



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

January 26, 2022

Ms. Cheryl A. Gayheart
Regulatory Affairs Director
Southern Nuclear Operating Co., Inc.
3535 Colonnade Parkway
Birmingham, AL 35243

SUBJECT: JOSEPH M. FARLEY NUCLEAR PLANT, UNITS 1 AND 2; AND VOGTLE
ELECTRIC GENERATING PLANT, UNITS 1 AND 2, ISSUANCE OF
AMENDMENTS REGARDING REVISION TO USE BEACON POWER
DISTRIBUTION MONITORING SYSTEM (EPID L-2021-LLA-0109)

Dear Ms. Gayheart:

The U. S. Nuclear Regulatory Commission (NRC) has issued the enclosed Amendment No. 239 to Renewed Facility Operating License No. NPF-2 and Amendment No. 236 to Renewed Facility Operating License No. NPF-8 for the Joseph M. Farley Nuclear Plant (Farley), Units 1 and 2, respectively; and Amendment No. 212 to Renewed Facility Operating License NPF-68 and Amendment No. 195 to Renewed Facility Operating License NPF-81 for the Vogtle Electric Generating Plant (Vogtle), Units 1 and 2, respectively. The amendments consist of changes to the License and Technical Specifications (TSs) in response to your application dated June 9, 2021.

The amendments would revise TS 3.1.7, "Rod Position Indication," TS 3.2.1, "Heat Flux Hot Channel Factor ($F_Q(Z)$)," and TS 3.3.1, "Reactor Trip System (RTS) Instrumentation," to allow the use of an alternate means of determining power distribution information.

The proposed amendments would allow the use of a dedicated on-line core power distribution monitoring system (PDMS) to perform surveillance of core thermal limits. The PDMS to be used at Farley, Units 1 and 2; and Vogtle, Units 1 and 2, is the Westinghouse proprietary core analysis system called "Best Estimate Analyzer for Core Operations – Nuclear" (BEACON™).

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

If you have questions, you can contact me at 301-415-3100 or John.Lamb@nrc.gov.

Sincerely,

/RA/

John G. Lamb, Senior Project Manager
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-348, 50-364, 50-424,
and 50-425

Enclosures:

1. Amendment No. 239 to NPF-2
2. Amendment No. 236 to NPF-8
3. Amendment No. 212 to NPF-68
4. Amendment No. 195 to NPF-81
5. Safety Evaluation

cc: 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. 239
Renewed License No. NPF-2

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Southern Nuclear Operating Company, Inc. (Southern Nuclear), dated June 9, 2021, 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. 239, 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 Technical
Specifications

Date of Issuance: January 26, 2022



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

SOUTHERN NUCLEAR OPERATING COMPANY, INC.

ALABAMA POWER COMPANY

DOCKET NO. 50-364

JOSEPH M. FARLEY NUCLEAR PLANT, UNIT 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 236
Renewed License No. NPF-8

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Southern Nuclear Operating Company, Inc. (Southern Nuclear), dated June 9, 2021, 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. 236, 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 Technical
Specifications

Date of Issuance: January 26, 2022

ATTACHMENT

JOSEPH M. FARLEY NUCLEAR PLANT, UNIT 1

LICENSE AMENDMENT NO. 239

TO RENEWED FACILITY OPERATING LICENSE NO. NPF-2

DOCKET NO. 50-348

LICENSE AMENDMENT NO. 236

JOSEPH M. FARLEY NUCLEAR PLANT, UNIT 2

TO RENEWED FACILITY OPERATING LICENSE NO. NPF-8

DOCKET NO. 50-364

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

Remove Pages

License

License No. NPF-2, page 4
License No. NPF-8, page 3

TSs

3.1.7-1
3.1.7-3
3.2.1-3
3.2.1-4
3.3.1-9
3.3.1-12

Insert Pages

License

License No. NPF-2, page 4
License No. NPF-8, page 3

TSs

3.1.7-1
3.1.7-3
3.2.1-3
3.2.1-4
3.3.1-9
3.3.1-12

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 239, 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 2821 megawatts thermal.

