
- (6) EDG Cell No. 3 (23' elevation) on August 22, 2019

71111.06 - Flood Protection Measures

Inspection Activities - Internal Flooding (IP Section 02.02a.) (1 Sample)

The inspectors evaluated internal flooding mitigation protections in the:

- (1) Unit 1 and Unit 2 Turbine Building on August 29, 2019

71111.11Q - Licensed Operator Regualification Program and Licensed Operator Performance

Licensed Operator Performance in the Actual Plant/Main Control Room (IP Section 03.01) (1 Sample)

- (1) The inspectors observed and evaluated licensed operator performance in the main control room during Unit 1 reactor startup and approach to criticality on September 8, 2019.

Licensed Operator Regualification Training/Examinations (IP Section 03.02) (1 Sample)

- (1) The inspectors observed and evaluated Cycle 3 Re-qualification exam on August 29, 2019. Note this exam was also considered the annual operating exam.

71111.12 - Maintenance Effectiveness

Routine Maintenance Effectiveness Inspection (IP Section 02.01) (3 Samples)

The inspectors evaluated the effectiveness of routine maintenance activities associated with the following equipment and/or safety significant functions:

- (1) Nuclear Condition Report (NCR) 742444, 2C Conventional SW strainer shear pin failure on April 8, 2015
- (2) NCR 2260472, Maintenance Rule Evaluation of pinhole leak in Unit 2 RHR Service water on September 30, 2019
- (3) The inspectors performed a detailed review of the 2019 Maintenance Rule evaluation, 10CFR50.65 a(3)

71111.13 - Maintenance Risk Assessments and Emergent Work Control

Risk Assessment and Management Sample (IP Section 03.01) (5 Samples)

The inspectors evaluated the risk assessments for the following planned and emergent work activities:

- (1) EDG-4 maintenance outage on July 19, 2019
- (2) Unit 1 'B' train RHR and RHR service water outage on July 31, 2019
- (3) Unit 2 Reactor Core Isolation & Cooling (RCIC) system outage on August 15, 2019
- (4) Emergent failure of Unit 1 RFCS on August 20, 2019
- (5) Unit 1 and Unit 2 elevated risk due to Hurricane Dorian on September 5, 2019

71111.15 - Operability Determinations and Functionality Assessments

Operability Determination or Functionality Assessment (IP Section 02.02) (4 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

- (1) NCR 02284711, EDG-2 Temperature Control Valve (TCV)-2139 corrosion
- (2) NCR 2288158, EDG-4 auxiliary lube oil pump leak
- (3) NCR 2291182, EDG-3 high operating cylinder temperature
- (4) NCR 2259496, 2-E41-F059 pipe stress calculation used incorrect valve weight

71111.19 - Post-Maintenance Testing

Post-Maintenance Test Sample (IP Section 03.01) (5 Samples)

The inspectors evaluated the following post maintenance tests (PMT):

- (1) OPT-08.1.4B, "RHR Service Water System Operability – Loop B Test" following adjustment to 1-SW-V102 cross tie valve on July 31, 2019
- (2) OPT-12.2C, No. 3 Diesel Generator Monthly Load Test following adjustment to fuel racks on September 11, 2019
- (3) PMT of through wall leak of tee connection below 1-SW-V159, following weld repair on September 18, 2019
- (4) PMT of Unit 1 High Pressure Coolant Injection (HPCI) Turbine following system maintenance on selected components on September 26, 2019
- (5) PMT on Unit 2 RCIC system following maintenance outage on August 15, 2019

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Surveillance Tests (other) (IP Section 03.01) (4 Samples)

- (1) OPT-08.2.2B LPCI/RHR System Operability Test – Loop B on July 31, 2019
- (2) OPT-37.2.2, Reactor Feed Pump Turbine Stop Valve Testing on September 9, 2019
- (3) OPT-12.2C, No. 3 Diesel Generator Monthly Load Test on September 10, 2019
- (4) OPT-12.1C, No. 3 Diesel Generator LOOP/LOCA Loading Test on July 11, 2019

RCS Leakage Detection Testing (IP Section 03.01) (1 Sample)

- (1) OOI-02.3, Drywell Leakage Control (U1) (RCS), due to elevated DWFD Leakage on September 19, 2019

FLEX Testing (IP Section 03.02) (1 Sample)

- (1) FLEX Vehicle 02 Caterpillar Operational Check on September 23, 2019

71114.02 - Alert and Notification System Testing

Inspection Review (IP Section 02.01-02.04) (1 Sample)

- (1) The inspectors evaluated the maintenance and testing of the alert and notification system during the week of July 8, 2019.

