



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
WASHINGTON, D.C. 20555-0001

October 5, 2018

Mr. Daniel G. Stoddard
Senior Vice President and
Chief Nuclear Officer
Innsbrook Technical Center
5000 Dominion Blvd.
Glen Allen, VA 23060-6711

**SUBJECT: SURRY POWER STATION, UNIT NOS. 1 AND 2, ISSUANCE OF
AMENDMENTS REVISING TECHNICAL SPECIFICATIONS SECTION 3.16,
"EMERGENCY POWER SYSTEM," FOR A TEMPORARY 21-DAY ALLOWED
OUTAGE TIME (EPID L-2017-LLA-0380)**

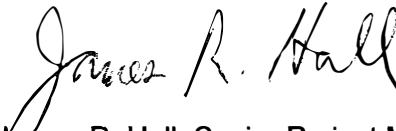
Dear Mr. Stoddard:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No. 293 to Renewed Facility Operating License No. DPR-32 and Amendment No. 293 to Renewed Facility Operating License No. DPR-37 for the Surry Power Station (SPS), Unit Nos. 1 and 2, respectively. The amendments revise the Technical Specifications (TSs) in response to your application dated November 7, 2017, as supplemented by letters dated June 21, 2018 and October 3, 2018.

The amendments revise the SPS, Unit Nos. 1 and 2, TS 3.16, "Emergency Power System" to provide a temporary, one-time 21-day allowed outage time (AOT) for replacement of Reserve Station Service Transformer (RSST) C and associated cabling.

A copy of the related Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

A handwritten signature in black ink that reads "James R. Hall". The signature is written in a cursive style with a large initial "J" and "H".

James R. Hall, Senior Project Manager
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-280 and 50-281

Enclosures:

1. Amendment No. 293 to DPR-32
2. Amendment No. 293 to DPR-37
3. Safety Evaluation

cc: Listserv



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

VIRGINIA ELECTRIC AND POWER COMPANY

DOCKET NO. 50-280

SURRY POWER STATION, UNIT NO. 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 293
Renewed License No. DPR-32

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Virginia Electric and Power Company (the licensee) dated November 7, 2017, as supplemented by letters dated June 21, 2018 and October 3, 2018, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

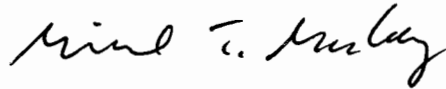
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 3.B of Renewed Facility Operating License No. DPR-32 is hereby amended to read as follows:

B. Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 293, are hereby incorporated in the renewed license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 60 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Michael T. Markley, Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to License No. DPR-32
and the Technical Specifications

Date of Issuance: October 5, 2018



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

VIRGINIA ELECTRIC AND POWER COMPANY

DOCKET NO. 50-281

SURRY POWER STATION, UNIT NO. 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 293
Renewed License No. DPR-37

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Virginia Electric and Power Company (the licensee) dated November 7, 2017, as supplemented by letters dated June 21, 2018 and October 3, 2018, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

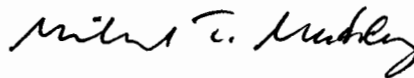
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 3.B of Renewed Facility Operating License No. DPR-37 is hereby amended to read as follows:

B. Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 293, are hereby incorporated in the renewed license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 60 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Michael T. Markley, Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to License No. DPR-37
and the Technical Specifications

Date of Issuance: October 5, 2018

ATTACHMENT TO
SURRY POWER STATION, UNIT NOS. 1 AND 2
LICENSE AMENDMENT NO. 293
RENEWED FACILITY OPERATING LICENSE NO. DPR-32
DOCKET NO. 50-280
AND
LICENSE AMENDMENT NO. 293
RENEWED FACILITY OPERATING LICENSE NO. DPR-37
DOCKET NO. 50-281

Replace the following pages of the Licenses and the Appendix A Technical Specifications (TSs) with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove Pages

License

License No. DPR-32, page 3
License No. DPR-37, page 3

TSs

TS 3.16-3

TS 3.16-7

Insert Pages

License

License No. DPR-32, page 3
License No. DPR-37, page 3

TSs

TS 3.16-3
TS 3.16-3a
TS 3.16-7
TS 3.16-7a
TS 3.16-7b

3. This renewed license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations: 10 CFR Part 20, Section 30.34 of 10 CFR Part 30, Section 40.41 of 10 CFR Part 40, Sections 50.54 and 50.59 of 10 CFR Part 50, and Section 70.32 of 10 CFR Part 70; and is subject to all applicable provisions of the Act and the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified below:

A. Maximum Power Level

The licensee is authorized to operate the facility at steady state reactor core power levels not in excess of 2587 megawatts (thermal).

B. Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 293 are hereby incorporated in the renewed license. The licensee shall operate the facility in accordance with the Technical Specifications.

C. Reports

The licensee shall make certain reports in accordance with the requirements of the Technical Specifications.

D. Records

The licensee shall keep facility operating records in accordance with the requirements of the Technical Specifications.

