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

November 17, 2016

Mr. Charles R. Pierce
Regulatory Affairs Director
Southern Nuclear Operating Co., Inc.
P.O. Box 1295, Bin 038
Birmingham, AL 35201-1295

SUBJECT: JOSEPH M. FARLEY NUCLEAR PLANT, UNITS 1 AND 2 – ISSUANCE OF AMENDMENTS RELATED TO TECHNICAL SPECIFICATION 3.3.5 (CAC NOS. MF7106 AND MF7107)

Dear Mr. Pierce:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 206 to Renewed Facility Operating License No. NPF-2 and Amendment No. 202 to Renewed Facility Operating License No. NPF-8 for the Joseph M. Farley Nuclear Plant, Units 1 and 2, respectively. The amendments consist of changes to the technical specifications (TSs) in response to your application dated November 20, 2015, as supplemented by letters dated January 12, April 11, and June 30, 2016.

The amendments revise the setpoint requirements in TS 3.3.5, "Loss of Power Diesel Generator Start Instrumentation." The change was requested to fulfill a license condition to eliminate the manual actions in lieu of automatic degraded voltage protection to assure adequate voltage to safety-related equipment during design-basis events.

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

Sincerely,

Shawn Williams

Shawn A. Williams, Senior Project Manager
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-348 and 50-364

Enclosures:
1. Amendment No. 206 to NPF-2
2. Amendment No. 202 to NPF-8
3. Safety Evaluation

cc w/enclosures: Distribution via Listserv

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

SOUTHERN NUCLEAR OPERATING COMPANY, INC.

ALABAMA POWER COMPANY

DOCKET NO. 50-348

JOSEPH M. FARLEY NUCLEAR PLANT, UNIT 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 206
Renewed License No. NPF-2

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment to the Joseph M. Farley Nuclear Plant, Unit 1, (the facility), Renewed Facility Operating License No. NPF-2, filed by Southern Nuclear Operating Company, Inc. (the licensee), dated November 20, 2015, as supplemented by letters dated January 12, April 11, and June 30, 2016, 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 license 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 2.C.(2) of Renewed Facility Operating License No. NPF-2, is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 206, are hereby incorporated in the renewed license. Southern Nuclear 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 90 days 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 the Renewed Facility
Operating License and
Technical Specifications

Date of Issuance: November 17, 2016

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

SOUTHERN NUCLEAR OPERATING COMPANY

ALABAMA POWER COMPANY

DOCKET NO. 50-364

JOSEPH M. FARLEY NUCLEAR PLANT, UNIT 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 202
Renewed License No. NPF-8

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment to the Joseph M. Farley Nuclear Plant, Unit 2, (the facility), Renewed Facility Operating License No. NPF-8, filed by Southern Nuclear Operating Company, Inc. (the licensee), dated November 20, 2015, as supplemented by letters dated January 12, April 11, and June 30, 2016, 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 license 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 2.C.(2) of Renewed Facility Operating License No. NPF-8 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 202, are hereby incorporated in the renewed license. Southern Nuclear 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 90 days 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 the Renewed Facility
Operating License
and Technical Specifications

Date of Issuance: November 17, 2016

ATTACHMENT TO JOSEPH M. FARLEY NUCLEAR PLANTS

UNITS 1 AND 2

LICENSE AMENDMENT NO. 206

TO RENEWED FACILITY OPERATING LICENSE NO. NPF-2

DOCKET NO. 50-348

AND LICENSE AMENDMENT NO. 202

TO RENEWED FACILITY OPERATING LICENSE NO. NPF-8

DOCKET NO. 50-364

Replace the following pages of the Renewed Facility Operating Licenses and 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	Insert
License	License
NPF-2, page 4	NPF-2, page 4
NPF-8, page 3	NPF-8, page 3
TSs	TSs
3.3.5-1	3.3.5-1
3.3.5-2	3.3.5-2
3.3.5-3	3.3.5-3
---	3.3.5-5

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 206, are hereby incorporated in the renewed license. Southern Nuclear shall operate the facility in accordance with the Technical Specifications.

(3) Additional Conditions

The matters specified in the following conditions shall be completed to the satisfaction of the Commission within the stated time periods following the Issuance of the renewed license or within the operational restrictions indicated. The removal of these conditions shall be made by an amendment to the renewed license supported by a favorable evaluation by the Commission.

a. Southern Nuclear shall not operate the reactor in Operational Modes 1 and 2 with less than three reactor coolant pumps in operation.

b. Deleted per Amendment 13

c. Deleted per Amendment 2

d. Deleted per Amendment 2

e. Deleted per Amendment 152

Deleted per Amendment 2

f. Deleted per Amendment 158

g. Southern Nuclear shall maintain a secondary water chemistry monitoring program to inhibit steam generator tube degradation. This program shall include:

1) Identification of a sampling schedule for the critical parameters and control points for these parameters;

2) Identification of the procedures used to quantify parameters that are critical to control points;

3) Identification of process sampling points;

4) A procedure for the recording and management of data;

5) Procedures defining corrective actions for off control point chemistry conditions; and

(2) Alabama Power Company, pursuant to Section 103 of the Act and 10 CFR Part 50, "Licensing of Production and Utilization Facilities," to possess but not operate the facility at the designated location in Houston County, Alabama in accordance with the procedures and limitations set forth in this renewed license.

(3) Southern Nuclear, pursuant to the Act and 10 CFR Part 70, to receive, possess and use at any time special nuclear material as reactor fuel, in accordance with the limitations for storage and amounts required for reactor operation, as described in the Final Safety Analysis Report, as supplemented and amended;

(4) Southern Nuclear, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess, and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;

(5) Southern Nuclear, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess, and use in amounts as required any byproducts, source or special nuclear material without restriction to chemical or physical form for sample analysis or instrument calibration or associated with radioactive apparatus or components; and

(6) Southern Nuclear, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

C. This renewed license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporate below:

(1) Maximum Power Level

Southern Nuclear is authorized to operate the facility at reactor core power levels not in excess of 2775 megawatts thermal.

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 202, are hereby incorporated in the renewed license. Southern Nuclear shall operate the facility in accordance with the Technical Specifications.

(3) Delete per Amendment 144

(4) Delete Per Amendment 149

(5) Delete per Amend 144

3.3 INSTRUMENTATION

3.3.5 Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation

LCO 3.3.5 The LOP instrumentation for each Function in Table 3.3.5-1 and Table 3.3.5-2 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.5-1 and Table 3.3.5-2.

