William R. Gideon
Vice President
Brunswick Nuclear Plant
P.O. Box 10429
Southport, NC 28461

o: 910.832.3698

December 4, 2017

Serial: BSEP 17-0116

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 Request for Risk-Informed Exigent License Amendment - Technical Specification 3.8.1, *AC Sources – Operating,* One-Time Extension of Emergency Diesel Generator Completion Times and Suspension of Surveillance Requirements

References:
1. Letter from William R. Gideon (Duke Energy) to the U.S. Nuclear Regulatory Commission Document Control Desk, *Request for Risk-Informed Exigent License Amendment - Technical Specification 3.8.1, AC Sources – Operating, One-Time Extension of Emergency Diesel Generator Completion Times and Suspension of Surveillance Requirements*, dated November 28, 2017, ADAMS Accession Number ML17326B619

2. NRC E-mail Capture, *Brunswick Unit 1 and Unit 2 Request for Additional Information Related [to] the Exigent Amendment Request for One-Time Extension of EDG Completion Times - Electrical Engineering (EPID: L-2017-LLA-0398)*, dated December 4, 2017

Ladies and Gentlemen:

By letter dated November 28, 2017 (i.e., Reference 1), Duke Energy Progress, LLC (Duke Energy), submitted a one-time, risk-informed exigent license amendment request (LAR) for the Brunswick Steam Electric Plant (BSEP), Unit Nos. 1 and 2. The proposed license amendment would extend the current Completion Time of Technical Specification (TS) 3.8.1, Required Action D.5, from the original 14 days to 44 days, and a commensurate change to extend the maximum Completion Time associated with discovery of failure to meet TS 3.8.1.a or b (i.e., from the original 17 days to 47 days). These changes are being requested in order to avoid an unnecessary shutdown of both Unit 1 and Unit 2. In addition, consistent with defense-in-depth philosophy, Duke Energy also requested to suspend monthly testing of Emergency Diesel Generators (EDGs) 1, 2, and 3 per Surveillance Requirement (SR) 3.8.1.2, SR 3.8.1.3, and SR 3.8.1.6 during the proposed extended Completion Times, if applicable.

On December 4, 2017, by electronic mail (i.e., Reference 2), the NRC provided a request for additional information (RAI) regarding the LAR. Duke Energy's response to the RAI is enclosed.

This document contains no new regulatory commitments.

I declare, under penalty of perjury, that the foregoing is true and correct. Executed on December 4, 2017.

Sincerely,

William R. Gideon

WRM/wrm

Enclosure: Response to Request for Additional Information

cc: 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. Gale Smith, NRC Senior Resident Inspector
8470 River Road
Southport, NC 28461-8869

U. S. Nuclear Regulatory Commission, Region II
ATTN: Mr. Mark E. Franke, Acting Director Division of Reactor Projects
245 Peachtree Center Ave, NE, Suite 1200
Atlanta, GA 30303-1257

U. S. Nuclear Regulatory Commission
ATTN: Undine Shoop, Chief
Plant Licensing Branch II-2
11555 Rockville Pike
Rockville, MD 20852-2738

U. S. Nuclear Regulatory Commission
ATTN: Mr. Andrew Hon **(Electronic Copy Only)**
11555 Rockville Pike
Rockville, MD 20852-2738

Chair - North Carolina Utilities Commission
P.O. Box 29510
Raleigh, NC 27626-0510

Mr. W. Lee Cox, III, Section Chief **(Electronic Copy Only)**
Radiation Protection Section
North Carolina Department of Health and Human Services
1645 Mail Service Center
Raleigh, NC 27699-1645
lee.cox@dhhs.nc.gov

Response to Request for Additional Information

By letter dated November 28, 2017, Duke Energy Progress, LLC (Duke Energy), submitted a one-time, risk-informed exigent license amendment request (LAR) for the Brunswick Steam Electric Plant (BSEP), Unit Nos. 1 and 2. The proposed license amendment would extend the current Completion Time of Technical Specification (TS) 3.8.1, Required Action D.5, from the original 14 days to 44 days, and a commensurate change to extend the maximum Completion Time associated with discovery of failure to meet TS 3.8.1.a or b (i.e., from the original 17 days to 47 days). These changes are being requested in order to avoid an unnecessary shutdown of both Unit 1 and Unit 2. In addition, consistent with defense-in-depth philosophy, Duke Energy also requested to suspend monthly testing of Emergency Diesel Generators (EDGs) 1, 2, and 3 per Surveillance Requirement (SR) 3.8.1.2, SR 3.8.1.3, and SR 3.8.1.6 during the proposed extended Completion Times, if applicable.

On December 4, 2017, by electronic mail, the NRC provided a request for additional information (RAI) regarding the LAR. Those questions, and Duke Energy's responses, are provided below.

NRC Request

Regulatory Bases: GDC 17, "Electric power systems," of Appendix A to Part 50 of Title 10 of the *Code of Federal Regulations* requires, in part, that nuclear power plants have onsite and offsite electric power systems to permit the functioning of structures, systems, and components (SSCs) that are important to safety. Provisions shall be included to minimize the probability of losing electric power from any of the remaining supplies as a result of, or coincident with, the loss of power generated by the nuclear power unit, the loss of power from the transmission network, or the loss of power from the onsite electric power supplies.