E. Deleted by Amendment 65

F. Deleted by Amendment 71

G. Deleted by Amendment 227

H. Deleted by Amendment 227

I. Fire Protection

The licensee shall implement and maintain in effect the provisions of the approved fire protection program as described in the Updated Final Safety Analysis Report and as approved in the SER dated September 19, 1979, (and Supplements dated May 29, 1980, October 9, 1980, December 18, 1980, February 13, 1981, December 4, 1981, April 27, 1982, November 18, 1982, January 17, 1984, February 25, 1988, and

- E. Pursuant to the Act and 10 CFR Parts 30 and 70, to possess, but not separate, such by product and special nuclear materials as may be produced by the operation of the facility.
3. This renewed license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations: 10 CFR Part 20, Section 30.34 of 10 CFR Part 30, Section 40.41 of 10 CFR Part 40, Sections 50.54 and 50.59 of 10 CFR Part 50, and Section 70.32 of 10 CFR Part 70; and is subject to all applicable provisions of the Act and the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified below:
- A. Maximum Power Level

The licensee is authorized to operate the facility at steady state reactor core power Levels not in excess of 2587 megawatts (thermal)
 - B. Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 293 are hereby incorporated in this renewed license. The licensee shall operate the facility in accordance with the Technical Specifications.
 - C. Reports

The licensee shall make certain reports in accordance with the requirements of the Technical Specifications.
 - D. Records

The licensee shall keep facility operating records in accordance with the Requirements of the Technical Specifications.
 - E. Deleted by Amendment 54
 - F. Deleted by Amendment 59 and Amendment 65
 - G. Deleted by Amendment 227
 - H. Deleted by Amendment 227

2. If a primary source is not available, the unit may be operated for seven (7) days provided the dependable alternate source can be OPERABLE within 8 hours. If specification A-4 is not satisfied within seven (7) days, the unit shall be brought to COLD SHUTDOWN.(*)
3. One battery may be inoperable for 24 hours provided the other battery and battery chargers remain OPERABLE with one battery charger carrying the DC load of the failed battery's supply system. If the battery is not returned to OPERABLE status within the 24 hour period, the reactor shall be placed in HOT SHUTDOWN. If the battery is not restored to OPERABLE status within an additional 48 hours, the reactor shall be placed in COLD SHUTDOWN.
4. One buried fuel oil storage tank may be inoperable for 7 days for tank inspection and related repair, provided the following actions are taken:
 - a. prior to removing the tank from service, verify that 50,000 gallons of replacement fuel oil is available offsite and transportation is available to deliver that volume of fuel oil within 48 hours, and
 - b. prior to removing the tank from service and at least once every 12 hours, verify that the remaining buried fuel oil storage tank contains $\geq 17,500$ gallons, and
 - c. prior to removing the tank from service and at least once every 12 hours, verify that the above ground fuel oil storage tank contains $\geq 50,000$ gallons.

(*) To facilitate the replacement of the Reserve Station Service Transformer C and associated cabling during the fall 2018 Unit 2 refueling outage, the use of a temporary, one-time, 21-day allowed outage time (AOT) is permitted for the unavailability of a primary source. Prior to entry into and during the 21-day AOT, the following actions shall be taken:

- Within 30 days prior to entering the temporary 21-day AOT, functionality of the Alternate AC (AAC) System, (i.e., the supplemental power source) shall be verified.
- During the 21-day AOT, the functionality of the AAC System shall be checked once per shift. If the AAC System becomes non-functional at any time during the 21-day AOT, it shall be restored to functional status within 24 hours, or the unit shall be brought to HOT SHUTDOWN within the next 6 hours and COLD SHUTDOWN within the following 30 hours.

If these conditions are not satisfied or if the buried fuel oil storage tank is not returned to OPERABLE status within 7 days, both units shall be placed in HOT SHUTDOWN within the next 6 hours and COLD SHUTDOWN within the following 30 hours.

- C. The continuous running electrical load supplied by an emergency diesel generator shall be limited to 2750 KW.

Basis

The Emergency Power System is an on-site, independent, automatically starting power source. It supplies power to vital unit auxiliaries if a normal power source is not available. The Emergency Power System consists of three diesel generators for two units. The Unit 1 diesel generator and the Unit 2 diesel generator are dedicated to emergency buses 1H and 2H, respectively. A third diesel generator is provided as a "swing diesel" and is shared by Units 1 and 2. Upon receipt of a safety injection signal on a unit, the shared diesel generator automatically aligns to either emergency bus 1J (Unit 1) or 2J (Unit 2) as a backup power supply for the accident unit. The shared diesel is configured to preferentially load to the Unit 2 emergency bus on a loss of offsite power without a safety injection signal. The Unit 1 and Unit 2 diesel generators also supply power for certain common or shared plant systems/components. The diesel generators have a cumulative 2,000 hour rating of 2750 KW. The actual loads are verified by engineering calculation to remain below the 2750 kw limit.

TS action statement 3.16.B.1.a.2 provides an allowance to avoid unnecessary testing of an OPERABLE EDG(s). If it can be determined that the cause of an inoperable EDG does not exist on the OPERABLE EDG(s), operability testing does not have to be performed. If the cause of the inoperability exists on the other EDG(s), then the other EDG(s) would be declared inoperable upon discovery, and the applicable required action(s) would be entered. Once the failure is repaired, the common cause failure no longer exists and the operability testing requirement for the OPERABLE EDG(s) is satisfied. If the cause of the initial inoperable EDG cannot be confirmed not to exist on the remaining EDG(s), performance of the operability test within 24 hours provides assurance of continued operability of those EDG(s).

In the event the inoperable EDG is restored to OPERABLE status prior to completing the operability testing requirement for the OPERABLE EDG(s), the corrective action program will continue to evaluate the common cause possibility, including the other unit's EDG or the shared EDG. This continued evaluation, however, is no longer under the 24-hour constraint imposed by the action statement.

According to Generic Letter 84-15 (Ref. 6), 24 hours is reasonable to confirm that the OPERABLE EDG(s) is not affected by the same problem as the inoperable EDG.