71114.03 - Emergency Response Organization Staffing and Augmentation System

Inspection Review (IP Section 02.01-02.02) (1 Sample)

- (1) The inspectors evaluated the readiness of the Emergency Response Organization during the week of July 8, 2019.

71114.04 - Emergency Action Level and Emergency Plan Changes

Inspection Review (IP Section 02.01-02.03) (1 Sample)

- (1) The inspectors evaluated submitted Emergency Action Level, Emergency Plan, and Emergency Plan Implementing Procedure changes during the week of July 8, 2019. This evaluation does not constitute NRC approval.

71114.05 - Maintenance of Emergency Preparedness

Inspection Review (IP Section 02.01 - 02.11) (1 Sample)

- (1) The inspectors evaluated the maintenance of the emergency preparedness program during the week of July 8, 2019.

71114.06 - Drill Evaluation

Drill/Training Evolution Observation (IP Section 03.02) (1 Sample)

The inspectors evaluated:

- (1) Evaluated simulator training evolution on August 29, 2019

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

EP01: Drill/Exercise Performance (IP Section 02.12) (1 Sample)

- (1) *EP01: Drill & Exercise Performance*

EP02: ERO Drill Participation (IP Section 02.13) (1 Sample)

- (1) *EP02: Emergency Response Organization Drill Participation*

EP03: Alert & Notification System Reliability (IP Section 02.14) (1 Sample)

- (1) *EP03: Alert & Notification System Reliability*

BI01: Reactor Coolant System (RCS) Specific Activity Sample (IP Section 02.10) (2 Samples)

- (1) Unit 1 (July 1, 2018 - June 30, 2019)
- (2) Unit 2 (July 1, 2018 - June 30, 2019)

BI02: RCS Leak Rate Sample (IP Section 02.11) (2 Samples)

- (1) Unit 1 (July 1, 2018 – June 30, 2019)
- (2) Unit 2 (July 1, 2018 – June 30, 2019)

71152 - Problem Identification and Resolution

Annual Follow-up of Selected Issues (IP Section 02.03) (2 Samples 1 Partial)

The inspectors reviewed the licensee's implementation of its corrective action program related to the following issues:

- (1) AR 2264674, "All EDG's Auto Started During Electrical Transfer", was selected to verify that the Licensee was appropriately addressing the event that occurred on March 25, 2019 when all EDG's auto-started during restoration of the Unit 2 Unit Auxiliary Transformer (UAT) backfeed operation. The inspectors determined that the Licensee's failure to perform an adequate design change evaluation for the Unit 2 Main Power Transformer replacement in 2005 was a performance deficiency. Specifically, the licensee failed to recognize the lower 2nd order harmonic content during current in-rush that is associated with the newer transformer design. The inspectors determined that the PD was minor since all of the more-than-minor screening questions were answered 'no'. The inspectors also determined that no violation of NRC requirements occurred.
- (2) AR 2237808, "1-SW-1B-CONV-PMP-STR Sheer Pin Broken" was selected to verify that the licensee was addressing the multiple sheer pin failures. The inspectors determined that the Licensee has taken adequate corrective actions to prevent reoccurrence of the multiple sheer pin failures in 2015. Specifically, the preventive maintenance frequency was reduced from a three year to two year and the sheer pins were being inspected to ensure adequate pin engagement to prevent premature failures. However, the 1B CSW pump strainer sheer pin failed on October 12, 2018. The preventive maintenance was deferred for six months to obtain the pump strainer motor mount specified in EC 410315 that will correct the shear key engagement issue. The two year maintenance was due in September 2018. The inspectors reviewed the maintenance deferral and determined the licensee had provided reasonable justification at the time.
- (3) (Partial)
AR 02214514, "NRC EQ Inspection Violation for Limitorque Heater Evaluation" was selected to verify that the licensee was addressing non-cited violation (NCV) 05000325/324/2018011 documented in inspection report 05000325/324/2018011. The inspectors reviewed the licensee's evaluation for the impact on qualified life of the motor operated valve (MOV) components due to the heat rise caused by the continuously energized heaters. The inspectors reviewed the heater specifications from the vendor, the heater power supply, and the MOV assembly drawings. The heater was installed adjacent to the MOV components in question.