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 236, 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

3.1 REACTIVITY CONTROL SYSTEMS

3.1.7 Rod Position Indication

LCO 3.1.7 The Digital Rod Position Indication (DRPI) System and the Demand Position Indication System shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

-----NOTE-----
Separate Condition entry is allowed for each inoperable DRPI and each demand position indicator.

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. One DRPI per group inoperable in one or more groups.</p>	<p>A.1 Verify the position of the rod with inoperable DRPI indirectly by using core power distribution information.</p> <p><u>OR</u></p> <p>A.2.1 Verify the position of the rod with inoperable DRPI indirectly by using core power distribution information.</p> <p><u>AND</u></p>	<p>Once per 8 hours</p> <p>8 hours</p> <p><u>AND</u></p> <p>Once per 31 EFPD thereafter</p> <p><u>AND</u></p> <p>8 hours after discovery of each unintended rod movement</p> <p><u>AND</u></p> <p>(continued)</p>

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>C. One or more DRPI inoperable in one or more groups and associated rod has been moved ≥ 24 steps in one direction since the last determination of the rod's position.</p>	<p>C.1.1 Initiate action to verify the position of the rods with inoperable DRPIs indirectly by using core power distribution information.</p> <p style="text-align: center;"><u>AND</u></p> <p>C.1.2 Complete rod position verification started in Required Action C.1.1.</p> <p style="text-align: center;"><u>OR</u></p> <p>C.2 Reduce THERMAL POWER to $\leq 50\%$ RTP.</p>	<p>Immediately</p> <p>8 hours</p> <p>8 hours</p>
<p>D. One or more demand position indicators per bank inoperable in one or more banks.</p>	<p>D.1.1 Verify by administrative means all DRPIs for the affected banks are OPERABLE.</p> <p style="text-align: center;"><u>AND</u></p> <p>D.1.2 Verify the most withdrawn rod and the least withdrawn rod of the affected banks are ≤ 12 steps apart.</p> <p style="text-align: center;"><u>OR</u></p> <p>D.2 Reduce THERMAL POWER to $\leq 50\%$ RTP.</p>	<p>Once per 8 hours</p> <p>Once per 8 hours</p> <p>8 hours</p>
<p>E. Required Action and associated Completion Time not met.</p>	<p>E.1 Be in MODE 3.</p>	<p>6 hours</p>

SURVEILLANCE REQUIREMENTS

-----NOTE-----

During power escalation at the beginning of each cycle, THERMAL POWER may be increased until an equilibrium power level has been achieved, at which core power distribution information is obtained.

SURVEILLANCE		FREQUENCY
SR 3.2.1.1	Verify F _Q (Z) is within steady state limit.	<p>Once after each refueling prior to THERMAL POWER exceeding 75% RTP</p> <p><u>AND</u></p> <p>Once after achieving equilibrium conditions after exceeding, by $\geq 20\%$ RTP, the THERMAL POWER at which F_Q(Z) was last verified</p> <p><u>AND</u></p> <p>In accordance with the Surveillance Frequency Control Program</p>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.2.1.2 -----NOTE-----</p> <p>If</p> $\text{maximum over } Z \left[\frac{F_Q(Z)}{K(Z)} \right]$ <p>has increased since the previous evaluation of F_Q(Z):</p> <p>a. Increase F_Q(Z) by the appropriate penalty factor specified in the COLR and reverify that this value is within the transient limits; or</p> <p>b. Repeat SR 3.2.1.2 once per 7 EFPD until either "a." above is met or two successive surveillances indicate</p> $\text{maximum over } Z \left[\frac{F_Q(Z)}{K(Z)} \right]$ <p>has not increased.</p> <p>-----</p> <p>Verify F_Q(Z) is within the transient limit.</p>	<p>Once after each refueling prior to THERMAL POWER exceeding 75% RTP</p> <p><u>AND</u></p> <p>(continued)</p>

SURVEILLANCE REQUIREMENTS

-----NOTE-----
 Refer to Table 3.3.1-1 to determine which SRs apply for each RTS Function.