Reserve Station Service Transformer (RSST) C is the primary offsite power source for the 1H and 2J Emergency Buses via transfer bus F. To facilitate the replacement of RSST-C and associated cabling during the fall 2018 Unit 2 refueling outage, Technical Specification 3.16.B.2 is modified by a footnote permitting the use of a temporary, one time, 21-day allowed outage time (AOT). The 21-day AOT will permit Unit 1 to continue to operate for 21 days. While RSST-C is unavailable during replacement, transfer bus F will be powered from the dependable alternate source (i.e, backfeed through the Unit 2 Main Step-up Transformer/2C Station Services Transformer). The backfeed power supply will allow transfer bus F to perform its normal function while RSST-C is being replaced. Prior to entry into the 21-day AOT, the following actions shall be taken:

1. Within 30 days prior to entering the temporary 21-day AOT, functionality of the Alternate AC (AAC) System (i.e., the supplemental power source) shall be verified.
2. During the 21-day AOT, the functionality of the AAC System shall be checked once per shift. If the AAC System becomes non-functional at any time during the 21-day AOT, it shall be restored to functional status within 24 hours, or the unit shall be brought to HOT SHUTDOWN within the next 6 hours and COLD SHUTDOWN within the following 30 hours.

The verification of functionality of the AAC System prior to entering the temporary 21-day AOT will be based on the previous satisfactory quarterly test. The once per shift functionality check will be performed during shiftly operator rounds.

In addition to verifying and checking functionality of the AAC System prior to and during the temporary 21-day AOT, the following actions will also be taken:

- Weather conditions will be monitored and preplanned maintenance will not be scheduled if severe weather conditions are anticipated.
- The system load dispatcher will be contacted once per day to ensure no significant grid perturbations (high grid loading unable to withstand a single contingency of line or generation outage) are expected during the temporary 21-day AOT.
- Component testing or maintenance of safety systems and important non-safety equipment in the offsite power systems that can increase the likelihood of a plant transient (unit trip) or LOOP will be avoided. In addition, no discretionary switchyard maintenance will be performed.
- TS required systems, subsystems, trains, components, and devices that depend on the remaining power sources will be verified to be operable and positive measures will be provided to preclude subsequent testing or maintenance activities on these systems, subsystems, trains, components, and devices.
- Operation or maintenance of plant equipment when its redundant equipment or train is out of service will be controlled in accordance with procedure OP-SU-601, "Protected Equipment." The Unit 1 steam-driven Auxiliary Feedwater Pump will be controlled as "Protected Equipment" during the temporary 21-day AOT.
- The status of the AAC diesel generator, EDGs, RSST-A and RSST-B will be monitored once per shift.

References

- (1) UFSAR Section 8.5 Emergency Power System
- (2) UFSAR Section 9.3 Residual Heat Removal System
- (3) UFSAR Section 9.4 Component Cooling System
- (4) UFSAR Section 10.3.2 Auxiliary Steam System
- (5) UFSAR Section 10.3.5 Condensate and Feedwater System
- (6) Generic Letter 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability," dated July 2, 1984



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO

AMENDMENT NO. 293 TO RENEWED FACILITY OPERATING LICENSE NO. DPR-32

AND

AMENDMENT NO. 293 TO RENEWED FACILITY OPERATING LICENSE NO. DPR-37

VIRGINIA ELECTRIC AND POWER COMPANY

SURRY POWER STATION, UNIT NOS. 1 AND 2

DOCKET NOS. 50-280 AND 50-281

1.0 INTRODUCTION

By letter dated November 7, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17317A464), as supplemented by letters dated June 21, 2018 and October 3, 2018, (ADAMS Accession Nos. ML18178A167 and ML18277A171), Virginia Electric and Power Company (the licensee) submitted a request for changes to the Technical Specifications (TSs) for the Surry Power Station (SPS), Unit Nos. 1 and 2. The requested changes would revise TS 3.16, "Emergency Power System," to provide a temporary, one-time 21-day allowed outage time (AOT) for replacement of Reserve Station Service Transformer (RSST) C and associated cabling.

The supplements dated June 21, 2018 and October 3, 2018, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on February 13, 2018 (83 FR 6236).

The proposed change would support replacement of RSST-C during the upcoming SPS, Unit No. 2, fall 2018 refueling outage.

2.0 REGULATORY EVALUATION

The licensee received its construction permits for both SPS units in 1968. SPS Unit No. 1 was licensed for operation in December 1972 and SPS Unit No. 2 was licensed for operation in May 1973. During the initial plant licensing of SPS, Unit Nos. 1 and 2, design of the SPS electrical distribution system met the regulatory requirements in place at that time. The plants' design approval for the construction phase was based on the proposed general design criteria (GDC) published by the Atomic Energy Commission (AEC) for public comment in the *Federal Register* (32 FR 10213) on July 11, 1967 (the "draft GDC"). The draft GDC included Criterion 4 (Sharing of Systems) and Criterion 39 (Emergency Power for Engineered Safety Features),

which are applicable to the proposed change. On February 20, 1971, the AEC published in the *Federal Register* (36 FR 3255) a final rule that added Appendix A to 10 CFR Part 50, "General Design Criteria for Nuclear Power Plants" (the "final GDC"). Differences between the draft GDC and final GDC included a consolidation from 70 to 64 criteria. As discussed in the NRC Staff Requirements Memorandum for SECY-92-223, "Resolution of Deviations Identified During the Systematic Evaluation Program," dated September 18, 1992 (ADAMS Accession No. ML003763736), the Commission decided not to apply the final GDC to plants with construction permits issued prior to May 21, 1971. However, per SPS Updated Final Safety Analysis Report (UFSAR) Chapter 8, "Electrical Systems," the SPS electrical distribution system was technically evaluated and determined to be in compliance with final GDC Criterion 17, "Electric Power System."

The U.S. Nuclear Regulatory Commission (NRC) staff applied the following regulatory requirements and guidance documents for review of the license amendment request (LAR).