----------NOTES----------
1. For Unit 1, use Table 3.3.5-1 until Mode 4 entry following the spring 2018 outage (1R28); thereafter use Table 3.3.5-2.
2. For Unit 2, use Table 3.3.5-1 until Mode 4 entry following the fall 2017 outage (2R25); thereafter use Table 3.3.5-2.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ----------NOTE---------- Only applicable to Functions 1 and 2. ---------- One or more functions with one channel per train inoperable.	A.1 ----------NOTE---------- The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels. ---------- Place channel in trip.	6 hours
B. ----------NOTE---------- Only applicable to Functions 1 and 2. ---------- One or more Functions with two or more channels per train inoperable.	B.1 Restore all but one channel per train to OPERABLE status.	1 hour

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time of Condition A or B not met.	C.1 Enter applicable Condition(s) and Required Action(s) for the associated DG made inoperable by LOP DG start instrumentation.	Immediately
D. ----------NOTE---------- Only applicable to Function 3. ---------- One Alarm Function channel inoperable on one or more trains.	D.1 Verify voltage on associated bus is ≥ 3850 volts.	Once per 4 hours
E. Required Action and associated Completion Time of Condition D not met.	E.1 Restore bus voltage to ≥ 3850 volts.	1 hour
F. Required Action and associated Completion Time of Condition E not met.	F.1 Be in MODE 3. AND F.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.5.1	----------NOTES---------- 1. TADOT shall exclude actuation of the final trip actuation relay for LOP Functions 1 and 2. 2. Setpoint verification not required. ---------- Perform TADOT.	In accordance with the Surveillance Frequency Control Program
SR 3.3.5.2	----------NOTE---------- CHANNEL CALIBRATION shall exclude actuation of the final trip actuation relay for Functions 1 and 2. ---------- Perform CHANNEL CALIBRATION.	In accordance with the Surveillance Frequency Control Program
SR 3.3.5.3	----------Note---------- Response time testing shall include actuation of the final trip actuation relay. ---------- Verify ESF RESPONSE TIME within limit.	In accordance with the Surveillance Frequency Control Program

Table 3.3.5-2 (page 1 of 1)
Loss of Power Diesel Generator Start Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRAIN	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	DELAY TIME
1. 4.16 kV Emergency Bus Loss of Voltage DG Start	1,2,3,4, (a)	3	SR 3.3.5.1 SR 3.3.5.2 SR 3.3.5.3	≥ 3222 V and ≤ 3418 V	NA
2. 4.16 kV Emergency Bus Degraded Grid Voltage Actuation	1,2,3,4, (a)	3	SR 3.3.5.1 SR 3.3.5.2 SR 3.3.5.3	Bus 1F: ≥ 3761 V Bus 1G: ≥ 3752 V Bus 2F: ≥ 3757 V Bus 2G: ≥ 3778 V	≤ 11.4 sec ≤ 11.4 sec ≤ 9.9 sec ≤ 9.9 sec

(a) When associated DG is required to be OPERABLE by LCO 3.8.2, "AC Sources - Shutdown."

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO

AMENDMENT NO. 206 TO RENEWED FACILITY OPERATING LICENSE NO. NPF-2

AND

AMENDMENT NO. 202 TO RENEWED FACILITY OPERATING LICENSE NO. NPF-8

SOUTHERN NUCLEAR OPERATING COMPANY

JOSEPH M. FARLEY NUCLEAR PLANT, UNITS 1 AND 2

DOCKET NOS. 50-348 AND 50-364

1.0 INTRODUCTION

By application dated November 20, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15324A297), as supplemented by letters dated January 12, April 11, and June 30, 2016 (ADAMS Accession Nos. ML16012A457, ML16117A285, and ML16182A262, respectively), Southern Nuclear Operating Company, Inc. (SNC, the licensee) submitted a request to change the Joseph M. Farley Nuclear Plant (FNP or Farley), Units 1 and 2, Technical Specifications (TSs). The supplemental letters dated April 11 and June 30, 2016, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the U.S. Nuclear Regulatory Commission (NRC or the Commission) staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on February 16, 2016 (81 FR 7842).

The amendments revise TS 3.3.5, "Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation." The change was requested to fulfill a license condition stated in Appendix C of FNP Unit 1 Renewed Facility Operating License No. NPF-2 and in Appendix C of FNP Unit 2 Renewed Facility Operating License No. NPF-8. The license condition states that, "SNC shall implement the Degraded Voltage modifications to eliminate the manual actions in lieu of automatic degraded protection voltage to assure adequate voltage to safety-related equipment during design-basis events."

The license condition requires SNC to implement automatic degraded voltage protection modifications that will eliminate use of manual actions as part of the FNP degraded voltage protection scheme and that are to be completed before restart from the fall 2017 refueling outage for Unit 2 (2R25) and before restart from the spring 2018 refueling outage for Unit 1 (1R28). These modifications will ensure adequate voltage is available to safety-related equipment during design-basis events.

2.0 REGULATORY EVALUATION

2.1 Background

In the component design basis inspection (CDBI) report dated December 19, 2011 (ADAMS Accession No. ML113530575), the NRC inspection team identified an unresolved item (URI) regarding the licensee's use of administrative controls at FNP in lieu of automatic degraded voltage protection.

Joseph M. Farley Nuclear Plant

The existing FNP Units 1 and 2 degraded voltage protection scheme relies on administrative controls (i.e., manual actions) to assure adequate voltage to safety-related equipment during design-basis events by avoiding or minimizing the occurrence of degraded voltage conditions as accepted by the NRC on November 21, 1995, "NRC Inspection Report Nos. 50-348/95-18 and 50-364/95-18, Notice of Violation, and Safety Evaluation Report [SER]" (ADAMS Legacy Accession No. 9512110029). This SER relied, in part, on a commitment by SNC to include limiting conditions for operation (LCOs) and surveillance requirements (SRs) for the degraded grid voltage alarm relays in the planned conversion to Improved Technical Specifications (ITSs). In fulfillment of this commitment, Function 3, "4.16 kV Emergency Bus Degraded Grid Voltage Alarm," was added to Table 3.3.5-1 of the FNP TSs when the ITSs were issued on November 30, 1999 (ADAMS Accession Package No. ML993500022).

As stated above, during the CDBI performed at FNP in 2011, the NRC inspection team identified an issue regarding the use of administrative controls at FNP in lieu of automatic degraded voltage protection to assure adequate voltage to safety-related equipment during design-basis events. The December 19, 2011, CDBI report designated this issue as a URI, and noted the similarity of this issue to the degraded voltage protection issue at Hatch Nuclear Plant (HNP).