71153 - Followup of Events and Notices of Enforcement Discretion

Event Report (IP Section 03.02) (2 Samples)

The inspectors evaluated the following licensee event reports (LERs):

- (1) LER 05000325/2019-001-00, Unplanned Automatic Start of Emergency Diesel Generators (ADAMS accession: ML19143A378): The inspectors determined that it was not reasonable to foresee or correct the cause discussed in the LER therefore no performance deficiency was identified. The inspectors also concluded that no

violation of NRC requirements occurred. The circumstances surrounding this LER are documented in report Section 71152.

- (2) LER 05000324/2019-002-00, Manual Reactor Protection System Actuation and Specified System Actuation (ADAMS accession: ML19148A590): The inspectors determined that it was not reasonable to foresee or correct the cause discussed in the LER therefore no performance deficiency was identified. The inspectors also concluded that no violation of NRC requirements occurred.

INSPECTION RESULTS

Failure to Maintain the Effectiveness of the Emergency Plan			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Emergency Preparedness	Green NCV 05000325,05000324/2019003-01 Open/Closed	[H.3] - Change Management	71114.04
<p>The inspectors determined that the licensee's failure to maintain their Emergency Plan was a performance deficiency. Specifically, from May 2004 to July 2018, the licensee failed to maintain the correct site-specific delta-T value used in their dose assessment process. Delta-T is the difference in temperature measurements taken at two different heights on the meteorological (MET) tower. At Brunswick, the MET tower high temperature sensor is at about 103 meters from ground level and the low temperature sensor is at about 10 meters above the ground; therefore, the delta-T (the difference between the upper and lower temperature sensors) is about 93 meters. Having an incorrect delta-T value used in the dose assessment software could have caused a dose assessor to determine an incorrect stability class in a limited number of cases. This issue is not an immediate safety concern because the site-specific delta-T value (~ 93 m) is now being used and procedures are in place to prevent choosing the incorrect stability class that could have resulted in an inaccurate dose assessment.</p> <p><u>Description:</u> While performing a detailed review of NCR 02140377, entitled "AD-EP-ALL-0202, Rev. 4 Issued Without 50.54(q) Review" the inspectors noted that the delta-T value was inaccurate from May 2004 until November 2018.</p> <p>The inspectors noted that from May 2004, to the time of inspection, there were three opportunities for the licensee to correct the delta-T value in their dose assessment software while performing revisions to their dose assessment procedure. In 2004, the site-specific delta-T value was changed from 93 m to 100 m, based on guidance in Regulatory Guide 1.23 (with no accompanying 10 CFR 50.54(q) evaluation). In 2014, the licensee upgraded their dose assessment software to Unified RASCAL Interface (URI) and normalized the delta-T value to 90 m (again with no accompanying 10 CFR 50.54(q) evaluation). In 2018, the licensee wrote a nuclear condition report to return the delta-T value to 93 m (also with no accompanying 10 CFR 50.54(q)). Following the inspectors' inquiries, the licensee evaluated the effect of the incorrect delta-T value and found that in a very small number of cases an incorrect stability class could be used in dose assessment, which would result in erroneous assessment results.</p> <p><u>Corrective Actions:</u> The licensee entered the issue into the corrective action program and provided additional analysis to characterize the impact of the incorrect delta-T value.</p>			

By returning the delta-T value to the site-specific value of 93 m and updating procedures to use local meteorological data or National Weather Service data to determine stability class ensures the correct stability class is used when performing dose assessment.

The licensee corrected the delta-T value in their software on November 2018; however, an inadequate assessment was made as to its impact on the dose assessment process and whether it was a reduction in effectiveness, which led to an associated Severity Level IV NCV provided in the following write-up.

Corrective Action References: Nuclear Condition Report 02281669.