- SPS UFSAR Chapter 8, "Electrical Systems" - The electrical systems are designed to supply electrical power to all essential unit equipment during normal operation and under accident conditions. The electrical power distribution system for the Surry Power Station provides duplicate systems for emergency components. Each system is continuously energized from the external system grid or from onsite diesel generators. The system is designed such that should a loss of offsite power (LOOP) occur, the onsite diesel generators will power the emergency power system.
- SPS UFSAR Section 1.4.4, "Sharing of Systems" - Reactor facilities do not share systems or components unless it is shown safety is not impaired by sharing.
- SPS UFSAR Section 1.4.39, "Emergency Power for Engineered Safeguards" - Alternative power systems are provided and designed with adequate independence, redundancy, capacity, and testability to permit the functioning required of the engineered safeguards. As a minimum, the onsite power system and offsite power system each, independently provide this capacity, assuming the failure of a single active component in each power system.
- Section 10 CFR 50.36, "Technical specifications" - Requires, in part, that the TSs and a summary statement of the bases for such specifications shall be included by applicants for a license authorizing operation of a production or utilization facility. Specifically, 10 CFR 50.36(c) requires that TSs include items in five specific categories related to station operation. These categories are (1) safety limits, limiting safety system settings, and limiting control settings, (2) limiting conditions for operation (LCOs), (3) surveillance requirements, (4) design features, and (5) administrative controls. The proposed change to the SPS TS relates to the LCO category.
- Section 10 CFR 50.36(c)(2), "Limiting conditions for operation" - Provides the requirements for the establishment of TS limiting conditions for operation. Specifically, 10 CFR 50.36(c)(2)(i) provides that limiting conditions for operation are the lowest functional capability or performance levels of equipment required for safe operation of the facility. When a limiting condition for operation of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the technical specifications until the condition can be met.

- Section 10 CFR 50.63, "Loss of all alternating current power" - Requires, in part, that a nuclear power plant shall be able to withstand for a specified duration and recover from a complete loss of offsite and onsite alternating current (AC) sources (i.e., a station blackout (SBO)).
- Section 10 CFR 50.65, "Requirements for monitoring the effectiveness of maintenance at nuclear power plants" - Requires, in part, that the licensee shall monitor the performance or conditions of structures, systems or components in a manner sufficient to provide reasonable assurance that these structures systems and components are capable of fulfilling their intended functions.

The NRC staff also reviewed the LAR based on the following regulatory guidance documents:

- NUREG-0800, BTP 8-8, February 2012 (ADAMS Accession No. ML113640138), provides guidance to the NRC staff in reviewing LARs for licensees proposing a one-time or permanent TS change to extend an Emergency Diesel Generator (EDG) AOT beyond 72 hours. The BTP 8-8 emphasizes that more defense-in-depth is needed for SBO scenarios that are more likely to occur as compared to the likely occurrence of the large and medium size loss-of-coolant accident scenarios (which require a fast start EDG).
- NUREG-0800, Standard Review Plan, Section 19.2, "Review of Risk Information Used to Support Permanent Plant-Specific Changes to the Licensing Basis: General Guidance," June 2007 (ADAMS Accession No. ML071700658) provides guidance to the NRC staff on how information from a probabilistic risk analysis (PRA) can be combined with other pertinent information in the process of making a regulatory decision. Specifically, Appendix D defines those conditions or situations that constitute "special circumstances" where additional risk information may be required.
- Regulatory Guide (RG) 1.93, "Availability of Electric Power Sources," March 2012 (ADAMS Accession No. ML090550661), provides guidance with respect to operating restrictions on completion times (CTs) if the number of available AC sources is less than that required by the TS LCO. In particular, this guide recommends a maximum CT of 72 hours for an inoperable onsite or offsite AC source where the available onsite or offsite power source is one less than the LCO.
- RG 1.155, "Station Blackout," August 1988 (ADAMS Accession No. ML003740034), provides guidance for complying with 10 CFR 50.63 that requires nuclear power plants to be capable of coping with an SBO event for a specified duration.
- RG 1.177, "An Approach for Plant-Specific, Risk-Informed Decision making: Technical Specifications," May 2011 (ADAMS Accession No. ML100910008), describes an acceptable risk-informed approach for assessing proposed changes to TS AOTs, also known as CTs.

The SPS TSs are custom for the plant and were derived at the time of initial licensing. The terms completion time (CT) and allowed outage time (AOT) are used interchangeably throughout to describe the amount of time for which a limiting condition for operation may not be met as long as the prescribed remedial actions in the TSs are followed, in accordance with 10 CFR 50.36(c)(2)(i).

3.0 TECHNICAL EVALUATION

3.1 Description of the SPS Alternating Current Electrical Power System

The SPS switchyard and offsite electric power system are described in the UFSAR Chapter 8. The SPS offsite power system is comprised of 500 kilo Volt (kV) and 230 kV transmission systems. The 230 kV switchyard power system is physically and electrically independent of the 500 kV switchyard. The two (2) independent switchyards supply the System (Switchyard) Reserve Transformers (SRTs) with offsite power. There are three (3) SRTs. The 500 kV switchyard supplies SRT-1 (500/36.5-kV transformer), and the 230 kV switchyard supplies SRT-2 (230/36.5-kV transformer) and SRT-4 (230/36.5-kV transformer). Offsite power can be supplied to SRT-1 from three (3) independent sources. Offsite power can be supplied to SRT-2 and SRT-4 from ten (10) independent sources.

The SRTs supply the Reserve Station Service Transformers (RSSTs). The SRTs are designated as the primary offsite power sources. There are three (3) RSSTs. SRT-1 supplies RSST-A and/or RSST-B, SRT-2 supplies RSST-C, and SRT-4 can supply RSST-A and/or RSST-B, or RSST-C.