On December 29, 2011, the NRC issued Regulatory Issue Summary (RIS) 2011-12, Revision 1, "Adequacy of Station Electric Distribution System Voltages," (ADAMS Accession No. ML113050583) to clarify the NRC staff's technical position on existing regulatory requirement and the voltage studies necessary to properly determine degraded voltage relay (DVR) settings. Consistent with the position expressed by the NRC staff in the CDBI report and in the RIS 2011-12, the similar HNP degraded voltage case was resolved with a definitive determination that reliance on manual actions, as part of the degraded voltage protection scheme, did not meet regulatory requirements, and that previous acceptance of this protection scheme by the NRC staff did not constitute an exemption from the regulations. As a consequence, SNC elected to resolve the 2011 CDBI degraded voltage URI at FNP by submitting a license amendment request (LAR) on December 21, 2012, which provided a schedule for implementing plant modifications to eliminate manual actions for degraded voltage protection at FNP. This LAR, supplemented by additional information in a letter dated May 21, 2013 (ADAMS Accession No. ML13144A081), resulted in the license amendment issued on May 13, 2014 (ADAMS Accession No. ML14069A344).

The pertinent license condition for FNP Units 1 and 2 states that, "SNC shall implement the Degraded Voltage modifications to eliminate the manual actions in lieu of automatic degraded

voltage protection to assure adequate voltage to safety-related equipment during design basis events." Completion of this license condition is required before restart from the spring 2018 outage for Unit 1 and before restart from the fall 2017 outage for Unit 2. The changes proposed by this LAR are to enable compliance with this license condition for FNP Units 1 and 2.

2.2 System Description

The FNP Updated Final Safety Analysis Report (UFSAR) states that each unit is provided with one unit auxiliary transformer and four startup auxiliary transformers (SATs) two for each unit. The SATs are connected to the Alabama Transmission System through four separate 230 kilovolt (kV) cables. These SATs provide power for startup, shutdown, and after shutdown requirements for both units. The breaker arrangement provides breaker-and-a-half protection for all four startup SATs (1A, 1B, 2A, and 2B). Under normal operating conditions, these SATs supply power to 4.16 kilovolt (kV) Emergency Buses F, G, H, J, K, and L. Buses K and L are considered extensions of Buses F and G. The 4.16 kV Emergency Buses F, H, and K of each unit, and their associated emergency loads, are designated as load group Train A. The corresponding 4.16 kV Emergency Buses G, J, and L of each unit, and their associated emergency loads, are designated as load group Train B.

The onsite alternating current (AC) power system for FNP consists of five DGs with 1-2A and 1C assigned to the load group Train A, while DGs 1B, 2B, and 2C are assigned to the load group Train B. The five DGs have two different ratings: DGs 1-2A, 1B, and 2B are rated at 4075 kilowatt (kW), and DGs 1C and 2C are rated at 2850 kW. Four of the DGs: 1-2A, 1C, 1B, and 2B, are dedicated for use during design-basis events, and DG 2C is dedicated as the alternate AC (AAC) power source for use during a station blackout event. DG 1C with the rating of 2850 kW does not have enough capacity to support accident loads required for safe shutdown of the plants. Thus, this DG is selected to power the safety buses of the non-accident unit.

The 4.16 kV emergency buses provide electrical power to safety-related equipment such as pumps motors, motor operated valves, and associated control components. The preferred source of power for 4.16 kV emergency buses for the required equipment is offsite power. The LOP protection instrumentation monitors the voltage on the F and G 4.16 kV emergency buses of each FNP unit. Each electrical train has independent LOP instrumentation and relay actuation logic to detect the degraded grid or loss of voltage conditions. The LOP emergency diesel generators (EDGs) start signal is actuated when offsite power is either unavailable or is insufficiently stable to allow safe unit operation.

The 4.16 kV emergency buses are provided with two sets of undervoltage (UV) protection; one is called DVR, and the other is known as loss-of-voltage relay. The UV relays protect the Class 1E internal combustion diesel engine connected to the emergency buses from excessively low voltages indicative of complete loss of voltage or serious degradation of the offsite power source. The DVRs monitor voltage on Buses 1F, 1G, 2F, and 2G, and there are three relays per bus. The three relays are combined in two-out-of-three logic on the same bus to generate an LOP signal if the voltage is below the nominal setpoints and remains below this value for a specified amount of time. The LOP signal results in an automatic trip of the applicable 4.16 kV preferred power supply breakers, disconnecting the undervoltage bus from

its preferred offsite power source. The undervoltage bus is then transferred to receive power from an EDG (an alternate power source).

Currently, there are three LOP protection instrumentation actuations levels. An alarm is set at a setpoint of not less than 3850 V on detection of degraded grid voltage. A LOP signal is generated for sustained degraded grid voltage at not less than 3675 V. At not less than 3255 V, a LOP signal is generated for almost instantaneous loss-of-voltage conditions. Actuation of the DVR, or loss of voltage relays, will automatically disconnect the 4.16 kV emergency buses from the offsite power source.

2.3 Description of Proposed Change

FNP's current degraded voltage protection relies upon administrative controls and the automatic portion of the degraded voltage protection scheme to ensure bus availability. The automatic loss-of-voltage actuation scheme employs setpoints, which are too low to assure operability of all safety-related electrical equipment in case of sustained degraded grid voltage (DGV) conditions. As a result, administrative measures have been implemented to perform manual controls during degraded voltage conditions.

To resolve these non-conservative issues and to assure that adequate voltage is provided to the safety-related equipment during design-basis events and accident conditions, the licensee requested to upgrade the existing automatic degraded voltage protection scheme by installing new DVRs and to increase the allowable value (AV) for the 4.16 kV emergency bus DGV actuation function. The NRC staff reviewed the 27N datasheet (ABB Power T&D Company Inc.) to clarify the new DVRs (Type 27N) operate with a higher level of precision, which makes it possible to increase the DVR actuation setpoints. The new setpoint levels will provide fully automatic protection of safety-related equipment, while minimizing the chance of unwanted disconnection from the preferred offsite power source.

The licensee proposed to add a new Table 3.3.5-2, "Loss of Power Diesel Generator Start Instrumentation," to LCO 3.3.5 after Table 3.3.5-1 in the FNP Units 1 and 2 TSs.

Reference to Table 3.3.5-2 will be added to LCO 3.3.5 and the applicability statement, followed by notes to accommodate the differing implementation dates for Units 1 and 2 as follows:

1. For Unit 1, use Table 3.3.5-1 until Mode 4 entry following the spring 2018 outage (1R28); thereafter use Table 3.3.5-2.