Performance Assessment:

Performance Deficiency: The inspectors determined that failure to maintain the BNP E-Plan was a performance deficiency within the licensee's ability to foresee and correct.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Procedure Quality attribute of the Emergency Preparedness cornerstone and adversely affected the cornerstone objective to ensure that the licensee is capable of implementing adequate measures to protect the health and safety of the public in the event of a radiological emergency.

Significance: The inspectors assessed the significance of the finding using Appendix B, "Emergency Preparedness SDP."

Cross-Cutting Aspect: H.3 - Change Management: Leaders use a systematic process for evaluating and implementing change so that nuclear safety remains the overriding priority.

Enforcement:

Violation: Title 10 CFR Part 50.54(q)(2) requires that a holder of a nuclear power reactor operating license under this part, shall follow and maintain the effectiveness of an emergency plan that meets the requirements in Appendix E to this part and the planning standards of 10 CFR 50.47(b). Title 10 of the Code of Federal Regulations, Part 50.54(b)(9) requires adequate methods, systems, and equipment for assessing and monitoring actual or potential offsite consequences of a radiological emergency condition are in use. Title 10 CFR Part 50, Appendix E, Section IV.B., "Assessment Actions," requires in part, that the means to be used for determining the magnitude of, and for continuously assessing the impact of, the release of radioactive materials shall be described, including EALs that are to be used as criteria for determining the need for notification and participation of local and State agencies, the Commission, and other federal agencies.

Contrary to the above, the licensee failed to maintain the effectiveness of the E-Plan. Specifically, from May 2004 to July 2018, the licensee failed to maintain adequate methods, systems, and equipment for assessment of radiological releases were in use when the licensee failed to maintain their site-specific delta-T values used in their dose assessment process. Using the incorrect delta-T value could lead to selection of the wrong stability class used in the dose assessment process. Using the incorrect stability class could result in an incorrect dose assessment. This issue is not an immediate safety concern because the site-specific delta-T value is now being used, an extent of condition was performed, and the issue placed into the licensee's corrective action program.

Enforcement Action: This violation is being treated as an non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.

Failure to Adequately Document the Basis for a Change to an Emergency Plan Implementing Procedure

Cornerstone	Severity	Cross-Cutting Aspect	Report Section
Not Applicable	Severity Level IV NCV 05000325,05000324/2019003-02 Open/Closed	Not Applicable	71114.04

The inspectors identified a Severity Level IV (SL-IV) non-cited violation (NCV) (NRC identified) of Title 10 of the Code of Federal Regulations, Part 50.54(q)(3), for changes made to the Brunswick Steam Electric Plant (BNP) Radiological Emergency Plan (E-Plan) that failed to demonstrate the changes would not reduce the effectiveness of the E-Plan. Specifically, the licensee did not provide an adequate analysis to demonstrate that the changes made to the delta-T value used in their dose assessment process was not a reduction in effectiveness of the BNP E-Plan.

Description: While performing a detailed review of a change to the BNP E-Plan, the inspectors identified that the 50.54(q) change documentation for AD-EP-ALL-0202, Emergency Response Offsite Dose Assessment, Rev. 7, did not adequately assess whether the changes were a reduction in effectiveness to the E-Plan. The inspectors determined that no analysis was performed for changes made to delta-T value used in the dose assessment process going back to 2004. The procedure was revised in 2004, 2014, and in 2018. Delta-T is the difference in temperature measurements taken at two different heights on the meteorological (MET) tower. At Brunswick the MET tower high temperature sensor is at about 103 meters from ground level and the low temperature sensor is at about 10 meters above the ground; therefore, the delta-T (the difference between the upper and lower temperature sensor) is about 93 meters. Having an incorrect delta-T value could have caused a dose assessor to input an incorrect stability class in a limited number of cases and could have resulted in an inaccurate dose assessment and therefore required an analysis be performed to explain why a reduction in effectiveness had not occurred.

Corrective Actions: The licensee entered the issue into the corrective action program and provided additional analysis to characterize the impact of the incorrect delta-T value.

By returning the delta-T value to the site-specific value of 93 m and updating procedures to use local meteorological data or National Weather Service data to determine stability class ensures the correct stability class is used when performing dose assessment.

