



August 10, 2016

Serial: BSEP 16-0073

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

Subject: Brunswick Steam Electric Plant, Unit Nos. 1 and 2  
Renewed Facility Operating License Nos. DPR-71 and DPR-62  
Docket Nos. 50-325 and 50-324  
Report of 10 CFR 50.59 Evaluations, 10 CFR 72.48 Evaluations, and Commitment Changes

- References:
1. Letter to the U.S. Nuclear Regulatory Commission from Annette H. Pope, Report of 10 CFR 50.59 Evaluations and Commitment Changes, dated August 14, 2014, ADAMS Accession Number ML14234A324
  2. Letter to the U.S. Nuclear Regulatory Commission from Annette H. Pope, 10 CFR 72.48(d)(2) Biennial Report, dated November 11, 2014, ADAMS Accession Number ML14335A354

Ladies and Gentlemen:

In accordance with 10 CFR 50.59(d)(2) and 10 CFR 72.48(d)(2), Duke Energy Progress, Inc. (Duke Energy), is providing a report summarizing the 10 CFR 50.59 and 10 CFR 72.48 evaluations of changes, tests, and experiments implemented during the period from August 1, 2014, to July 31, 2016. The 10 CFR 50.59 report is provided in Enclosure 1, and the 10 CFR 72.48 report is provided in Enclosure 2. In addition, a summary of commitment changes since July 31, 2014 (i.e., the previous report of 10 CFR 50.59 Evaluations and Commitment Changes), made in accordance with Duke Energy's commitment management program (i.e., AD-LS-ALL-0010, "Commitment Management"), is provided in Enclosure 3.

No regulatory commitments are contained in this submittal. Please refer any questions regarding this submittal to Mr. Lee Grzeck, Manager - Regulatory Affairs, at (910) 457-2487.

Sincerely,

Annette H. Pope  
Director – Organizational Effectiveness  
Brunswick Steam Electric Plant

IE47  
NRR

TMS/tms

Enclosures:

1. Summary of Changes, Tests, and Experiments Requiring 10 CFR 50.59 Evaluations
2. Summary of Changes, Tests, and Experiments Requiring 10 CFR 72.48 Evaluations
3. Regulatory Commitment Change Summary Report

cc (with enclosures):

U. S. Nuclear Regulatory Commission, Region II  
ATTN: Ms. Catherine Haney, Regional Administrator  
245 Peachtree Center Ave, NE, Suite 1200  
Atlanta, GA 30303-1257

U. S. Nuclear Regulatory Commission  
ATTN: Mr. Andrew Hon (Mail Stop OWFN 8G9A) **(Electronic Copy Only)**  
11555 Rockville Pike  
Rockville, MD 20852-2738  
Andrew.Hon@nrc.gov

U. S. Nuclear Regulatory Commission  
ATTN: Ms. Michelle P. Catts, NRC Senior Resident Inspector  
8470 River Road  
Southport, NC 28461-8869

Chair - North Carolina Utilities Commission **(Electronic Copy Only)**  
4325 Mail Service Center  
Raleigh, NC 27699-4300  
swatson@ncuc.net

