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Serial: BSEP 17-0019

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
Response to Request for Additional Information Regarding License Amendment Request for Reactor Protection System (RPS) Electrical Protection Assembly (EPA) Electric Power Monitoring Surveillance Requirements (SRs) 3.3.8.2.2 and 3.3.8.2.3

References:

1. Letter from William R. Gideon (Duke Energy) to U.S. Nuclear Regulatory Commission, *Request for License Amendment – Reactor Protection System (RPS) Electrical Protection Assembly (EPA) Electric Power Monitoring Surveillance Requirements (SRs) 3.3.8.2.2 and 3.3.8.2.3*, dated April 13, 2016, ADAMS Accession Number ML16111B203

2. NRC E-mail Capture, *Brunswick Unit 1 and Unit 2 Request for Additional Information Related to Request to Revise SRs 3.3.8.2.2 and 3.3.8.2.3 (CAC Nos. MF7602 and MF7603)*, dated January 31, 2017, ADAMS Accession Number ML17031A292

Ladies and Gentlemen:

By letter dated April 13, 2016 (i.e., Reference 1), Duke Energy Progress, LLC, submitted a license amendment request (LAR) for the Brunswick Steam Electric Plant (BSEP), Unit Nos. 1 and 2. The proposed amendment would revise the Allowable Values of Surveillance Requirements (SR) contained in Technical Specifications (TS) 3.3.8.2, "RPS Electric Power Monitoring." Specifically, the TS change proposed to amend the Reactor Protection System (RPS) electric power monitoring assembly Allowable Values for overvoltage and undervoltage contained within SR 3.3.8.2.2 and SR 3.3.8.2.3.

On January 31, 2017, by electronic mail (i.e., Reference 2), the NRC provided a request for additional information (RAI) regarding the LAR. Duke Energy's response is provided in the enclosure of this letter.

No new regulatory commitments are contained in this letter.

Designated as original
3/28/17

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NRR

Please refer any questions regarding this submittal to Mr. Lee Grzeck, Manager – Regulatory Affairs, at (910) 457-2487.

I declare, under penalty of perjury, that the foregoing is true and correct. Executed on March 1, 2017.

Sincerely,

William R. Gideon

WRG/mkb

Enclosures:

1. Response to Request for Additional Information
2. Nuclear Generation Group Calculation 1C71-0016, Revision 1, *Reactor Protection System Power Monitor Overvoltage, Undervoltage, Underfrequency, and Time Delay Uncertainty and Setpoint Calculation*

cc:

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cc (with Enclosure 1 only)

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Response to Request for Additional Information

By letter dated April 13, 2016 (i.e., Reference 1 in the cover letter), Duke Energy Progress, LLC, submitted a license amendment request (LAR) for the Brunswick Steam Electric Plant (BSEP), Unit Nos. 1 and 2. The proposed amendment would revise the Allowable Values (AV) of Surveillance Requirements (SR) contained in Technical Specifications (TS) 3.3.8.2, *RPS Electric Power Monitoring*. Specifically, the TS change proposed to amend the Reactor Protection System (RPS) electric power monitoring assembly Allowable Values for overvoltage and undervoltage contained within SR 3.3.8.2.2 and SR 3.3.8.2.3.

On January 31, 2017, by electronic mail (i.e., Reference 2 in the cover letter), the NRC provided a request for additional information (RAI) regarding the LAR. Duke Energy's response is provided below.

NRC RAI:

Request 1:

Section 2.2 of Enclosure 1 of the subject license amendment request (LAR) states, in part, that "[d]uring the review of the EC [Engineering Change], issues were identified with the current RPS EPA setpoints that could potentially allow the SSPV coils to operate above their design maximum voltage rating and below their minimum design voltage rating based on worst case conditions and when calculated voltage drops are taken into account."

The LAR did not explain the reason, the type, or the severity of the issues identified. Therefore, the NRC staff requests the licensee to:

(a) Explain the reason, the type, and the severity of the issues identified
(b) Submit a copy of the updated calculation and associated methodology used to perform the calculation for NRC staff review.
(c) If not included in the calculation, provide the voltage rating of the AVCO solenoids in order for the NRC staff to assure that the voltages selected are conservative with regard to the equipment rated voltages.

BSEP Response 1(a):

The design and licensing basis of the Electrical Protection Assembly (EPA) breaker setting is to protect the scram solenoid pilot valves (SSPVs) from prolonged exposure (i.e., greater than a few seconds) to voltages beyond their design limits of 115 +/- 10 VAC (i.e., 105 to 125 VAC). In determining the ASCO setpoints, circa August 1996, Calculations 1C71-0016, Rev. 0 and 2C72-0019, Rev. 0, used the transient voltage conditions and not the sustained voltage values when determining the design limits. The maximum voltage design limit was based on a maximum "surge" voltage of 138V per the General Electric (GE) Reactor Protection System (RPS) Design Specification, No. 22A1480, Revision 3, and the minimum voltage design limit is based on a minimum voltage "excursion" of 95 V per the BSEP Design Basis Document (DBD)-03, Revision 001, *Reactor Protection System*.

As a result, for the original ASCO type SSPVs, the overvoltage trip setpoint for EPA breakers 1/2-C71/C72-EPA5 and 1/2-C71/C72-EPA6 (i.e., alternate power supply) was higher than required to ensure the SSPV coils operate below their design maximum voltage rating. The

overvoltage trip setpoint (i.e., 130 VAC) for the alternate power supply through EPA-5/6 may not open the breaker until voltage reaches 131 VAC, potentially exposing the SSPV coils to a voltage above their upper design limit of 125 VAC (i.e., 128 VAC worst case when a nominal voltage drop of 3 VAC to the devices is taken into account). Also, the undervoltage trip setpoint for 1/2-C71/C72-EPA1, 1/2-C71/C72-EPA2, 1/2-C71/C72-EPA3 and 1/2-C71/C72-EPA4 (i.e., normal power supply) was lower than required to ensure the SSPV coils operate above their design minimum voltage rating. The undervoltage trip setpoint (i.e., 107 VAC) for the normal power supply through EPA-1/2/3/4 may not open until 106 VAC, potentially exposing the SSPV coils to a voltage below their lower design limit of 105 VAC (i.e., 103 VAC worst case when a nominal voltage drop of 3 VAC to the devices is taken into account).

BSEP Response 1(b):

The requested setpoint calculation has been included as Enclosure 2 of this submittal.

BSEP Response 1(c):

The requested information is contained in the calculation provided in Enclosure 2 of this submittal.

Request 2:

Section 3 of Enclosure 1 of the LAR states that the EPA provides underfrequency protection, the setpoint of which is defined in SRs 3.3.8.2.2 and 3.3.8.2.3 as being a frequency of ≥ 57.2 Hz. However, there is no mention in the LAR whether there is any change pertaining to the frequency being required for the solenoid valve replacement.

Please confirm that there are no changes to the frequency settings or associated equipment.

BSEP Response 2:

There are no changes to the frequency settings. Per Calculation 1C71-0016, the AVs and device setpoint remain the same (i.e., unchanged) at 57.2 Hz and 57.7 Hz, respectively. The Design Limit for the RPS EPA underfrequency function is 57.0 Hz. This value is based on the protective circuitry requirement of -5.0% of 60 Hz as found in BSEP DBD-03, Revision 007, *Reactor Protection System*. This is conservative based on the minimum qualified frequency of 56.5 Hz per Brunswick Design Report (DR) 296, Rev. 0, *Wyle Laboratories Test Report 44400R96-1*.