As described in Chapter 8, Section 8.3 of the UFSAR, each SPS unit is designed with two (2) independent 4,160 V emergency buses and associated switchgear. The RSSTs supply these safety-related buses during all modes of operation (normal, start-up and shutdown). Each RSST is sized to start up a single unit or shutdown both units. Emergency Buses 1H and 1J supply the Unit 1 safety-related loads, and Emergency Buses 2H and 2J supply the Unit 2 safety-related loads. Each safety-related emergency bus has capacity to carry 100 percent of the emergency loads. RSST-A supplies Emergency Bus 1J, RSST-B supplies Emergency Bus 2H, and RSST-C supplies Emergency Buses 1H and 2J.

The Emergency Power System, which provides a backup power source for the emergency buses, consists of three (3) diesel generators (DGs). The DGs have a cumulative 2,000 hour rating of 2,750 kilo Watts (KW). The standby power supply functions as a source of alternating current (AC) power for plant safe shutdown in the event of loss of preferred power and for post-accident operation of engineered safety feature loads. The Unit 1 DG and the Unit 2 DG are dedicated to Emergency Buses 1H and 2H, respectively. The Unit 1 and Unit 2 DGs also supply power for certain common or shared plant systems/components. The third DG is provided as a "swing diesel" that is shared by Units 1 and 2. Upon receipt of a safety injection signal on a unit, the shared DG automatically aligns to either Emergency Bus 1J or 2J as a backup power supply for the accident unit. The shared diesel is configured to preferentially load to the Unit 2 emergency bus on a LOOP without a safety injection signal.

3.2 Description of the Proposed Changes to the TSs and Operating Licenses

In the LAR dated November 7, 2017, the licensee provided the following basis for the one-time 21-day AOT:

1. The existing RSST-C is the original plant equipment and is reaching the end of its dependable service life. Replacement of RSST-C will assure continued dependable and safe generation of electrical power. The proposed temporary 21-day AOT is needed to allow sufficient time to replace RSST-C and associated cabling while permitting Unit 1 to maintain normal power operation. The temporary 21-day AOT

also precludes the unnecessary transient of shutting down Unit 1 and the attendant risk. The RSST-C installation activity includes replacement of components that support RSST operation, including associated cabling, the load tap changer, monitoring equipment, overhead disconnect switches, sudden pressure relays, and protective relays. A detailed evaluation of the proposed RSST-C installation activities determined that 21 days is sufficient time to complete installation, with margin.

2. Current Technical Specifications Requirements - TS 3.9, "Station Service Systems," requires the following:

- 3.9.A.1: A unit's reactor shall not be made critical without all three of the unit's 4,160 V buses energized.
- 3.9.A.5: Both of the 4,160 V emergency buses energized as explained in Section 3.16.

3. TS Action 3.16.B.2 requires that the unit be brought to cold shutdown after 7 days if (a) "a primary source is not available" or (b) "specification A-4 is not satisfied."

The licensee stated that an operating unit is required to have both 4,160 V Emergency Buses (1H and 1J) energized from separate primary circuits from the offsite transmission network. The primary circuits are SRTs 1, 2, and 4. Emergency Bus 1J is normally supplied by SRT-1 via Transfer Bus D and RSST-A. Emergency Bus 1H is normally supplied by SRT-2 via Transfer Bus F and RSST-C. Taking off RSST-C for replacement will result in the loss of a primary source for Unit 1 Emergency Bus 1H, requiring a Unit 1 shutdown within 7 days based on the current TS required CT. Since replacement of RSST-C is estimated to take longer than the current TS required CT of 7 days, the licensee is requesting a one-time 21-day AOT to allow Unit 1 to continue to operate during the AOT with Emergency Bus 1H supplied by a dependable alternate source of power.

The licensee stated that the Emergency Bus 2H is normally supplied by SRT-1 via Transfer Bus E and RSST-B, and Emergency Bus 2J is normally supplied by SRT-2 via Transfer Bus F and RSST-C.

The licensee proposed to revise TS 3.16.B.2 to add a temporary one-time extension of the primary source AOT from 7 days to 21 days as follows:

- TS 3.16.B.2 If a primary source is not available, the unit may be operated for seven (7) days provided the dependable alternate source can be OPERABLE within 8 hours. If specification [3.16.] A-4 is not satisfied within seven (7) days, the unit shall be brought to COLD SHUTDOWN. (*)

(*) To facilitate replacement of the Reserve Station Service Transformer C and associated cabling during the fall 2018 Unit 2 refueling outage, the use of a temporary, one-time, 21-day allowed outage time (AOT) is permitted for the unavailability of a primary source. Prior to entry into and during the 21-day AOT, the following actions shall be taken:

- Within 30 days prior to entering the temporary 21-day AOT, functionality of the Alternate AC (AAC) System (i.e., the supplemental power source) shall be verified.
- During the 21-day AOT, the functionality of the AAC System shall be checked once per shift. If the AAC System becomes non-functional at any time during the 21-day AOT, it shall be restored to functional status within 24 hours, or the unit shall be brought to HOT SHUTDOWN within the next 6 hours and COLD SHUTDOWN within the following 30 hours.

In the LAR dated November 7, 2017, the licensee also proposed to add License Condition 3.V to the Renewed Facility Operating Licenses for SPS Unit Nos. 1 and 2, as follows:

- V. As discussed in the footnote to Technical Specification 3.16.B.2, the use of a temporary 21-day allowed outage time will permit Unit 1 to continue to operate for 21 days during the fall 2018 Unit 2 refueling outage to facilitate replacement of Reserve Station Service Transformer C and associated cabling (Reference: Letter Serial No. 17-435, dated November 7, 2017).

However, upon determining that the proposed license condition is unnecessary, the licensee withdrew this part of the license amendment request by letter dated October 3, 2018.