## Summary of Changes, Tests, and Experiments Requiring 10 CFR 50.59 Evaluations

### Table of Contents

| <u>Activity Title</u>   | <u>Page</u> |
|---|-------------|
| CONDENSATE MARGIN TEST  | 2           |
| DISABLE 1A COMPRESSOR OF CONTROL BUILDING AIR<br>CONDITIONING UNIT 2D                       | 3           |
| INCREASE OF E11-F008 STROKE TIME  | 4           |
| UNIT 1 ALTERNATE BATTERY CHARGER INSTALLATION   | 5           |
| REMOVAL OF REACTOR BUILDING STANDBY AIR COMPRESSORS   | 6           |
| UNIT 2 ALTERNATE DECAY HEAT REMOVAL   | 7           |
| EMERGENCY DIESEL GENERATOR MARGIN IMPROVEMENTS –<br>VENTILATION RELAY AND TIMING UPGRADE    | 8           |
| EPG/SAG REVISION 3 UPGRADE INCLUDING FLEX AND SBO   | 9           |
| EMERGENCY DIESEL GENERATOR RELIABILITY CHANGES  | 10          |
| UPGRADE UNIT 2 FEEDWATER HEATER DRAIN CONTROLS  | 11          |
| REPLACE EXCITATION SYSTEM ON EMERGENCY DIESEL GENERATORS                                    | 12          |
| CHANGE IN ALLEN BRADLEY 700-RTC TO INCLUDE COMPLEX<br>PROGRAMMABLE LOGIC DEVICE TIMING CHIP | 13          |
| UNIT 2 ALTERNATE BATTERY CHARGER INSTALLATION   | 14          |
| ADDING NEW FUEL ZONE WATER LEVEL INSTRUMENTS  | 15          |

**Title:** Condensate Margin Test

**Evaluation Identification Number:** Action Request 700002

**Brief Description:**

The scope of this procedure was to test the Unit 2 Condensate and Feedwater System to document the condensate system performance of the redesigned and new condensate suction piping.

**Summary of 10 CFR 50.59 Evaluation:**

The procedure measured Condensate Pump and System Performance relative to operation of multiple condensate pumps from startup through 100% power ascension for various operating conditions and pressure and flow limitations. This procedure measured condensate pump margin to cavitation and was conducted at 60% and 95% plant power. This change did not affect other safety significant equipment and had no effect on plant safety response. The conclusion of the evaluation was that the proposed activity could be implemented under 10 CFR 50.59 without requiring prior NRC review or approval.

**Plant References:**

Special Procedure 2SP-EC85204  
Engineering Change (EC) 85204

**Title:** Disable Compressor 1A of Control Building AC Unit 2D

**Evaluation Identification Number:** Action Request 706433

**Brief Description:**

This was a temporary change of the control circuit to isolate the 1A compressor in the 2-VA-2D-CU-CB which reduced the total number of compressors available in the 2-VA-2D-CU-CB that can operate from four to three. This configuration resulted in a reduction in cooling capacity that affected the control room air conditioning system.

The 1A compressor was disabled by lifting a wire in the control circuit for that compressor. By isolating this compressor, the other three were available to start and provide up to a nominal 30 tons of cooling. Based upon control room temperature, each compressor has a different set point for starting. The control room thermostat was set at approximately one to two degrees below the current setting of 68° F to allow the 2-VA-2D-CU-CB to control at a temperature of approximately 68° F by starting the second, third, and fourth compressors. The system was then restored to normal.

**Summary of 10 CFR 50.59 Evaluation:**

The effective de-rating of the 2-VA-2D-CU-CB cooling unit by isolating the 1A compressor did not adversely affect the reliability of this unit. The other compressors in the 2-VA-2D-CU-CB were able to start on their initiating signals with no change in reliability. The other cooling units, 1-VA-1D-CU-CB and 2-VA-2E-CU-CB cooling units were not directly affected by this change; therefore, they would also start based upon valid rising temperature signals. Adequate cooling capability with the proposed change has already been evaluated for control room habitability as well as for equipment environmental conditions. This change did not affect other safety significant equipment and had no effect on plant safety response. The conclusion of the evaluation was that the proposed activity could be implemented under 10 CFR 50.59 without requiring prior NRC review or approval.

**Plant References:**

Temporary Change EC 97958

**Title:** Increase of E11-F008 Stroke Time

**Evaluation Identification Number:** Action Request 707238

**Brief Description:**

The scope of this change was to increase the E11-F008 stroke time limit from 30 seconds to 43 seconds. This was determined to be necessary after it was identified that the E11-F008 could be expected to operate without the battery charger available during a pipe break concurrent with loss of offsite power (LOOP).