The licensee corrected the delta-T value in their software on November 2018; however, an inadequate assessment was made as to its impact on the dose assessment process and whether it was a reduction in effectiveness, which led to this Severity Level IV NCV.

Corrective Action References: Nuclear Condition Report 02281561.

Performance Assessment: None

Performance Deficiency: The inspectors determined that the failure to provide an analysis

demonstrating that changes to the emergency plan was not a reduction in effectiveness is considered a performance deficiency within the licensee's ability to foresee and correct.

Screening: The inspectors determined the performance deficiency was more than minor because it impacted the NRC's ability to perform its regulatory function; therefore, traditional enforcement is applicable in accordance with Inspection Manual Chapter (IMC) 0611.

Cross-Cutting Aspect: Not applicable for Traditional Enforcement issues.

Enforcement:

Severity: This finding is a violation of NRC requirements because it has the potential for impacting the NRC's ability to perform its regulatory function. This finding is determined to be a SL-IV violation in accordance with Section 6.6.d.1 of the Enforcement Policy because it involves the licensee's ability to meet or implement a regulatory requirement not related to assessment or notification such that the effectiveness of the emergency plan is reduced.

Violation: Title 10 of the Code of Federal Regulations, Part 50.54(q)(3) states, in part, that a licensee may make changes to its emergency plan without NRC approval only if the licensee performs and retains an analysis demonstrating that the changes do not reduce the effectiveness of the plan and the plan, as changed, continues to meet the requirements in Appendix E to this part.

Contrary to the above, as of July 12, 2019, the licensee failed to perform an analysis demonstrating that changes to their E-Plan did not reduce the effectiveness of the plan. Specifically, the licensee did not provide an adequate analysis to demonstrate that the changes made to the delta-T value used in their dose assessment process was not a reduction in effectiveness of the BNP E-Plan.

Enforcement Action: This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.

EXIT MEETINGS AND DEBRIEFS

The inspectors confirmed that proprietary information was controlled to protect from public disclosure.

- On November 7, 2019, the inspectors presented the integrated inspection results to John Krakuszeski and other members of the licensee staff.
- On July 12, 2019, the inspectors presented the Emergency Preparedness Program inspection preliminary exit inspection results to R. Gideon and other members of the licensee staff.
- On September 26, 2019, the inspectors presented the Emergency Preparedness Program inspection final exit inspection results to J. Krakuszeski and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.01	Miscellaneous	DBD-144	External and Internal Flooding	Revision 1
	Procedures	0AI-68	Brunswick Nuclear Plant Response to Severe Weather Warnings	Revision 56
		0AOP-13	Brunswick Nuclear Plant Response to Severe Weather Warnings	Revision 69
	Work Orders	13397267		
71111.04Q	Drawings	D-02266 Sht. 2A	Starting Air for Diesel Generators Piping Diagram	Revision 27
	Procedures	0OP-39	Diesel Generator Operating Procedure	Revision 190
		1OP-05	Standby Liquid Control System	Revision 59
		1OP-43	Service Water System Operating Procedure	Revision 136
		2OP-17	Residual Heat Removal System Operating Procedure	Revision 181
		2OP-43	Service Water System Operating Procedure	Revision 168
		SD-05	Standby Liquid Control System	Revision 12
		SD-17	Residual Heat Removal System	Revision 20
		SD-39	Emergency Diesel Generators	Revision 22
		SD-43	Service Water System	Revision 27
71111.05Q	Fire Plans	0PFP-013	General Fire Plan	Revision 54
		AD-EG-ALL-1532	NFPA 805 Pre-Fire Plans	Revision 1
		CSD-BNP-PFP-0DG	Diesel Generator Building Pre-Fire Plans	Revision 1
		CSD-BNP-PFP-2RB	Unit 2 Reactor Building Pre-Fire Plans	Revision 0
	Procedures	0PLP-01.2	Fire Protection System Operability, Action, and Surveillance Requirements	Revision 51
		AD-EG-ALL-1520	Transient Combustible Control	Revision 11
71111.06	Procedures	0SMP-LOG002	Circulating Water Intake Pump Logic Verification	Revision 8
		SD-28	Main Condenser	Revision 5
		SD-29	Circulating Water System	Revision 18
	Work Orders	20087213		
		20176433		
71111.11Q	Miscellaneous	LORX-21	Simulator Guide - RCIC Turbine Low Suction Pressure	Revision 11