SURVEILLANCE	FREQUENCY
SR 3.3.1.1 -----NOTE----- Not required to be performed for source range instrumentation until 1 hour after THERMAL POWER is < P-6. ----- Perform CHANNEL CHECK.	In accordance with the Surveillance Frequency Control Program
SR 3.3.1.2 -----NOTE----- Not required to be performed until 24 hours after THERMAL POWER is $\geq 15\%$ RTP. ----- Compare results of calorimetric heat balance calculation to power range channel output. Adjust power range channel output if calorimetric heat balance calculation results exceed power range channel output by more than +2% RTP.	In accordance with the Surveillance Frequency Control Program
SR 3.3.1.3 -----NOTES----- 1. Not required to be performed until 7 days after THERMAL POWER is $\geq 50\%$ RTP. 2. Performance of SR 3.3.1.9 satisfies this SR. ----- Compare results of core power distribution information to Nuclear Instrumentation System (NIS) AFD. Adjust NIS channel if absolute difference is $\geq 3\%$.	In accordance with the Surveillance Frequency Control Program

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.1.9	<p>-----NOTES-----</p> <ol style="list-style-type: none"> 1. Neutron detectors are excluded from the calibration. 2. Not required to be performed until 7 days after THERMAL POWER is $\geq 50\%$ RTP. <p>-----</p> <p>Calibrate excore channels to agree with core power distribution information.</p>	In accordance with the Surveillance Frequency Control Program
SR 3.3.1.10	<p>-----NOTES-----</p> <ol style="list-style-type: none"> 1. Neutron detectors are excluded from CHANNEL CALIBRATION. 2. This Surveillance shall include verification that the time constants are adjusted to the prescribed values. <p>-----</p> <p>Perform CHANNEL CALIBRATION.</p>	In accordance with the Surveillance Frequency Control Program
SR 3.3.1.11	Perform COT.	<p>In accordance with the Surveillance Frequency Control Program</p> <p><u>AND</u></p> <p>-----NOTE-----</p> <p>Only required when not performed in accordance with the Surveillance Frequency Control Program.</p> <p>-----</p> <p>(continued)</p>



UNITED STATES
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SOUTHERN NUCLEAR OPERATING COMPANY, INC.

GEORGIA POWER COMPANY

OGLETHORPE POWER CORPORATION

MUNICIPAL ELECTRIC AUTHORITY OF GEORGIA

CITY OF DALTON, GEORGIA

DOCKET NO. 50-424

VOGTLE ELECTRIC GENERATING PLANT, UNIT 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 212
Renewed License No. NPF-68

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment to the Vogtle Electric Generating Plant, Unit 1 (the facility) Renewed Facility Operating License No. NPF-68 filed by the Southern Nuclear Operating Company, Inc. (the licensee), acting for itself, Georgia Power Company, Oglethorpe Power Corporation, Municipal Electric Authority of Georgia, and City of Dalton, Georgia (the owners), dated June 9, 2021, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as 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 set forth in 10 CFR Chapter I;
 - 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 hereby amended by page 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-68 is hereby amended to read as follows:

Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 212, and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. Southern Nuclear shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

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 License No. NPF-68
and the Technical Specifications

Date of Issuance: January 26, 2022



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

SOUTHERN NUCLEAR OPERATING COMPANY, INC.

GEORGIA POWER COMPANY

OGLETHORPE POWER CORPORATION

MUNICIPAL ELECTRIC AUTHORITY OF GEORGIA

CITY OF DALTON, GEORGIA

DOCKET NO. 50-425

VOGTLE ELECTRIC GENERATING PLANT, UNIT 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 195
Renewed License No. NPF-81

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment to the Vogtle Electric Generating Plant, Unit 2 (the facility) Renewed Facility Operating License No. NPF-81 filed by the Southern Nuclear Operating Company, Inc. (the licensee), acting for itself, Georgia Power Company Oglethorpe Power Corporation, Municipal Electric Authority of Georgia, and City of Dalton, Georgia (the owners), dated June 9, 2021, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as 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 set forth in 10 CFR Chapter I;
 - 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 hereby amended by page 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-81 is hereby amended to read as follows:

Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 195, and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. Southern Nuclear shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

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 License No. NPF-81
and the Technical Specifications