3.3 NRC Staff's Evaluation

The NRC staff considered the guidance in RG 1.177, Revision 1, in assessing the proposed changes. The NRC staff's assessment considered relevant safety margins and defense-in-depth attributes, including the success criteria, as well as equipment functionality, reliability, and availability.

3.3.1 Defense-in-depth for Onsite and Offsite Power Sources during the Proposed AOT

In the LAR, the licensee stated that in response to 10 CFR 50.63, an Alternate Alternating Current (AAC) system was installed to provide AC power to one emergency bus on each unit during a Station Blackout (SBO) event. The AAC System is non-safety related and is designed in accordance with the Regulatory Guide 1.155 and NUMARC 87-00, Appendix B.2. If all offsite power sources fail, reliable onsite power is ensured by the EDGs and/or the AAC System. In Attachment 2 of the LAR, the licensee provided various compensatory measures as regulatory commitments (see Section 3.4 of this SE) that the licensee will implement during the proposed 21-day AOT.

The licensee used Section B of BTP 8-8 to substantiate the proposed extension of the AOT. Section B of the BTP 8-8 states:

A supplemental power source should be available as a backup to the inoperable EDG or offsite power source, to maintain the defense-in-depth design philosophy of the electrical system to meet its intended safety function.

The LAR indicated that the licensee will use the installed AAC System, in conjunction with the compensatory measures provided as Attachment 2 to the LAR, as defense-in-depth measures to meet the intent of BTP 8-8, to maintain additional safety margin against any extended LOOP event coincident with unavailability of both EDGs in a single unit. In the LAR, the licensee

stated that during the 21-day AOT, the functionality of the AAC System will be checked once per shift. If the AAC System becomes non-functional at any time during the 21-day AOT, it will be restored to functional status within 24 hours, or the unit will be brought to HOT SHUTDOWN within the next 6 hours and COLD SHUTDOWN within the following 30 hours.

The UFSAR Section 8.4.6 states that the installed AAC DG is independent from the emergency DGs. The AAC DG and its auxiliaries are housed in a separate building located south of the Radwaste Facility. The air start system contains sufficient capacity for five starts and the fuel oil system for the AAC diesel contains sufficient fuel to operate the DG at 3,640 kW for the postulated 4-hour SBO duration. The LAR indicates that to maintain the system in a standby state, there is a keep warm system consisting of a jacket water heater with a circulating pump and a lube oil heater with a circulating pump. Additionally, an ungrounded 125 V direct current system is provided for the 4 kV and 480 V AC switchgear controls, DG controls, and generator protection.

The UFSAR Section 8.4.6 also states that the SPS AAC System is designed to provide power to the emergency buses within 10 minutes of determining that an SBO event has occurred and is sized to carry the loads necessary to bring both units to a safe shutdown condition and maintain them in a safe shutdown condition for the postulated 4 hour SBO event duration.

The UFSAR Section 8.4.6 further states that the AAC generator is connected to the station via 4 kV Buses 0M and 0L. Bus 0L is located in the Unit 2 normal switchgear room and provides connection from Bus 0M to Transfer Buses D and E, which in turn allows connection to Emergency Buses 1J and 2H, respectively. Following a loss of AC power on either Transfer Bus D or Bus E in conjunction with the loss of power on Transfer Bus F, the AAC DG will receive an automatic start signal. Momentary trip signals to breakers associated with the 0M and 0L Buses ensure that the AAC System is initially isolated. Once the generator has reached proper speed and voltage, breakers automatically close to power Buses 0M and 0L, and a manual action is then required to energize Transfer Buses D or E.

In the LAR, the licensee stated that proposed temporary 21-day AOT configuration will not challenge the defense-in-depth provisions for a LOOP because each emergency bus will continue to be backed up by an EDG and/or AAC System DG as follows:

- Emergency Bus 1J will be backed up by EDG 3 and the AAC DG
- Emergency Bus 1H will be backed up by EDG 1
- Emergency Bus 2H will be backed up by EDG 2 and the AAC DG
- Emergency Bus 2J is backed up by EDG 3

Prior to entry into and during the 21-day AOT, the licensee stated that the following actions will be taken:

1. Within 30 days prior to entering the temporary 21-day AOT, functionality of the AAC System (i.e., the supplemental power source) will be verified.
2. During the 21-day AOT, the functionality of the AAC System will be checked once per shift. If the AAC System becomes non-functional at any time during the 21-day

AOT, it will be restored to functional status within 24 hours, or the unit will be brought to HOT SHUTDOWN within the next 6 hours and COLD SHUTDOWN within the following 30 hours.

Based on the above, the NRC staff concludes that the licensee's use of the AAC System as a backup to the EDG or offsite power source during the proposed temporary one-time 21-day AOT is consistent with the guidance in BTP 8-8 and RG 1.155. Additionally, the proposed 21-day AOT configuration and operating restrictions will preserve the defense-in-depth because each switchyard (230 kV and 500 kV) has multiple sources of offsite power, each emergency bus is continuously supplied from a physically and electrically independent offsite power source, and each emergency bus can be supplied by either an EDG or a supplemental AC power source (AAC DG).

In the LAR, the licensee stated that verification of functionality of the AAC System prior to entering the temporary 21-day AOT will be based on the previous satisfactory quarterly test. Once per shift functionality checks will be performed during operator rounds.

In the LAR and a letter dated June 21, 2018, the licensee stated that SPS has several procedures in place to identify and repair a non-functional AAC System and restore the AAC System within 24 hours. The licensee stated that if a failure of the AAC System occurs during the proposed temporary 21-day AOT, it will be identified either by Operations rounds performed once a shift using 0-LOG-OS-001 R, *Outside Logs*, or by Main Control Room annunciator 0-WD-D2, *AAC System Alarm*. The licensee also stated that plant operators will take appropriate actions in accordance with the established procedures to repair and restore the AAC.