2. For Unit 2, use Table 3.3.5-1 until Mode 4 entry following the fall 2017 outage (2R25); thereafter use Table 3.3.5-2.

Table 3.3.5-1 (page 1 of 1)
Loss of Power Diesel Generator Start Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRAIN	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	TRIP SETPOINT
1. 4.16 kV Emergency Bus Loss of Voltage DG Start	1,2,3,4, (a)	3	SR 3.3.5.1 SR 3.3.5.2 SR 3.3.5.3	≥ 3222 V and ≤ 3418 V	≥ 3255
2. 4.16 kV Emergency Bus Degraded Grid Voltage Actuation	1,2,3,4, (a)	3	SR 3.3.5.1 SR 3.3.5.2 SR 3.3.5.3	≥ 3638 V and ≤ 3749 V	≥ 3675
3. 4.16 kV Emergency Bus Degraded Grid Voltage Alarm	1,2,3,4	1	SR 3.3.5.1 SR 3.3.5.2	≥ 3835	≥ 3850

(a) When associated DG is required to be OPERABLE by LCO 3.8.2, "AC Sources – Shutdown."

The proposed Table 3.3.5-2 differs from the Table 3.3.5-1. The "Trip Setpoint" column is replaced by a new "Delay Time" column, and "Function" 2, "4.16 kV Emergency Bus Degraded Grid Voltage Actuation," has new AV lower limits specified for each of the 4.16kV Emergency Buses (1F, 1G, 2F, and 2G). In addition, Table 3.3.5-2 does not have Function 3, "4.16kV Emergency Bus Degraded Grid Voltage Alarm," as Table 3.3.5-1.

Table 3.3.5-2 (page 1 of 1)
Loss of Power Diesel Generator Start Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRAIN	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	DELAY TIME
1. 4.16 kV Emergency Bus Loss of Voltage DG Start	1,2,3,4, (a)	3	SR 3.3.5.1 SR 3.3.5.2 SR 3.3.5.3	≥ 3222 V and ≤ 3418 V	NA
2. 4.16 kV Emergency Bus Degraded Grid Voltage Actuation	1,2,3,4, (a)	3	SR 3.3.5.1 SR 3.3.5.2 SR 3.3.5.3	Bus 1F: ≥ 3761 V Bus 1G: ≥ 3752 V Bus 2F: ≥ 3757 V Bus 2G: ≥ 3778 V	≤ 11.4 Sec ≤ 11.4 Sec ≤ 9.9 Sec ≤ 9.9 Sec

(a) When associated DG is required to be OPERABLE by LCO 3.8.2, "AC Sources – Shutdown."

2.4 Regulatory Requirements and Guidance

- Title 10 of the *Code of Federal Regulations* (10 CFR) 50.36, "Technical specifications," paragraph (a)(1), states, in part, that, "Each applicant for a license authorizing operation of a production or utilization facility shall include in his application proposed technical specifications in accordance with the requirements of this section."

- 10 CFR 50.36(c)(1)(ii)(A) states, in part, that, "Where a limiting safety system setting is specified for a variable on which a safety limit has been placed, the setting must be so chosen that protective action will correct the abnormal situation before a safety limit is exceeded. If, during operation, it is determined that the automatic safety system does not function as required, the licensee shall take appropriate action, which may include shutting down the reactor."

- 10 CFR 50.36(c)(3) states that, "Surveillance requirements are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met."

- 10 CFR 50.59, "Changes, tests and experiments," paragraph (a)(1), states that, "Change means a modification or addition to, or removal from, the facility or procedures that affects a design function, method of performing or controlling the function, or an evaluation that demonstrates that intended functions will be accomplished."

- FNP General Design Criteria (GDC) 13, "Instrumentation and control," requires instrumentation and control systems to monitor and maintain plant variables including those variables that affect the fission process, integrity of the reactor core, the reactor coolant pressure boundary, and the containment over their expected range for normal operating, for anticipated operational occurrences, and under accident conditions.

- FNP GDC 17, "Electric power systems," requires, in part, that an onsite electric power system and an offsite electric power system are provided to permit functioning of structures, systems, and components important to safety. The onsite electric power supplies, including the batteries, and the onsite electric distribution system have sufficient independence, redundancy, and testability to perform their safety functions, assuming a single failure. In addition, this criterion requires the transmission network to the onsite electric distribution system to be supplied by two physically independent circuits. This assures that specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded. Provisions are 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 from the onsite electric power supplies.

- FNP GDC 20, "Protection system functions," requires the protection system be designed to initiate automatically the operation of appropriate systems, including the reactivity control systems, to assure that specified acceptable fuel design limits are not exceeded as a result of anticipated operational occurrences, and to sense accident conditions and initiate the operation of systems and components important to safety.

- Per 10 CFR 50.55a(h), protection systems of nuclear power reactors of all types must meet the requirements specified in this paragraph. 10 CFR 50.55a, "Protection systems," paragraph (h)(2), states that for nuclear power plants with construction permits issued after January 1, 1971, but before May 13, 1999, protection systems must meet the requirements in IEEE Std 279–1968, "Proposed IEEE Criteria for Nuclear Power Plant Protection Systems," or the requirements in IEEE Std 279–1971, "Criteria for Protection Systems for Nuclear Power Generating Stations," or the requirements in IEEE Std 603–1991, "Criteria for Safety Systems for Nuclear Power Generating Stations, and the correction sheet dated January 30, 1995.

- Regulatory Guide (RG) 1.105, Revision 3, "Setpoints for Safety-Related Instrumentation," December 1999 (ADAMS Accession No. ML993560062), describes a method acceptable to the NRC staff for complying with the NRC's regulations for ensuring that setpoints for safety-related instrumentation are initially within and remain within the TS limits. RG 1.105 endorses Part I of Instrument Society of America (ISA) Standard S67.04-1994, "Setpoints for Nuclear Safety-Related Instrumentation." The staff used this guide to establish the adequacy of the licensee's setpoint calculation methodologies and the related plant surveillance procedures.

- Regulatory Issue Summary 2011-12, Revision 1, "Adequacy of Station Electric Distribution System Voltages," dated December 29, 2011 (ADAMS Accession No. ML113050583). The NRC staff used this document to clarify the NRC staff's technical position on existing regulatory requirements for voltage studies necessary for DVR (second level undervoltage protection) setting bases and transmission network/offsite/station electric power system design bases to meet the regulatory requirements specified in GDC 17 of Appendix A to 10 CFR 50.

- NUREG-0800, Revision 2, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR [Light-Water Reactor] Edition," Appendix 8-A, July 1981, Branch Technical Position (PSB)-1, Position B.1 (ADAMS Accession No. ML052350520). In addition to the undervoltage scheme provided to detect loss of offsite power at the Class 1E buses, a second level of undervoltage protection with time delay should also be provided to protect the Class 1E equipment.

3.0 TECHNICAL EVALUATION

3.1 Electrical Engineering Evaluation

The LOP protection instrumentation monitors voltage on the "F" and "G" 4.16 kV safety-related buses of each FNP unit. There are currently three LOP protection instrumentation actuation levels. An alarm sounds at a setpoint of not less than 3850 V on detection of DGV voltage. At not less than 3675 V, a LOP signal is generated for sustained degraded grid voltage. At not less than 3255 V, a LOP signal is generated for near instantaneous loss-of-voltage conditions. Actuation of the degraded grid or loss-of-voltage relays will automatically disconnect the 4.16 kV emergency buses from the offsite power source.