Date of Issuance: January 26, 2022

ATTACHMENT

VOGTLE ELECTRIC GENERATING PLANT, UNIT 1

LICENSE AMENDMENT NO. 212

RENEWED FACILITY OPERATING LICENSE NO. NPF-68

DOCKET NO. 50-424

AND

VOGTLE ELECTRIC GENERATING PLANT, UNIT 2

LICENSE AMENDMENT NO. 195

RENEWED FACILITY OPERATING LICENSE NO. NPF-81

DOCKET NO. 50-425

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. NPF-68, page 4

License No. NPF-81, page 3

TSs

3.1.7-1

3.1.7-3

3.2.1-4

3.3.1-9

3.3.1-10

Insert Pages

License

License No. NPF-68, page 4

License No. NPF-81, page 3

TSs

3.1.7-1

3.1.7-3

3.2.1-4

3.3.1-9

3.3.1-10

(1) Maximum Power Level

Southern Nuclear is authorized to operate the facility at reactor core power levels not in excess of 3625.6 megawatts thermal (100 percent power) in accordance with the conditions specified herein.

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 212, and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. Southern Nuclear shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

(3) Southern Nuclear Operating Company shall be capable of establishing containment hydrogen monitoring within 90 minutes of initiating safety injection following a loss of coolant accident.

(4) Deleted

(5) Deleted

(6) Deleted

(7) Deleted

(8) Deleted

(9) Deleted

(10) Mitigation Strategy License Condition

The licensee shall develop and maintain strategies for addressing large fires and explosions and that include the following key areas:

(a) Fire fighting response strategy with the following elements:

1. Pre-defined coordinated fire response strategy and guidance
2. Assessment of mutual aid fire fighting assets
3. Designated staging areas for equipment and materials
4. Command and control
5. Training and response personnel

(b) Operations to mitigate fuel damage considering the following:

1. Protection and use of personnel assets
2. Communications
3. Minimizing fire spread
4. Procedures for Implementing integrated fire response strategy
5. Identification of readily-available pre-staged equipment
6. Training on integrated fire response strategy

- (2) Georgia Power Company, Oglethorpe Power Corporation, Municipal Electric Authority of Georgia, and City of Dalton, Georgia, pursuant to the Act and 10 CFR Part 50, to possess but not operate the facility at the designated location in Burke County, Georgia, in accordance with the procedures and limitations set forth in this 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 byproduct, 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;
- (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 authorized herein.

C. This license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter 1 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 incorporated below.

(1) Maximum Power Level

Southern Nuclear is authorized to operate the facility at reactor core power levels not in excess of 3625.6 megawatts thermal (100 percent power) in accordance with the conditions specified herein.

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 195 and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. Southern Nuclear shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

The Surveillance requirements (SRs) contained in the Appendix A Technical Specifications and listed below are not required to be performed immediately upon implementation of Amendment No. 74. The SRs listed below shall be

3.1 REACTIVITY CONTROL SYSTEMS

3.1.7 Rod Position Indication

LCO 3.1.7 The Digital Rod Position Indication (DRPI) System and the Demand Position Indication System shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

-----NOTE-----
Separate Condition entry is allowed for each inoperable DRPI and each inoperable demand position indicator.

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. One DRPI per group inoperable in one or more groups.</p>	<p>A.1 Verify the position of the rod with inoperable DRPI indirectly by using core power distribution information.</p> <p><u>OR</u></p> <p>A.2.1 Verify the position of the rod with inoperable DRPI indirectly by using core power distribution information.</p> <p><u>AND</u></p>	<p>Once per 8 hours</p> <p>8 hours</p> <p><u>AND</u></p> <p>Once per 31 EFPD thereafter</p> <p><u>AND</u></p> <p>8 hours after discovery of each unintended rod movement</p> <p><u>AND</u></p> <p>(continued)</p>

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.2.1.2 -----NOTE-----</p> <p>If maximum over Z $\left[\frac{F_Q(Z)}{K(Z)} \right]$ has increased since the previous evaluation of F_Q(Z):</p> <ol style="list-style-type: none"> a. Increase F_Q(Z) by an appropriate penalty factor specified in the COLR and verify this value is within the transient limits; or b. Repeat SR 3.2.1.2 once per 7 EFPD until either a. above is met or two successive surveillances indicate maximum over Z $\left[\frac{F_Q(Z)}{K(Z)} \right]$ has not increased. <p>-----</p> <p>Verify F_Q(Z) is within transient limit.</p>	<p>Once after each refueling after achieving equilibrium conditions at any power level exceeding 50% RTP</p> <p><u>AND</u></p> <p>(continued)</p>

SURVEILLANCE REQUIREMENTS

-----NOTE-----
Refer to Table 3.3.1-1 to determine which SRs apply for each RTS Function.