**Summary of 10 CFR 50.59 Evaluation:**

Valve 1(2)-E11-F008 is the outboard isolation valve on the Residual Heat Removal (RHR) shutdown cooling suction line for Unit 1 and Unit 2, respectively. It is a gate valve with a DC powered motor operator. The valve must be opened to allow RHR to provide the non-safety related shutdown cooling function of RHR.

General Electric Evaluation 001N8498 Rev. 0, determined the stroke time allowance for E11-F008 can be increased to 43 seconds without jeopardizing reactor level inventory during a postulated crack in the RHR system piping during shutdown cooling. The report concluded that the rate of coolant loss was such that a closing time of up to 100 seconds prevents level dropping to Top of Active Fuel (TAF). Therefore, increasing the limit from 30 seconds to 43 seconds does not result in a safety concern. The conclusion of the evaluation was the proposed activity could be implemented under 10 CFR 50.59 without requiring prior NRC review or approval.

**Plant References:**

EC 95350

Updated Final Safety Analysis Report (UFSAR) Change Package 14FSAR-067

AR 745125

**Title:** Unit 1 Alternate Battery Charger Installation

**Evaluation Identification Number:** Action Request 1963267

**Brief Description:**

The scope of this change is to provide Unit 1 Division I and Division II each with a 125 VDC alternate safety related battery charger.

**Summary of 10 CFR 50.59 Evaluation:**

The change in testing methodology represents an adverse effect of the change package and the way a battery charger UFSAR described design function is performed or controlled, as the chargers will not always be required to recharge the station batteries at greater than 200 amperes.

This evaluation assesses a change in the method that the battery chargers are tested to ensure that the design capability of the charges is met. The criteria is based on the initial recharge rate following the battery service test and the steady state loads when restoring the battery from the design minimum charge state to the fully charged state. The UFSAR describes the current supplied by the chargers following the service test when supplying current to the batteries as well as current to the normal DC bus loads. With the addition of an alternate charger, testing of all chargers in accordance with the established process could prevent a battery service test from being performed if one of the chargers were out of service during its performance. An alternate means of testing using a load bank eliminates the requirement to restore a charger to service for the battery service test. The new means of testing the battery chargers provides sufficient validation that the chargers are capable of meeting the established criteria. The conclusion of the evaluation was that the proposed activity could be implemented under 10 CFR 50.59 without requiring prior NRC review or approval.

**Plant References:**

EC 96957 (number changed to 296957 in new tracking program)

AR 711681



**Title:** Removal of Reactor Building Standby Air Compressors

**Evaluation Identification Number:** Action Request 713531

**Brief Description:**

This plant change removed the Reactor Building standby air compressors from service.

**Summary of 10 CFR 50.59 Evaluation:**

The UFSAR does not credit the Reactor Building Standby Air Compressors in the safety analysis. Removing the Reactor Building Standby Air Compressors does not affect other equipment relied on in the safety analyses to prevent or mitigate accident conditions. This change had no effect on any physical constants or coefficients, or any other factor considered in uncertainty measurements, models, or any UFSAR described evaluation methodology used in establishing the design bases or safety analysis. The conclusion of the evaluation was that the proposed activity could be implemented under 10 CFR 50.59 without requiring prior NRC review or approval.

**Plant References:**

EC 59731

AR 747383

**Title:** Unit 2 Alternate Decay Heat Removal

**Evaluation Identification Number:** Action Request 718311

**Brief Description:**

The overall change provided permanent secondary side piping to and from a new plate-and-frame heat exchanger to the existing 2A Reactor Building Closed Cooling Water (RBCCW) pump and provided a new 2D RBCCW pump. A part of the change was to rely on administrative controls during Conventional Service Water header outages to ensure Service Water was available for decay heat removal in the event of a single failure. The existing licensing basis used similar NRC-approved administrative controls to ensure single failure tolerant Service Water for decay heat removal during Nuclear Service Water header outages.