Per NUREG-0800, Appendix 8-A, PSB-1, Position B.1, the DVR first time delay is for a degraded voltage alarm in the control room, and also calls for immediate separation from offsite power in the event of subsequent occurrence of a safety injection (SI) actuation signal. The second time delay, per Position B.1.b.2, is for automatic separation from offsite power after a duration limited such that Class 1E loads will not be damaged.

NRC Staff Evaluation

The NRC staff reviewed the design information and the corresponding TS proposed changes related to the DVR to implement modifications that will eliminate use of manual actions as part of the FNP degraded voltage protection scheme. In a request for additional information (RAI), the staff asked the licensee to explain how FNP is complying with PSB-1 in regard to the use of two-time delays and the deletion of the 4.16 kV Emergency Bus Degraded Grid Voltage Alarm from the TSs.

In the supplements provided by the licensee, dated April 11, 2016, and June 30, 2016, the licensee stated that while Function 3 (4.16kV Emergency Bus Degraded Grid Voltage Alarm) is deleted from the new Table 3.3.5-2 proposed by the LAR, the degraded grid alarm itself will remain in service, and operator actions in response to alarm actuation will remain unchanged. The licensee also stated that the second time delay referred to by PSB-1 pertains to providing for automatic separation from the offsite power system. This requirement is met by Function 2, "4.16 kV Emergency Bus Degraded Grid Voltage Actuation," in both the current Table 3.3.5-1 and in the proposed new Table 3.3.5-2. In addition, the licensee stated that the first time delay (Function 3 in TS Table 3.3.5-1) is implemented by the alarm function of Weschler Model BG252 voltmeters, while the second time delay (Function 2 in TS Tables 3.3.5-1 and 3.3.5-2) is separately implemented by the DVRs (currently Type CV-2 induction disc inverse time relays, to be replaced with Type 27N solid state definite time relays).

The NRC staff concludes this response adequate in regard to the existence of two-timers, since the licensee addressed the identification of the two-timers as recommended in PSB-1. However, the licensee stated that automatic separation with an SI signal was not needed because the new DVR actuation voltage AVs proposed in the LAR have been calculated to maintain adequate voltage on the Class 1E buses assuming imposition of SI loads. The NRC staff considered the latter statement as a deviation from PSB-1 and requested the licensee to verify whether the calculations supported the fact that the DVR actuation voltage AVs proposed

in the LAR had been calculated to maintain adequate voltage on the Class 1E buses, assuming the imposition of SI loads.

The licensee stated that the DVR AVs in TS Table 3.3.5-2 that range from 3752 V to 3778 V is well below the 3835 V AV for the alarm function in TS Table 3.3.5-1; therefore, separating a Class 1E bus from the preferred offsite power source at the alarm setpoint voltage as called for by Position B.1.b.1 is not warranted. Calculation SE-SNC529029-001 and SE-SNC529029-002 provided by the licensee in its letter dated January 12, 2016 (ADAMS Accession No. ML16012A457), presented the following assumptions and criteria that support its position with respect to maintaining adequate voltage on the Class 1E buses following an SI signal:

1. Normal steady-state, Loss of Coolant Accident (LOCA) steady-state, LOCA group motor starting, and individual motor starting cases were studied to determine the lowest 4kV bus voltage that could supply adequate voltage to all safety-related loads.

2. Identification of the most limiting component for each train. The corresponding pre-start or steady-state voltage at its relative 4kV bus was determined to be the minimum required voltage (MRV) based on the required starting or steady-state voltage of this component. This MRV was considered for all study cases to verify that all other components achieved adequate voltage to perform the required safety functions (i.e., start and run). The lowest voltage at the 4kV bus during the LOCA group motor start at the MRV is the minimum starting voltage (maximum value for the loss of station power relay dropout setting).

Consistent with the staff's Branch Technical Position PSB-1 and Regulatory Information Summary 2011-12, Revision 1, as a minimum, the model would be expected to utilize loads on the plant distribution system consistent with the specific transient or accident being analyzed. These models would allow calculation of voltages at terminals of all safety-related equipment with the voltage at the DVR monitored bus at the DVR dropout setting, providing the necessary design basis for the DVR voltage settings. In this manner, the DVR circuit ensures adequate voltage (starting and running) to all safety-related equipment. Voltage-time settings for DVRs should be selected so as to avoid inadvertent separation of safety buses from the offsite power system during unit startup, normal operation (including motor starting), and shutdown.

The NRC staff reviewed the summary of Calculations SE-SNC529029-001 and SE-SNC529029-002 and the LAR. In an RAI, the NRC staff requested SNC to provide sufficient technical bases to conclude that safety-related MOVs will perform safety functions, such as opening or closing the valves within the times assumed in the design basis and minimum required open/close coil pickup voltage (control circuit voltage) without actuating the protective devices such as breakers, relays, fuses etc.

Based on the NRC staff's review of the RAI response in the letter dated April 11, 2016, staff determined that all MOVs required for safe shutdown can perform their safety function at the lower analytical limit of the DVR. Control power fuses are sized adequately to not melt on extended contactor inrush current. In addition, the staff concluded that low voltage margin motors have sufficient contactor voltages for coil pickup, coil dropout, and adequate terminal voltage. Based on the above, the NRC staff understands that the MOV will not trip during the

valve stroke due to thermal overload (TOL) tripping prior to DVR time delay completion time. The NRC staff also concludes that the fuse sizing proposed by the licensee is acceptable.

The licensee simulated LOCA safety injection group motor starting scenario (Case 5F LOCA Start) with Bus 1F pre-start voltage forced to the MRV of 88.92 percent, which is lower than the lower analytical value of 3726.11 V (89.57 percent). All safety-related loads fed by Bus 1F maintained adequate starting voltage. Similarly, for Bus 1G, pre-start voltage forced to the MRV of 88.6 percent. All safety-related loads fed by Bus 1G maintained adequate starting voltage, except in cases where some components did not have adequate starting voltage, the licensee demonstrated, through calculations or modifications, that these components can perform their intended design function.

The licensee also simulated LOCA steady-state cases 1.4F and 1.4G and individual motor starting cases 4F and 4G with the 4kV buses forced to their respective MRV. Similarly, the licensee simulated load flow studies for Buses 2F and 2G and their connected loads and found all safety-related loads were capable of starting and maintained adequate terminal voltage. The staff reviewed the information submitted by the licensee and concluded that all safety-related loads were capable of starting and maintained adequate terminal voltage with the 4kV buses forced to their respective MRV.