SURVEILLANCE		FREQUENCY
SR 3.3.1.1	Perform CHANNEL CHECK.	In accordance with the Surveillance Frequency Control Program
SR 3.3.1.2	<p>-----NOTES----- Not required to be performed until 12 hours after THERMAL POWER is $\geq 15\%$ RTP. -----</p> <p>Compare results of calorimetric heat balance calculation to power range channel output. Adjust power range channel output if calorimetric heat balance calculation results exceed power range channel output by more than +2% RTP.</p>	In accordance with the Surveillance Frequency Control Program
SR 3.3.1.3	<p>-----NOTES----- Not required to be performed until 24 hours after THERMAL POWER is $\geq 50\%$ RTP. -----</p> <p>Compare results of the core power distribution information to Nuclear Instrumentation System (NIS) AFD. Adjust NIS channel if absolute difference is $\geq 3\%$.</p>	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.4	<p>-----NOTE-----</p> <p>This Surveillance must be performed on the reactor trip bypass breaker prior to placing the bypass breaker in service.</p> <p>-----</p> <p>Perform TADOT.</p>	In accordance with the Surveillance Frequency Control Program
SR 3.3.1.5	Perform ACTUATION LOGIC TEST.	In accordance with the Surveillance Frequency Control Program
SR 3.3.1.6	<p>-----NOTES-----</p> <ol style="list-style-type: none"> 1. Not required to be performed until 7 days after THERMAL POWER is $\geq 75\%$ RTP. 2. Neutron detectors are excluded from CHANNEL CALIBRATION. <p>-----</p> <p>Calibrate excore channels to agree with core power distribution information.</p>	In accordance with the Surveillance Frequency Control Program

(continued)



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO

JOSEPH M. FARLEY NUCLEAR PLANT, UNITS 1 AND 2

AMENDMENT NO. 239 TO RENEWED FACILITY OPERATING LICENSE NPF-2

AMENDMENT NO. 236 TO RENEWED FACILITY OPERATING LICENSE NPF-8

VOGTLE ELECTRIC GENERATING PLANT, UNITS 1 AND 2

AMENDMENT NO. 212 TO RENEWED FACILITY OPERATING LICENSE NPF-68

AMENDMENT NO. 195 TO RENEWED FACILITY OPERATING LICENSE NPF-81

SOUTHERN NUCLEAR OPERATING COMPANY, INC.

DOCKET NOS. 50-348, 50-364, 50-424, AND 50-425

1.0 INTRODUCTION

By application dated June 9, 2021 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML21160A257), Southern Nuclear Operating Company (SNC, the licensee) submitted a license amendment request (LAR) for the Joseph M. Farley Nuclear Plant (Farley), Units 1 and 2, and Vogtle Electric Generating Plant (Vogtle), Units 1 and 2.

The amendments consist of proposed changes to the License and Technical Specifications (TSs) and would revise TS 3.1.7, "Rod Position Indication," TS 3.2.1, "Heat Flux Hot Channel Factor ($F_Q(Z)$)," and TS 3.3.1, "Reactor Trip System (RTS) Instrumentation," to permit the use of the Westinghouse "Best Estimate Analyzer for Core Operations – Nuclear" (BEACON™) Power Distribution Monitoring System (PDMS), as described in WCAP-12472-P-A, "BEACON Core Monitoring and Operations Support System," to perform power distribution surveillances. The proprietary, non-public version of WCAP-12472 is located in ADAMS Accession No. ML19304C540, and the non-proprietary, public version is located in ADAMS Legacy Library Accession No. 9409280021.