EEOB-RAI-1(a)

(a) Please provide a brief discussion of the load testing performed on SUPP-DG in the recent past (e.g., date of performance, loading data, etc.) and the results to ensure its availability during the Completion Time extension.

Response to EEOB-RAI-1(a):

0PT-12.26, *Supplemental Diesel Generator Load Test*, was last performed on October 31, 2017. The load test operates the supplemental diesel generator (SUPP-DG) between 3,850 kW and 4,150 kW and maintains a 0.8 power factor for one hour to satisfy the surveillance. SUPP-DG load testing is next scheduled to be performed December 5, 2017.

EEOB-RAI-1(b)

(b) Please provide a discussion to confirm that the protection devices (breaker/relay etc.) associated with SUPP-DG have been coordinated with the downstream protection devices.

Response to EEOB-RAI-1(b):

The coordination, as documented in EC 279694 Attachment B.5.13, provides protection for the SUPP-DG. Other devices' protection schemes are coordinated to protect the buses. From EC 279694, Attachment B.5.13:

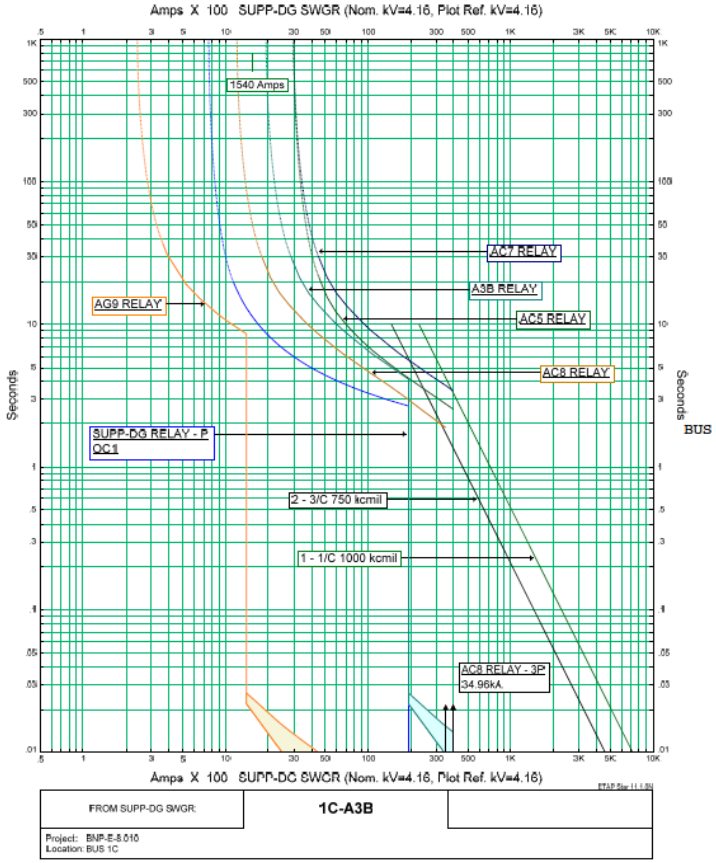
The over-current protection (50/51V) of the 700G relay has been set to protect the cable as shown on Figure 1. As shown on Figure 1, when the SUPP-DG is feeding an emergency bus, a fault on the emergency bus will actuate the 700G over-current protection before the fault is cleared by the emergency bus over-current protection, which is not selective coordination (i.e., protective device closest to the fault will actuate first). If the emergency bus being fed by the SUPP-DG is not available due to a fault, then the SUPP-DG would no longer be capable of feeding the bus and non-selective tripping of the output breaker is acceptable. Therefore, the relay settings selected will provide adequate coordination and cable protection.

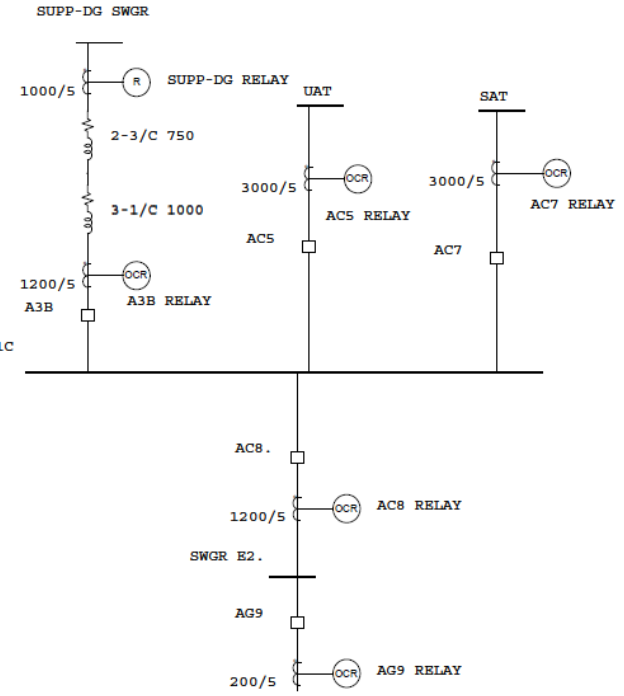
The existing protection from the 4160 V supply breaker to the safety-related load breakers is coordinated. This coordination is independent of the relay settings that protect the SUPP-DG. The coordination analysis is documented in calculation BNP-E-8.010, Attachment B. There are four Time Current Characteristic Curves due to the multiple line-ups possible with the SUPP-DG. All four are similar. Only one is discussed below.