Based on the above information provided by the licensee, the NRC staff finds that operators' use of existing plant procedures to restore the AAC System within 24 hours, if it becomes non-functional during the proposed 21-day AOT, is consistent with the guidance in BTP 8-8 and RG 1.93. Therefore, the use of existing procedures to identify and repair a non-functional AAC System is acceptable.

Because the licensee's use of the AAC System is consistent with the guidance in BTP 8-8, and the configuration and operating restrictions during the 21-day AOT will preserve the defense-in-depth, the NRC staff concludes that the use of the AAC System is acceptable.

3.3.2 Safety Margin

In the LAR, the licensee stated that the proposed TS change will allow use of the Unit 2 dependable alternate power source as the primary source for Buses 1H and 2J for a period of up to 21 days. The licensee stated that the proposed change will not result in plant operation in a configuration outside the current design basis because the design basis includes use of the Unit 2 dependable alternate source. The licensee indicated that during the proposed 21 day AOT, the margin of safety will be maintained by maintaining the capability to supply Emergency Buses 1H and 2J with a redundant, separate, reliable offsite power source, and maintaining the onsite power sources in their design basis configuration. Under the licensee's proposed change, Transfer Bus F and Emergency Buses 1H and 2J will be powered from the dependable alternate source (i.e., backfeed through the Unit 2 Main Step-up Transformer 2 and Transformer SS-TX-2C) during the replacement of RSST-C.

The NRC staff concludes that Transfer Bus F will continue to supply power to Emergency Buses 1H and 2J through backfeed from the Unit No. 2 Main Step-up Transformer 2 and Transformer SS-TX-2C during the proposed temporary one-time 21-day AOT in a manner that is similar to the design basis configuration. The NRC staff further concludes that backfeed power supply will allow Transfer Bus F to perform its normal design basis functions to supply the required electrical power to the pumps for the steam generators make up and core cooling. The proposed backfeed power supply to Transfer Bus F from Unit No. 2 Main Step-up Transformer 2 and Transformer SS-TX-2C is only intended for the 21-day AOT and is a temporary configuration.

In the LAR, the licensee used GDC 17 to evaluate the proposed changes in the LAR. In Section 7.0 of the LAR, the licensee asserted that the design function of the Emergency Power System and the station's compliance with GDC 17 are not affected by the proposed change.

Based on the above and review of the proposed configuration, the NRC staff concludes that the proposed backfeed from Unit 2 Main Step Up Transformer 2 would ensure that electric power from at least one of the onsite or offsite power sources will be available following a loss-of-coolant accident to ensure that core cooling, containment integrity, and other vital safety functions will be maintained. The NRC staff further concludes that the impact on safety margin will be minimal and is acceptable.

The NRC staff reviewed whether the proposed TS change will have any adverse impact on the licensee's compliance with SPS UFSAR Section 1.4.4, SPS UFSAR Section 1.4.39, 10 CFR 50.36, 10 CFR 50.63 and 10 CFR 50.65. Due to defense-in-depth of onsite and offsite power sources, the NRC staff finds that for the more likely LOOP and SBO scenarios, the reduction in safety margin is expected to be minimal. Thus, the NRC staff concludes that there is no adverse impact on continued compliance with these regulatory requirements.

3.3.3 Risk Insights Evaluation

In the LAR dated November 7, 2017, the licensee stated:

During the 21-day temporary AOT, the increase in risk will be assessed and managed in accordance with the requirements of 10 CFR 50.65(a)(4). Online risk for Surry Unit 1 will be assessed using a PRA model dedicated to the purpose of performing configuration risk analysis. Shutdown risk for Surry Unit 2 will be managed in accordance with Surry's shutdown risk management program. Configurations that approach or exceed the limits defined in NUMARC 93-01 are identified and either avoided or addressed by risk management actions. Emergent configurations are identified and analyzed by the on-shift staff for prompt determination of whether risk management actions are needed.

The licensee further stated that the proposed TS AOT extension is a "one-time, 21-day allowed outage time [...] for replacement of Reserve Station Service Transformer (RSST) C and associated cabling." Consistent with BTP 8-8 the licensee provided deterministic input with risk insights. Because the requested changes are consistent with currently approved NRC staff positions, this LAR is not a risk-informed LAR and a risk evaluation was not submitted by the licensee for the purpose of making a regulatory decision. The NRC staff determined that "special circumstances" as discussed in NUREG-0800, Section 19.2, "Review of Risk Information Used to Support Permanent Plant-Specific Changes to the Licensing Basis; General Guidance," (ADAMS Accession No. ML071700658), which necessitate providing additional risk

information where undue risk may exist even when all regulatory requirements are satisfied, do not exist in this case. As such, the NRC staff did not request any additional risk information associated with review of this LAR.

The PRA models used by the licensee to derive the submitted risk insights were not reviewed by the staff to determine their technical acceptability to support this LAR. As a result, the staff did not rely on numerical results for its regulatory decision. The staff performed an independent risk analysis using SAPHIRE Version 8.1.7 and the plant-specific NRC Standardized Plant Analysis Risk (SPAR) model. The plant-specific SPAR model was configured to assess the risk impact contribution from internal events. In addition, the NRC staff determined that consideration of the contribution of internal fire, seismic, and high winds does not impact the insights.

The risk insights provided by licensee in Section 3.4 of the LAR and the insights from the plant-specific NRC SPAR model both support the traditional engineering analysis conclusions associated with the licensee's proposed compensatory actions. The available risk insights do not challenge the engineering conclusions that the proposed change maintains defense-in-depth.