The BEACON™ PDMS would augment the functional capability of the neutron flux mapping system for the purposes of power distribution surveillances at Farley, Units 1 and 2; and Vogtle, Units 1 and 2. Certain TS Required Actions, for when a limiting condition for operation (LCO) is not met, and certain Surveillance Requirements (SRs) would be changed to refer to core power distribution information or surveillances of the core rather than flux mapping of the current movable incore detectors.

The BEACON™ system was developed by Westinghouse to improve operational support for pressurized-water reactors (PWRs). It is a core monitoring and support package that uses Westinghouse standard instrumentation in conjunction with an analytical methodology for online generation of three-dimensional power distributions. The system provides core monitoring, core measurement reduction, core analysis, and core predictions. Since BEACON™ does not have any direct inputs to the Reactor Trip System (RTS), BEACON™ will not affect any of the accident analyses in the Farley, Units 1 and 2, or Vogtle, Units 1 and 2, design and licensing bases.

Attachments 6 through 9 of its application dated June 9, 2021, provide licensee identified proposed changes to the TS Bases and to the Technical Requirements Manual (TRM). These changes provide additional detail as discussed in the licensee's evaluation of the proposed amendment in Attachment 1 to its LAR. The U.S. Nuclear Regulatory Commission (NRC) staff reviewed this information, in the context of the licensee-controlled TS Bases Control Program, but did not review these conforming changes as part of its approval of the proposed amendments.

2.0 REGULATORY EVALUATION

2.1 Applicable Regulatory Requirements and Guidance

Section 182a of the Atomic Energy Act requires applicants for nuclear power plant operating licenses to include TSs as part of the license. The TSs ensure the operational capability of structures, systems, and components that are required to protect the health and safety of the public. The NRC's regulatory requirements related to the content of the TSs are contained in Section 50.36, "Technical specifications," of Title 10 of the *U.S. Code of Federal Regulations* (10 CFR 50.36), which requires that the TSs include items in the following categories: (1) safety limits, limiting safety system settings, and limiting control settings; (2) Limiting Condition for Operations (LCOs); (3) SRs; (4) design features; and (5) administrative controls. However, the rule does not specify the particular requirements to be included in a plant's TSs. As stated in 10 CFR 50.36(c)(2)(i), LCOs 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..." The regulations in 10 CFR 50.36(c)(3) state that SRs 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."

As required by 10 CFR 50.36(c)(2)(ii), a TS LCO of a nuclear reactor must be established for each item meeting one or more of the following criteria:

- Criterion 1: Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary.
- Criterion 2: A process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

Criterion 3: A structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

Criterion 4: A structure, system, or component, which operating experience or probabilistic safety assessment has shown to be significant to public health and safety.

Those items that do not fall within or satisfy any of the above criteria do not need to be included in the LCOs of the TSs.

There are no specific regulatory requirements on PDMSs, such as the BEACON system; however, the use of such systems by licensees in monitoring the power distribution in the reactor core during power operation must be consistent with the safe operation of the plant.

3.0 TECHNICAL EVALUATION

3.1 System Descriptions

Farley and Vogtle

In-core instrumentation provides information on the neutron flux distribution at selected core locations. From this information, the core power distribution can be determined. The Movable Incore Detector System (MIDS) has movable flux detectors that can traverse the entire length of selected fuel assemblies, thus providing an extremely accurate, three-dimensional map of the neutron flux distribution.

Westinghouse developed the BEACON™ system to improve operational support for PWRs. It is a core monitoring and support package that uses Westinghouse standard instrumentation in conjunction with an analytical methodology for online generation of three-dimensional power distributions. The system provides the following for the core: monitoring, measurement reduction, analysis, and predictions.

BEACON™ Online Monitor (OLM) adds capability to calculate estimated critical condition, shutdown margin, load swing and other reactor engineering support functions plus on-line monitoring of core power distribution using core exit thermocouple data with no calculation of online uncertainties.

BEACON™ Technical Specification Monitor (TSM) has all the functions of BEACON™ OLM plus TS monitoring. BEACON™ TSM calculates online dynamic uncertainties based on instrumentation characteristics and time since the last flux map, plus allows the user to perform power distribution surveillances without taking a flux map using only the available instrumentation.