Figure 1 is one of the Time Current Characteristic Curves for the SUPP-DG. In the event of a short circuit exceeding 20 kA, overcurrent relays AG9 and SUPP-DG will trip instantaneously (i.e., with a time delay setting of 0.1 seconds).

The SUPP-DG is rated at 4,000 kW and its short circuit current is 5.5 kA (i.e., Full Load Amps / subtransient reactance). If a fault is greater than 5.5 kA, but less than 20 kA for approximately 4+ seconds, the SUPP-DG relay will trip to protect itself if the AG9 relay has not tripped at a lower value.

Figure 1


Amps X 100 SUPP-DG SWGR (Nom. kV=4.16, Plot Ref. kV=4.16)
1540 Amps
AC7 RELAY
A3B RELAY
AG9 RELAY
AC5 RELAY
AC8 RELAY
SUPP-DG RELAY - P
QC1
2 - 3/C 750 kcmil
1 - 1/C 1000 kcmil
AC8 RELAY - 3P
34.96kA
Seconds
Amps X 100 SUPP-DG SWGR (Nom. kV=4.16, Plot Ref. kV=4.16)
FROM SUPP-DG SWGR:
1C-A3B
Project: BNP-E-8.010
Location: BUS 1C


SUPP-DG SWGR
1000/5
R
SUPP-DG RELAY
2-3/C 750
3-1/C 1000
1200/5
A3B
OCR
A3B RELAY
BUS 1C
UAT
3000/5
OCR
AC5 RELAY
AC5
SAT
3000/5
OCR
AC7 RELAY
AC7
AC8.
1200/5
OCR
AC8 RELAY
SWGR E2.
AG9
200/5
OCR
AG9 RELAY

EEOB-RAI-2

In the LAR, on Page 21 (continued on Page 22) of Enclosure, the following is stated:

> "The other EDGs, offsite sources of power and the associated engineered safety equipment will remain operable and the SUPP-DG will remain available to mitigate the consequences of any previously analyzed accident."

Since, SUPP-DG can take up to an hour to provide power to an emergency bus, if needed, please explain how the SUPP-DG can contribute to mitigating the consequences of any previously analyzed accident.

Response:

Note that the High Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) systems are not addressed in the following discussion since the systems would be lost due to reactor depressurization during a Large Break and Medium Break Loss of Coolant Accident (LOCA).

The Brunswick units are designed such that each unit can be safely shutdown with only one division of Emergency Core Cooling Systems (ECCS) powered per unit. The listing below shows the major ECCS equipment for a LOCA that is powered by each EDG.

EDG 1	**EDG 2**	**EDG 3**	**EDG 4**
1A CS pump	1B CS pump	2A CS pump	2B CS pump
1A CS Valves	1B CS valves	2A CS valves	2B CS valves
1C RHR pump	1D RHR pump	1A RHR pump	1B RHR pump
2C RHR pump	2D RHR pump	2A RHR pump	2B RHR pump
2A LPCI valves	2B LPCI valves	1A LPCI valves	1B LPCI valves

With EDG 4 out of service, a loss of EDG 1 would result in one Core Spray (CS) loop remaining available on both units, along with the 1A and 2D Residual Heat Removal (RHR) pump and associated Low Pressure Coolant Injection (LPCI) system injection valves being available.

With EDG 4 out of service, a loss of EDG 2 would result in one CS loop remaining available on both units, along with the 1A, 1C, 2A, and 2C RHR pumps and associated LPCI injection valves being available.

Therefore, a failure of either EDG 1 or EDG 2 (i.e., with EDG 4 out of service) would allow the safe shutdown of both units, without reliance on the SUPP-DG or emergency bus cross-ties. The SUPP-DG could then be used to supply either of the de-energized 4160 V emergency buses, as determined by the Operations Shift Manager, providing power to additional ECCS pumps and valves for additional injection and containment cooling or sprays.

In the probabilistic risk analysis, the SUPP-DG is not credited for Large Break or Medium Break LOCAs, due to the timing of those accident scenarios. The SUPP-DG may be able to contribute to mitigating smaller break LOCAs along with other non-LOCA initiators, should the timing of those scenarios be longer than the necessary hour to provide power to an emergency bus and that bus is not powered by offsite power.

The SUPP-DG would be required in cases of a Loss of Offsite Power (LOOP) coincident with either an unavailable or failed EDG. Probabilistically, a LOCA associated with LOOP is considered insignificant. Deterministically, a LOOP and LOCA with a component unavailability or failure (i.e., such as EDG 4 being unavailable) is within the design basis of the unit; therefore, the SUPP-DG is not required for those accidents.