**Summary of 10 CFR 50.59 Evaluation:**

This change only affects the alignment of the Service Water system during outages with specific systems out of service. The new alignment uses existing component that will be operated consistent with existing design limits (system pressure, maximum pump flow, minimum required cooling flow, etc.). If this change was not implemented, a single failure could have the potential for a different result. For the applicable plant conditions, a failure to re-establish flow through the SW-V103 or SW-V106 after an auto close signal would have the potential to result in loss of required decay heat removal. With the proposed administrative controls, this possibility is eliminated. The conclusion of the evaluation was that the proposed activity could be implemented under 10 CFR 50.59 without requiring prior NRC review or approval.

**Plant References:**

EC 76247

AR 747376

**Title:** Emergency Diesel Generator Margin Improvements – Ventilation Relay and Timing Upgrade

**Evaluation Identification Number:** Action Request 735281

**Brief Description:**

The scope of this change added a timer relay and interlocking relay to each Diesel Generator Building Ventilation (DGBVA) Supply Fan starter to provide a 34 second delay in the restart of the timer.

**Summary of 10 CFR 50.59 Evaluation:**

The change to add a DGBVA timer upgrade was found to be acceptable. The DGBVA supply fans energize automatically and are available to support operation of the diesel generators following Emergency Diesel Generator breaker closure. An analysis of DGBVA system performance shows the temperature rise in the Diesel Generator Building (DGB) resulting from a delay in the start time of the DGB supply fans is bounded by existing design calculations; therefore, the integrity of the systems, structures, and components (SSCs) served by the DGBVA system is maintained. The conclusion of the evaluation was that the proposed activity could be implemented under 10 CFR 50.59 without requiring prior NRC review or approval.

**Plant References:**

EC 86413

**Title:** EPG/SAG Revision 3 Upgrade Including Flex And SBO

**Evaluation Identification Number:** Action Request 735404

**Brief Description:**

This evaluation addressed changes being made to BSEP Emergency Operating Procedures (EOPs) based on generic BWROG Emergency Procedure Guidelines/Severe Accident Guidelines (EPGs/SAGs), Revision 3, dated February 2013. Screening of changes was based on previous revision guidance contained In EPG/SAG, Revision 1 issued in 1998 and bounded by 10 CFR 50.59 evaluation 98-0138, Revision 0.

**Summary of 10 CFR 50.59 Evaluation:**

It was determined that the controls that exist within the EOPs and Support Procedures ensure that operations within the design and licensing basis is observed until conditions have deteriorated to beyond design basis conditions. The beyond design basis event actions were previously evaluated by the NRC in the safety evaluations performed for EPG, Revision 4, and for the ATWS stability modifications to the EPGs. Furthermore, the changes were shown to be appropriate for the a range of beyond design basis conditions which they were addressing (extended loss of AC and DC power and loss of ultimate heat sink). Finally, it was shown that they do not require prior approval by NRC to implement since the changes are for beyond design basis events and, as applicable, meet the requirements of the EPG, Revision 4, SER.

**Plant References:**

EC 94834

**Title:** Emergency Diesel Generator Reliability Changes

**Evaluation Identification Number:** Action Request 1949708

**Brief Description:**

The following two changes required evaluation:

- 1) Replacement of the two existing safety related air start compressors supplying independent air receivers by a single non-safety related compressor supplying both receivers is considered a reduction in redundancy and a change in quality with a potential adverse impact on the ability of diesel generators to perform their UFSAR described function.
- 2) Providing a cross-tie in the starting air compressor discharge piping between the diesel cells to allow a single compressor to charge multiple receivers is considered adverse in that it challenges the independence of the power sources as described in NRC Safety Guide 6.