The BEACON™-TSM application of the core PDMS includes the following: (1) essentially continuous monitoring of the core power distribution, and (2) flux maps using MIDS only required for BEACON™ calibration.

Westinghouse submitted topical report WCAP-12472-P, "BEACON Core Monitoring and Operations Support System," to the NRC on May 21, 1990 (included in ADAMS Accession No. ML092050097, Non-Public). The NRC issued a Safety Evaluation Report (SER) approving the topical report on February 16, 1994 (included in ADAMS Accession No. ML092050097). In its SER, the NRC concluded that BEACON™ is acceptable for performing core monitoring and operations support, subject to the conditions in the Technical Evaluation Report (TER) sections 3.3 and 3.4 on uncertainties. The TER is contained in ADAMS Accession No. ML092050097.

3.2 Description of Proposed Changes

3.2.1 Current TS 3.1.7 states:

The current TS 3.1.7, "Rod Position Indication," contains, among other things, the following Required Actions:

- A.1 - Verify the position of the rod with inoperable [Digital Rod Position Indication] DRPI indirectly by using movable incore detectors.
- A.2 - Verify the position of the rod with inoperable DRPI indirectly by using movable incore detectors.
- C.1.1 (Farley) - Initiate action to verify the position of the rods with inoperable DRPIs indirectly by using movable incore detectors.
- C.1 (Vogtle) – Verify the position of the rods with inoperable DPRIs by using movable incore detectors.

3.2.2 Revised TS 3.1.7 would state:

SNC proposes to delete "movable incore detectors" and replace it with "core power distribution information." The following are the proposed changes:

- A.1 - Verify the position of the rod with inoperable [Digital Rod Position Indication] DRPI indirectly by using core power distribution information.
- A.2 - Verify the position of the rod with inoperable DRPI indirectly by using core power distribution information.
- C.1.1 (Farley) - Initiate action to verify the position of the rods with inoperable DRPIs indirectly by using core power distribution information.
- C.1 (Vogtle) – Verify the position of the rods with inoperable DPRIs by using core power distribution information.

3.2.3 Current NOTE above the Farley SR 3.2.1.1

The NOTE above the Farley SR 3.2.1.1 in TS 3.2.1, "Heat Flux Hot Channel Factor ($F_Q(Z)$) (FQ Methodology)," currently states:

- During power escalation at the beginning of each cycle, THERMAL POWER may be increased until an equilibrium power level has been achieved, at which a power distribution map is obtained.

3.2.4 Proposed NOTE above the Farley SR 3.2.1.1

SNC proposed that “a power distribution map” will be replaced with “core power distribution information” so the NOTE would state:

- During power escalation at the beginning of each cycle, THERMAL POWER may be increased until an equilibrium power level has been achieved, at which core power distribution information is obtained.

3.2.5 Current SR 3.2.1.2 states:

Current NOTE above SR 3.2.1.2 states, in part:

- If measurements indicate...
- b. Repeat SR 3.2.1.2 once per 7 EFPD [effective full-power days] until either “a.” above is met or two successive flux maps indicate...

3.2.6 Revised SR 3.2.1.2 would state, in part:

In the NOTE for SR 3.2.1.2, SNC proposed to delete “measurements indicate,” and in NOTE “b” in SR 3.2.1.2, SNC proposed that “flux maps” will be replaced with “surveillances”.

The revised NOTE for SR 3.2.1.2, would state, in part:

- If...
- b. Repeat SR 3.2.1.2 once per 7 EFPD until either “a.” above is met or two successive surveillances indicate...

3.2.7 Current SR 3.3.1.3 states:

Current SR 3.3.1.3 states, in part:

- Compare results of the incore detector measurements to Nuclear Instrumentation System (NIS) AFD [axial flux difference]. Adjust NIS channel if absolute difference is $\geq 3\%$.

3.2.8 Revised SR 3.3.1.3 would state:

In SR 3.3.1.3, SNC proposed that “the incore detector measurements” be replaced with “core power distribution information”.