Since the licensee's approach in the calculation of the analytical limits consists of the identification of the most limiting component for each train and its MRV at the component level, which includes starting and running voltage requirements, the NRC staff finds the licensee's approach for determining the DVR settings is acceptable.

In satisfying the licensee conditions issued to FNP by License Amendments Nos. 194 and 190 (Units 1 and 2, respectively), by letter dated May 13, 2014 (ADAMS Accession No. ML14069A344), the proposed LAR eliminates manual actions in lieu of automatic degraded voltage protection. The purpose of the degraded voltage alarm is not affected by this change, and it will continue to fulfill the function of alerting operators to sustained degraded voltage conditions.

The staff concludes that the proposed setting and implementation schedule are acceptable.

NRC Staff Conclusion

The NRC staff has reviewed the licensee's proposed TS changes and supporting documentation. Based on the evaluation discussed above, the NRC staff determined that the proposed amendments to the FNP Units 1 and 2 TSs regarding the degraded and loss-of-voltage relays are consistent with the requirements in FNP GDC 17, 10 CFR 50.36, 10 CFR 50.55a(h)(2), and the guidance in PSB-1, and is, therefore, acceptable.

3.2 Instrumentation and Control Evaluation

The NRC staff reviewed and evaluated the licensee's submittals associated with this LAR. This evaluation was performed to accomplish the following objectives:

- Verify the licensee's setpoint calculation methodology using the square root of the sum of the squares (SRSS) to assure that control and monitoring setpoints are established and maintained in a manner consistent with plant safety function requirements.

- Verify the licensee's setpoint calculation values are adequate to assure, with a high confidence level, which required protective actions are initiated before the associated plant process parameters exceed their analytical limits.

The NRC staff evaluated the proposed amendments using the criteria of RG 1.105, Revision 3, to determine if setpoints for loss-of-voltage safety-related instrumentation are established and maintained within the TS limits.

3.2.1 Total Loop Uncertainties (TLU)

The TLU is the amount to which an instrument channel's output is in doubt (or the allowance made for such doubt) due to possible errors, either random or systematic. The uncertainty is generally identified within a probability and confidence level. Random error is described as a variable whose value at a particular future instant cannot be predicted exactly but can only be estimated by a probability distribution function. Bias is an uncertainty component that consistently has the same algebraic sign and is expressed as an estimated limit of error.

In Calculation SJ-SNC529029-001, the licensee determined the applicable uncertainty terms by the channel statistical allowance (CSA). The CSA is the combination of the various channel uncertainties by the SRSS, statistical, or algebraic techniques. It includes instrument (both sensor and process rack) uncertainties and non-instrument-related effects. This parameter is compared with the total allowance (TA) to determine the instrument channel margin.

CSA = TA – Margin

Margin, in setpoint determination, is an allowance added to the instrument channel uncertainty. Margin moves the setpoint further away from the analytical limit.

TA is the absolute value of the difference (in percent instrument span) between the safety analysis limit (SAL) and nominal trip setpoint (NTS).

TA = I SAL – NTS I
Thus,
CSA = I SAL – NTS I – Margin (1)

Based on RG 1.105, the TLU is defined as:

TLU = AL – NTS – Margin (2)
(AL (analysis limit) is equal to SAL as seen in equation 1 above)

Per the definitions of TLU and CSA and equations (1) and (2) above, the TLU and CSA are equivalent.

Each DVR loop consists of a transformer and relay. For this TLU calculation, the transformer will be treated as the primary element and the relay as the rack comparator (bistable) instrument, and there is no sensor in these loops. Due to the simple configuration of the 4.16 kV safety-related DVR loops (Buses 1F, 1G, 2F, and 2G) and the instrument locations located within mild environment areas of the plant, there are relatively few uncertainty terms that apply to TLU calculation below.

Drift is variation in sensor or instrument channel output that may occur between calibrations that cannot be related to changes in the process variable or environmental conditions. Based on Assumption Number 15 of Calculation SJ-SNC529029-001, the drift uncertainty is time-dependent and non-linear and can be extrapolated using SRSS.

In Assumption Number 11 of Calculation SJ-SNC529029-001, the radiation and seismic effects (RE and SE) are assumed to be negligible (zero) because FNP Units 1 and 2 are located in regions with low seismic activity. The containment buildings are constructed to prevent the inadvertent release of radioactivity to the environment under both normal operating conditions and the most severe accident conditions. In addition, Section 5, "Environmental Considerations," of Reference 5 of the LAR (Letter NL-12-2142 from SNC to NRC on December 21, 2012 (ADAMS Accession No. ML12356A470), provides justification that the RE and SE are negligible terms.

In Calculation SJ-SNC529029-001, the licensee calculated the CSA by the following equation:

$$CSA = \pm [(RCSA + RMTE)^2 + (RRA)^2 + (RTE)^2 + (RD)^2 + (PEA)^2]^{1/2}$$

Where:

RCSA = Relay Channel Statistical Allowance
RMTE = Relay Measurement Test
RRA = Relay Reference Accuracy
RTE = Relay Temperature Effect
RD = Relay Drift
PEA = Primary Element Accuracy

For this LAR, the licensee considered the RCSA and RMTE to be dependent variables, and RRA, RTE, RD, and PEA are considered to be independent variables with respect to RCSA and RMTE and each other. The licensee stated that, "No bias terms exist for this loop; the cables, transformers and relays are not exposed to a harsh environment." Therefore, the non-random and environmental allowance are not available in this calculation.

Based on data from Table 4, "Derivation of Uncertainties (Undervoltage Function)," Sheets 12 and 13 of Calculation SJ-SNC529029-001, the licensee provided justification for selecting the parameters for each of the identified uncertainty factors for the low degraded voltage relays being added and derived the following equation (3) to calculate the CSA. The NRC staff also used this equation to verify the CSA (TLU) for the nominal setpoint margin clarification below.

$$CSA = \pm \{(1521/(Setting)^2) + (6.0/Setting) + 1.3054\}^{1/2} \% \text{ Setting} \qquad (3)$$

The NRC staff concludes these assumptions and calculation methodology are acceptable for the independent variables considered in the instrument uncertainty calculation.

3.2.2 Proposed Technical Specification Upper/Lower Allowable

RG 1.105, Revision 3, specifies acceptable methods for combining uncertainties in determining a trip setpoint and its AVs. Based on the American National Standards Institute (ANSI)/ISA S67.04-1994, Section 4.4, "Choosing Trip Setpoints," the NTS for a trip or actuation on an increasing process would be calculated by the following equation:

NTS = AL - TLU - Margin
Thus,
Margin = AL - NTS - TLU
(In the LAR, the licensee uses NTS, while RG 1.105 uses NTSP for nominal trip setpoint).