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Switch , Control Rod Drift, Fuel Damage, Steam Line Break in Turbine Building, Emergency Depressurization	
	Procedures	0GP-02	Approach to Criticality and Pressurization of the Reactor	Revision 118
71111.12	Corrective Action Documents	742444		
	Procedures	AD-EG-ALL-1210	Maintenance Rule Program	Revision 1
71111.13	Procedures	0AP-025	BNP Integrated Scheduling	Revision 57
		AD-OP-ALL-0201	Protected Equipment	Revision 5
		AD-WC-ALL-0200	Online Work Management	Revision 13
		AD-WC-ALL-0250	Work Implementation and Completion	Revision 9
		AD-WC-ALL-0410	Work Activity Integrated Risk Management	Revision 7
		SD-02	Reactor Recirculation System	Revision 20
		SD-02.1	Reactor Recirculation System	Revision 0
71111.15	Corrective Action Documents	2288158		
	Operability Evaluations	AD-OP-ALL-0105	Operability Determinations and Functionality Assessments	Revision 4
71111.18	Calculations	G0050A-10	BNP UNIT NO. 1 SERVICE WATER SYSTEM HYDRAULIC ANALYSIS	Revision 15
	Engineering Changes	EC 400467	1-SW-1A-CONV-PMP replacement	Revision 3
	Work Orders	13458094		
71111.19	Procedures	0CM-MO502	Repair Instructions for Limitorque Motor Operators Model Number SMB-000	Revision 24
		OPT-10.1.1	RCIC System Operability Test	Revision 108
		SD-43	Service Water System	Revision 26
	Work Orders	1219582401		
		20309578	PMT of U1 HPCI Turbine following system maintenance on selected components	09/26/2019
		20341548	PMT of U1 HPCI Turbine following system maintenance on selected components	09/26/2019

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		20352949	PMT of through wall leak weld repair of the tee connection below 1-SW-V159	09/18/2019
		20355396	PMT of U1 HPCI Turbine following system maintenance on selected components	09/26/2019
71111.22	Procedures	0OI-02.3	Drywell Leakage Control	Revision 7
		0PT-12.2C	No. 3 Diesel Generator Monthly Load Test	Revision 116
		0PT-37.2.2	Reactor Feed Pump Turbine Stop Valve Testing (RS)	Revision 15
	Work Orders	20344718	FLEX Vehicle 02 (Caterpillar) Quarterly Operational Check	09/23/2019
71114.04	Corrective Action Documents	NCR 02115143	EC 404168 Met Tower Upgrade ERP Review	
	Corrective Action Documents Resulting from Inspection	NCR 02140377	AD-EP-ALL-0202, Rev. 4 issued without 50.54(q) review	
		NCR 02224606	AD-EP-ALL-0202, Rev. 7 (PRR 02166519)	
		NCR 02281669	Revise/Validate URI Job Aid CSD-EP-ALL-0202-01	
	Miscellaneous	0 ERP	Radiological Emergency Response Plan (ERP)	Revisions 91 and 92
	Procedures	AD-EP-ALL-0202	Emergency Response Offsite Dose Assessment,	Rev. 7
71114.06	Miscellaneous	LORX-21	DEP Evaluation Checklist for LORX-21	08/29/2019
	Procedures	0PEP-02.1.1	Emergency Control - Unusual Event, Alert, Site Area Emergency, and General Emergency	Revision 31
		AD-EP-ALL-0101	Emergency Classification	Revision 1
71152	Corrective Action Documents	2237808		
	Engineering Changes	EC 50054R8	Unit 1 Main Power Transformer Replacement	
		EC 50055R9	Unit 2 Main Power Transformer Replacement	
	Procedures	1OP-50	Plant Electric System Operating Procedure	Revision 136
		2OP-50	Plant Electric System Operating Procedure	Revision 165
		AD-PI-ALL-0100	Corrective Action Program	Revision 21
		AD-PI-ALL-0400	Operating Experience Program	Revision 7
71153	Corrective Action Documents	CR# 02265805	Root Cause Evaluation - Report Unit 2 Turbine Bearing #9 High Temperature Alarm	03/30/2019