**Summary of 10 CFR 50.59 Evaluation:**

From a reliability standpoint, the reduction in number of air compressors was compensated by the addition of cross-connect capability between the new air compressors. A reduction in the number of air compressors was not an adverse change because the air compressor does not provide a safety related function to start the Emergency Diesel Generator (EDG), nor does it affect reliability of the system given the added cross-connect provisions. For the design function associated with starting the EDG, the likelihood of occurrence of a malfunction was not increased given the provisions that ensure an adequate quantity of compressed air in the receivers. For EDG operation after the start, the likelihood of occurrence of a malfunction is reduced since the EDG no longer needed control air to provide its design function.

This change did not introduce any new failure modes which would result in a common mode failure affecting two or more diesels. Therefore, the proposed activity did not create a possibility for a malfunction of an SSC important to safety with a different result than any previously evaluated in the UFSAR. The conclusion of the evaluation was that the proposed activity could be implemented under 10 CFR 50.59 without requiring prior NRC review or approval.

**Plant References:**

EC 70110

**Title:** Upgrade Unit 2 Feedwater Heater Drain Controls

**Evaluation Identification Number:** Action Request 1966456

**Brief Description:**

The scope of this change is to upgrade the existing pneumatic Feedwater Heater Drain Level Control components with numerous digital components.

**Summary of 10 CFR 50.59 Evaluation:**

Installation of the new equipment will not have an adverse impact on the equipment in the environment such that performance of an existing system(s) used for accident detection will be more than minimally degraded compared to existing requirements. It can be reasonably concluded there is no clear trend toward increasing the likelihood of a malfunction of the feed water heater drain system after installation of this equipment. Thus, this change will not result in more than a minimal increase in the likelihood of occurrence of a malfunction of an SSC important to safety previously evaluated in the UFSAR. The equipment affected by this activity is strictly associated with non-safety related equipment. This activity makes no changes to existing interactions nor does it create new interactions between safety related and non-safety related systems. The activity has been evaluated per 10 CFR 50.59, and following the guidance provided in NEI 96-07 and NEI 01-01. The conclusion of the evaluation was that the proposed activity could be implemented under 10 CFR 50.59 without requiring prior NRC review or approval.

**Plant References:**

EC 277569

**Title:** Replace Excitation System on the Emergency Diesel Generators

**Evaluation Identification Number:** Action Request 1970919

**Brief Description:**

Replacement of the motor operated potentiometer (MOP) with the RA-70 digital reference adjuster is intended to increase Emergency Diesel Generator (EDG) system reliability. Motor-operated potentiometers have been problematic at a number of installations, often because the MOP is considered the weakest link in any voltage regulating system.

**Summary of 10 CFR 50.59 Evaluation:**

The RA-70 was evaluated and qualified to perform its intended function based on industry and regulatory accepted practices. The device has been fully qualified to operate in nuclear safety related applications. The software is relatively simple and has been thoroughly vetted per the requirements of EPRI TR-106439 and IEEE 7-4.3.2. The RA-70 has been environmentally qualified to operate in the EDG environment during normal and accident conditions. The failure modes and results of the RA-70 are equivalent to the failure modes and results of the MOP and the overall effect at the system level is the same. The conclusion of the evaluation was that the proposed activity could be implemented under 10 CFR 50.59 without requiring prior NRC review or approval.

**Plant References:**

EC 270989

**Title:** Change in Allen Bradley 700-RTC to Include Complex Programmable Logic Device Timing Chip

**Evaluation Identification Number:** Action Request 1989883

**Brief Description:**

This was a change to the Allen Bradley 700-RTC relay to include a Complex Programmable Logic Device (CPLD) timing chip in place of the Application Specific Integrated Circuit (ASIC) based timing chip. This evaluation addressed the acceptability of using the CPLD version of this Allen Bradley timing relay in all locations that it was currently installed.