The NRC staff calculated the margin between the TLU and associated analytical limit using the margin equation above, and the calculation results are reflected in Table 1 below, rows 12 and 15.

Where:
Upper AL/Lower AL: Upper and Lower Analytical Limit, data from Calculation SJ-SNC529029-001, Sheets 13 and 14

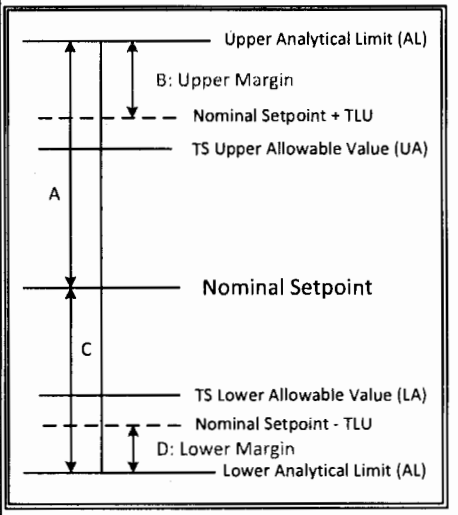
TS-UA/TS-LA: TS Upper/Lower Allowable Value, data from Calculation SJ-SNC529029-001, Sheets 16 - 22

NTSP: The chosen trip setpoints (nominal setpoint), data from Calculation SJ-SNC529029-001, Sheets 16 - 22.

TLU: The loop uncertainties VAC (voltage AC) at secondary side (at relay) are reflected in Table 1a of Calculation SJ-SNC529029-001, Sheet 1. For the primary 4.16 kV AC side of the potential transformer, the NRC staff calculated the CSA (equivalent to TLU) per CSA equation (3) above.

Table 1: Margin Between the TLU and the Associated Analytical Safety Limit Calculation

Row #		1F	1G	2F	2G
1	Upper AL	3858.82	3849.25	3855.07	3876.70
2	TS UA	3831.80	3822.00	3827.95	3849.30
3	Nominal Reset	3808.00	3798.20	3804.15	3825.50
4	Nominal Setpoint	3784.55	3775.10	3780.70	3802.05
5	TS LA	3760.75	3751.65	3757.25	3778.25
6	Lower AL	3726.11	3716.96	3722.37	3743.58
7	TLU/Upper (Reset)	43.51	43.40	43.47	43.71
8	TLU/Lower (Trip)	43.24	43.13	43.20	43.44
9	NS + UpperTLU	3828.06	3818.50	3824.17	3845.76
10	NS - LowerTLU	3741.31	3731.97	3737.50	3758.61
11	A	74.27	74.15	74.37	74.65
12	B (Upper margin)	30.76	30.75	30.90	30.94
13	C	58.44	58.14	58.33	58.47
14	D (Lower margin)	15.20	15.01	15.13	15.03
15	% Margin of Upper AL	41.42	41.47	41.55	41.45
16	% Margin of Lower AL	26.01	25.81	25.94	25.70



Calculation:

Upper/Lower TLU = ± {(1521/(Setting)^2 + (6/Setting) + 1.3054)}$^{1/2}$ * % Setting (Nominal Reset Setpoint & Setpoint from SJ-SNC529029-001, Sheets 16 - 22)

A = Upper AL - Nominal Setpoint (Data from SJ-SNC529029-001, Sheets 13-14 & 16-22)

B = Upper AL - (Nominal Setpoint + Upper TLU)

% Margin = (B/A) * 100

C = Nominal Setpoint - Lower AL (Data from SJ-SNC529029-001, Sheets 13-14 & 16-22)

D = (Nominal Setpoint - Lower TLU) - Lower AL

% Margin = (D/C) * 100

The NRC staff evaluated the nominal settings for FNP's DVR. The NRC staff found that the percent margins of the upper AL and the lower AL are adequate (as seen in Rows 15 and 16 in Table 1, greater than 41.45 percent for the upper AL and greater than 25.7 percent for the lower AL). These margins reflect that the trip setpoints have been chosen to assure that a trip or safety actuation occurs before the process reaches the AL levels.

The NRC staff reviewed the proposed FNP LAR against the criteria of RG 1.105 to ensure that setpoints for safety-related instrumentation are initially within and will remain within the technical specification limits. The NRC staff determined that sufficient margin exists between the NTSP and the AL such that the undervoltage relay safety function meets the performance criteria of RG 1.105. The methods described in RG 1.105 provide an acceptable way to satisfy criterion 13, "Instrumentation and Control," and criterion 20, "Protection System Functions," of Appendix A to 10 CFR Part 50. This method combines the various uncertainty types associated with the instruments and applies them to the TLU calculation. It also compares the uncertainties in determining a trip setpoint against the available margin between the analytical limits and the TS nominal setting. That is, there is 95 percent confidence level of achieving the required safety function at a 95 percent performance level.

3.2.3 Proposed DVR Time Delay

In Calculations SE-SNC529029-001 and SE-SNC529029-002, Table 7, "DVR Time Delay Operating Range (seconds)," the proposed 27N DVRs have a maximum analytical limit setting of 11.5 seconds for the 1F and 1G buses, and 10.0 seconds for the 2F and 2G buses. The anticipated maximum relay drift is 0.82 percent. This yields to 100.82 percent of the upper AV setting of the DVR delay operating range for the timing function of the 1F, 1G, 2F, and 2G buses. Therefore, the proposed upper AV setting of the 27N DVR Delay Operating Ranges are:

(11.50 sec ÷ 100.82) × 100 = 11.4 seconds (1F, 1G buses)
(10.00 sec ÷ 100.82) × 100 = 9.9 seconds (2F, 2G buses)

Assumption Number 5 of Calculations SE-SNC529029-001 and SE-SNC529029-002 indicate that the 27N DVR calibration limits are ± 0.5 seconds. Therefore, there is sufficient operating range for a setting of 9.0 seconds for Buses 1F and 1G, and 8 seconds for Buses 2F and 2G.