The NRC staff concludes that the licensee's plan for compliance with 10 CFR 50.65(a)(4) ensures that the risk impact of a 21-day AOT during replacement of RSST-C and associated cabling is appropriately assessed and managed for the one time TS change requested.

3.3.4 Human Factors

In the LAR dated November 7, 2017, Section 3.1, "Design Basis Configuration," the licensee stated that the current offsite and onsite electrical power distribution systems will be utilized to support the proposed 21-day AOT. This includes voltage and current loading level indications in the control room. However, the licensee noted that the AOT configuration replaces the normal primary power supply to emergency buses 1H and 2J with the designated dependable alternate source. The alternate electrical source, which normally requires 8 hours to connect, will be immediately available because it will be pre-connected and in service. In addition, the existing onsite power supplies will remain available to the emergency buses. Therefore, the licensee stated that no new or additional operator actions are required to support the proposed 21-day AOT.

In the LAR, Section 3.2, "Temporary, One-Time, 21-day AOT Configuration," the licensee stated that defense-in-depth is preserved during the proposed 21-day AOT as follows:

Defense-In-Depth is preserved because each emergency bus is continuously supplied from a physically and electrically independent offsite source, each emergency bus can be supplied by an emergency diesel generator, and each switchyard (230 kV and 500 kV) has multiple sources of offsite power.

The licensee further stated that operators retain the ability to manually select alternate power sources but the prearranged automatic transfer capability remains functional upon the failure of the normal electrical power source.

As indicated by the licensee, no additional equipment or systems will be utilized to support emergency electrical loads during the 21-day AOT and the emergency electrical loads will continue to be supplied by the current plant configuration. In the LAR, Section 3.3, "Design

Analysis,” the licensee stated that the existing load shedding scheme as described in SPS UFSAR Section 8.4.1 is not altered by the AOT configuration. In addition, the operating restrictions described in the LAR, Section 3.2, “Temporary, One-time, 21-day AOT Configuration,” are pre-executed and do not require specific operator manual actions to be performed during the proposed 21-day AOT.

The NRC staff concludes that the proposed temporary, one-time 21-day AOT does not involve the introduction of new or altered operator manual actions and does not introduce any new human factors considerations. Therefore, the NRC staff concludes that the proposed temporary, one-time 21-day AOT is acceptable with regard to human factors considerations.

3.4 Proposed Compensatory Measures

Attachment 2 of the LAR includes compensatory measures provided as regulatory commitments to meet the guidance in BTP 8-8 to assure safe shutdown during inoperability of one offsite circuit associated with modifications related to the RSST-C and associated cabling during the time when RSST-C will be out of service during the Unit 2 fall 2018 outage:

1. The temporary 21-day AOT will be used only once during the fall 2018 Unit 2 refueling outage to complete the RSST-C and associated cabling replacement.
2. Weather conditions will be monitored and preplanned maintenance will not be scheduled if severe weather conditions are anticipated.
3. The system load dispatcher will be contacted once per day to ensure no significant grid perturbations (high grid loading unable to withstand a single contingency of line or generation outage) are expected during the temporary 21-day AOT.
4. Component testing or maintenance of safety systems and important non-safety equipment in the offsite power systems that can increase the likelihood of a plant transient (unit trip) or LOOP will be avoided. In addition, no discretionary switchyard maintenance will be performed.
5. TS required systems, subsystems, trains, components, and devices that depend on the remaining power sources will be verified to be operable and positive measures will be provided to preclude subsequent testing or maintenance activities on these systems, subsystems, trains, components, and devices.
6. Operation or maintenance of plant equipment when its redundant equipment or train is out of service will be controlled in accordance with procedure OP-SU-601, “Protected Equipment”. The Unit 1 steam-driven auxiliary feed water pump will be controlled as “Protected Equipment” during the temporary 21-day AOT.
7. The status of the AAC diesel generator, EDGs, RSST-A and RSST-B will be monitored once per shift.

The NRC staff finds the proposed compensatory measures acceptable, but does not rely on regulatory commitments in its basis for this regulatory approval.

4.0 TECHNICAL CONCLUSION

The NRC staff has reviewed the licensee's proposed change to the SPS TS 3.16.B.2 to extend the current 7-day AOT to a temporary one-time AOT of 21 days for the replacement of the RSST-C and associated cabling. Based on the NRC Staff's review of the licensee compensatory measures, operating restrictions, and the deterministic technical evaluation in Section 3.0 of this SE, the NRC staff concludes that the proposed remedial actions inserted into TS 3.16.B.2 for the 21-day AOT are acceptable and that the proposed change will not impact the licensee's continuous compliance with the applicable regulatory requirements in SPS UFSAR Section 1.4.4, SPS UFSAR Section 1.4.39, 10 CFR Sections 50.36(c)(2), 50.63 and 50.65, and meets the intent of 10 CFR 50 Appendix A, GDC 17, as provided in SPS UFSAR Chapter 8.

5.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Virginia State official was notified of the proposed issuance of the amendments. On August 17, 2018, the State official confirmed that the Commonwealth of Virginia had no comments.

6.0 ENVIRONMENTAL CONSIDERATION

The amendments change requirements with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and change surveillance requirements. The NRC staff has determined that the amendments involve no significant increase in the amounts and no significant change in the types of any effluents that may be released offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (83 FR 6236). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

7.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

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Date: October 5, 2018

SUBJECT: SURRY POWER STATION, UNIT NOS. 1 AND 2, ISSUANCE OF AMENDMENTS REVISING TECHNICAL SPECIFICATIONS SECTION 3.16, "EMERGENCY POWER SYSTEM," FOR A TEMPORARY 21-DAY ALLOWED OUTAGE TIME (EPID L-2017-LLA-0380) DATED OCTOBER 5, 2018

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***via email**

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