**Summary of 10 CFR 50.59 Evaluation:**

The electrical and mechanical properties of the Emergency Diesel Generator (EDG) system was not be changed in such a way as to affect the operational capabilities of the EDG system. The response time of the EDG system was not adversely affected. Similarly the Control Rod Drive (CRD) system was not impacted by the use of the CPLD chip. Installation of the CPLD based timing relays did not increase burdens or constraints on the operators' ability to adequately respond to an accident. The initial accident assessments contained in the UFSAR remained unchanged as a result of the implementing activity. The new equipment was evaluated to verify compliance with its environment including temperature, humidity, seismic, and electromagnetic interference, and the new equipment had no adverse impact on its installed environment or another plant SSC. The conclusion of the evaluation was that the proposed activity could be implemented under 10 CFR 50.59 without requiring prior NRC review or approval.

**Plant References:**

EC 300888



**Title:** Unit 2 Alternate Battery Charger Installation

**Evaluation Identification Number:** Action Request 2023372

**Brief Description:**

The scope of this change is to provide Unit 2 Division I and Division II each with a 125 VDC alternate safety related battery charger.

**Summary of 10 CFR 50.59 Evaluation:**

The change in testing methodology represents an adverse effect of the change package and it is in the way a battery charger UFSAR described design function is performed or controlled, as the chargers will not always be required to recharge the station batteries at greater than 200 amperes.

This evaluation assesses a change in the method that the battery chargers are tested to ensure that the design capability of the charges is met. The criteria is based on the initial recharge rate following the battery service test and the steady state loads when restoring the battery from the design minimum charge state to the fully charged state. The UFSAR describes the current supplied by the chargers following the service test when supplying current to the batteries as well as current to the normal DC bus loads. With the addition of an alternate charger, testing of all chargers in accordance with the established process could prevent a battery service test from being performed if one of the chargers were out of service during its performance. An alternate means of testing using a load bank eliminates the requirement to restore a charger to service for the battery service test. The new means of testing the battery chargers provides sufficient validation that the chargers are capable of meeting the established criteria. The conclusion of the evaluation was that the proposed activity could be implemented under 10 CFR 50.59 without requiring prior NRC review or approval.

**Plant References:**

EC 294283

**Title:** Adding New Fuel Zone Water Level Instruments

**Evaluation Identification Number:** Action Request 2031186

**Brief Description:**

Pressure-compensated Fuel Zone Water Level (FZWL) indications will be installed under this change. The FZWL project is replacing the uncompensated FZWL level recorder (LR) with a configurable Yokogawa DX1012N digital recorder, and adding, in parallel with the level indicator (LI), a configurable Thermo Scientific SV10AC digital recorder. The recorders will utilize analog reactor pressure inputs to establish density-compensated values for the reactor water level indications.

**Summary of 10 CFR 50.59 Evaluation:**

The proposed changes were evaluated to be acceptable for use in the facility, without adverse effect on other plant equipment. These evaluations include seismic acceptability, electromagnetic compatibility, acceptable heat and power loadings, software verification and validation, and instrument scaling. The methods used for evaluation are not described in the UFSAR. No new methods of evaluation are required to assess the new equipment installed as part of this activity. The approach to evaluate, calculate, and document the post-accident level indication design and licensing requirements are not adversely impacted and remain identical to the current practice. No alternative or new approaches are required. The conclusion of the evaluation was that the proposed activity could be implemented under 10 CFR 50.59 without requiring prior NRC review or approval.

**Plant References:**

EC 300785

**Summary of Changes, Tests, and Experiments Requiring 10 CFR 72.48 Evaluations**

**Table of Contents**

**Activity Title**

**Page**

There were no 10 CFR 72.48 evaluations during the reporting period.

## **Regulatory Commitment Change Summary Report**

### **Table of Contents**

| <b><u>Activity Title</u></b> | <b><u>Page</u></b> |
|------------------------------|--------------------|
|------------------------------|--------------------|

There were no regulatory commitment changes during the reporting period.