The NRC staff confirmed the percentage of the upper allowable margin and analytical limit margin of the proposed DVR time delay, and the results are reflected in Table 2 below:

Table 2: DVR Time Delay Operating Range (seconds)

	Lower			Nominal	Upper			% Upper	% Upper
	Analytical Limit	Allowable Value	Calib. Limit	Trip Setpoint	Calib. Limit	Allowable Value *	Analytical Limit	Allowable Value Margin**	Anlytical Limit Margin***
Unit 1 1F, 1G	6.5	≥ 6.6	≥ 8.5	9	≤ 9.5	≤ 11.4	11.5	21.05	21.74
Unit 2 2F, 2G	6	≥ 6.1	≥ 7.5	8	≤ 8.5	≤ 9.9	10	19.19	20.00

* Tech. Spec. DVR Time Setting Requirement
** % Allowable Value Margin =((Allowable Value - Nominal Trip Setpoint) / Allowable Value) *100
*** % Analytical Margin =((Analytical limit - Nominal Trip Setpoint) / Analytical limit) *100

% Upper Allowable Value Margin: ((11.4 – 9.0) ÷ 11.4) × 100 = 21.05% (1F, 1G buses)
% Upper Analytical Margin: ((11.5 – 9.0) ÷ 11.5) × 100 = 21.74% (1F, 1G buses)

% Upper Allowable Value Margin: ((9.9 – 8.0) ÷ 9.9) × 100 = 19.19% (2F, 2G buses)
% Upper Analytical Margin: ((10.0 – 8.0) ÷ 10) × 100 = 20% (2F, 2G buses)

The NRC staff determined that the percentage margins of the upper allowable and analytical limit to the proposed DVR time delay settings are sufficient (approximately 21 percent and 19 percent as shown in Table 2 above) to reflect that the instrument setpoints will assure that a trip or safety actuation occurs within the established AL.

Therefore, the proposed DVR delay operating time of 11.4 seconds for Buses 1F and 1G and 9.9 seconds for Buses 2F and 2G are acceptable.

3.2.4 FNP Units 1 and 2 TS 3.3.5 Changes

The NRC staff reviewed LAR Enclosure 4, the proposed FNP Units 1 and 2 TS 3.3.5 Bases, paragraph B3.3.5, "Loss of Power Diesel Generator Start Instrumentation," of Section B3.3, "Instrumentation." The NRC staff reviewed the assumptions and design inputs and verified the calculations to determine that Calculations SE-SNC529029-001, SE-SNC529029-002, and SJ-SNC529029-001 provide reasonable assurance that the criterion of RG 1.105, Revision 3, is met.

The licensee proposed to replace the "Trip Setpoints" column in Table 3.3.5-2 of the FNP TSs by a new "Delay Time" column. NRC staff determined that it is acceptable, because the new DVR actuation voltage limits of Function 2 in Table 3.3.5-2 for the four 4.16 kV emergency buses (Buses 1F, 1G, 2F and 2G) are increased from existing AV range specified in Table 3.3.5-1 so as to provide for fully automatic degraded voltage protection on each bus, eliminating the need for manual actions. Consequently, the trip setpoints can be removed. The new solid-state relays provide for discrete setting of the actuation delay time. For that reason a new "Delay Time" column is being added to Table 3.3.5-2. This table does not have Function 3, "4.16kV Emergency Bus Degraded Grid Voltage Alarm," as does Table 3.3.5-1. The licensee further stated that the purpose of the degraded voltage alarm is not affected by this change, and it will continue to fulfill the function of alerting operators to sustained degraded voltage conditions. Based on the above, the NRC staff finds these changes acceptable.

NRC Staff Conclusion

The NRC staff evaluated the licensee's submittal of the proposed TS changes. Based on the review of the licensee's application and supplements, the NRC staff finds that the licensee has determined a new AV of the SR for 4.16 kV emergency bus DGV of the LOP DG Start instrumentation in accordance with the guidance criteria of RG 1.105, Revision 3, and in order to comply with the requirements of the10 CFR 50.36(c)(1)(ii)(A) and 10 CFR 50.36(c)(3).

Based on NRC staff's review of the LAR to revise the AV of SR for the 4.16 kV emergency bus DGV of the LOP DG Start instrumentation, the NRC staff concludes that:

- The new AV of the SR for 4.16 kV emergency bus DGV of the LOP DG Start instrumentation and their related relay times, are specified for a variable on which a safety limit has been placed, the setting has been chosen so that automatic protective action will correct the abnormal situation before a safety limit is exceeded. If during operation, the automatic safety system does not function as required, the licensee shall take appropriate required actions within the completion times as determined in the current LCO 3.3.5 section. Therefore, the requirement of 10 CFR 50.36(c)(1)(ii)(A) has been satisfied.

- The new AV of the SR for 4.16 kV emergency bus DGV of the LOP DG Start instrumentation to assure the necessary quality of systems and components are maintained, the facility operation will be within the safety limits. Therefore, the limiting conditions for operation will be met and the requirement 10 CFR 50.36(c)(3) has been satisfied.

- The new AV of the SR for 4.16 kV emergency bus DGV of the LOP DG Start instrumentation will permit functioning of structures, systems, and components important to safety. Therefore, the LAR satisfied the requirements of FNP GDC 17.
- With the new AV of the 4.16 kV emergency bus DGV of the LOP DG Start instrumentation, the protection system will be designed to initiate the operation of appropriate systems and ensure that specified acceptable design limits are not exceeded. Therefore, the LAR satisfies the requirements of FNP GDC 20.

Based on the above, the NRC staff concludes that the proposed changes to the FNP Units 1 and 2 TS 3.3.5, "Loss of Power Diesel Generator Start Instrumentation," is acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the State of Alabama official was notified of the proposed issuance of the amendments. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change requirements with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. 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 published in the *Federal Register* on February 16, 2016 (81 FR 7842). 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.

6.0 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: November 17, 2016

November 17, 2016

Mr. Charles R. Pierce
Regulatory Affairs Director
Southern Nuclear Operating Co., Inc.
P.O. Box 1295, Bin 038
Birmingham, AL 35201-1295

SUBJECT: JOSEPH M. FARLEY NUCLEAR PLANT, UNITS 1 AND 2 – ISSUANCE OF AMENDMENTS RELATED TO TECHNICAL SPECIFICATION 3.3.5 (CAC NOS. MF7106 AND MF7107)

Dear Mr. Pierce:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 206 to Renewed Facility Operating License No. NPF-2 and Amendment No. 202 to Renewed Facility Operating License No. NPF-8 for the Joseph M. Farley Nuclear Plant, Units 1 and 2, respectively. The amendments consist of changes to the technical specifications (TSs) in response to your application dated November 20, 2015, as supplemented by letters dated January 12, April 11, and June 30, 2016.

The amendments revise the setpoint requirements in TS 3.3.5, "Loss of Power Diesel Generator Start Instrumentation." The change was requested to fulfill a license condition to eliminate the manual actions in lieu of automatic degraded voltage protection to assure adequate voltage to safety-related equipment during design-basis events.

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

Sincerely,
/RA/
Shawn A. Williams, Senior Project Manager
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-348 and 50-364

Enclosures:
1. Amendment No. 206 to NPF-2
2. Amendment No. 202 to NPF-8
3. Safety Evaluation

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NAME	SWilliams	LRonewicz	MWaters (RStattle for)	JZimmerman
DATE	10/03/16	10/03/16	06/17/16	09/16/16
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