Revised SR 3.3.1.3 would state:

- Compare results of core power distribution information to Nuclear Instrumentation System (NIS) AFD. Adjust NIS channel if absolute difference is $\geq 3\%$.

3.2.9 Current Farley SR 3.3.1.9 and Vogtle SR 3.3.1.6 state:

- Calibrate excore channels to agree with incore detector measurements.

3.2.10 Revised Farley SR 3.3.1.9 and Vogtle SR 3.3.1.6 would state:

In Farley SR 3.3.1.9 and Vogtle SR 3.3.1.6, SNC proposed that “incore detector measurements” be replaced with “core power distribution information”.

- Calibrate excore channels to agree with core power distribution information.

3.3 WCAP-12472-P-A

The licensee is proposing changes to the Technical Specifications to allow the use of a PDMS at Farley and Vogtle. The PDMS would be an enhancement to the Farley and Vogtle power distribution measurement and indication capabilities. The core power distribution information that is referred to in the proposed changes to the technical specifications would be information from the PDMS.

The PDMS to be used at Farley and Vogtle is the BEACON™ system developed by Westinghouse to improve the monitoring support by Westinghouse-designed PWRs. The BEACON™ PDMS is a core monitoring and support package, which uses Westinghouse standard instrumentation in conjunction with an analytical methodology for online generation of three-dimensional power distributions to provide core monitoring, core measurement reduction, core analysis, and core predictions. The BEACON™ PDMS is periodically calibrated by the existing incore detector system.

The BEACON™ system is described in the topical report WCAP-12472-P-A, “BEACON: Core Monitoring and Operations Support System,” (ADAMS Package Accession No. ML19304C541) which was approved by the NRC staff for Westinghouse reactors in its letter dated February 16, 1994, which transmitted the NRC staff’s safety evaluation report (SER). (ADAMS Accession No. ML092050097). The NRC staff’s safety evaluation report (SER) endorsed the November 18, 1993, Brookhaven National Laboratory Technical Evaluation Report (TER), “Technical Evaluation of the BEACON Core Monitoring and Operations Support System Topical Report WCAP-12474-P.” The topical report is subject to the following conditions delineated in Section 4.0 of the TER:

1. In the cycle-specific applications of BEACON, the power peaking uncertainties for average enthalpy rise at rated power ($U\Delta H$) and quadrant tilt (UQ) must provide 95% probability upper tolerance limits at the 95% confidence level (Section 3.3 [of the TER])
2. In order to ensure that the assumptions made in the BEACON uncertainty analysis remain valid, the generic uncertainty components may require reevaluation when BEACON is applied to plant or core designs that differ sufficiently to have a significant impact on the WCAP-12472-P database (Section 3.4 [of the TER]), and

3. The BEACON Technical Specifications should be revised to include the changes described in Section 3 [of the TER] concerning Specifications 3.1.3.1 and 3.1.3.2, and the Core Operating Limits Report (Section 3.6 [of the TER]).

In addressing Condition 1, in Enclosure 1 to its application dated June 9, 2021, the licensee described that they would adhere to the Westinghouse methodology. This methodology incorporates BEACON™ system calibrations using the existing incore instruments at startup and beginning-of-cycle (BOC) conditions to validate the confidence level of the power peaking uncertainties and upper tolerance limits. Until the reload BOC validation can be completed, more conservative default values will be used. The licensee will utilize their operating programs and procedures to ensure that the calibration meets all cycle-specific requirements. The NRC staff finds that the licensee's implementation methodology is acceptable and conforms to the NRC-approved methodology outlined in Section 3.3 of the TER.

In addressing Condition 2, in Enclosure 1 to its application dated June 9, 2021, the licensee outlined that both Farley and Vogtle are Westinghouse designed plants. Farley and Vogtle both have incore detector instrumentation and nuclear fuels of Westinghouse manufacture that conforms to the WCAP database. The licensee noted that Vogtle, Unit 2, has some non-Westinghouse Lead Test Assemblies (LTAs) as permitted by TS 4.2.1 and will assess the use of future LTAs on a cycle-specific basis as part of the normal reload design process in accordance with TS requirements. The NRC staff finds that that licensee's implementation methodology is acceptable and conforms to the NRC-approved methodology outlined in Section 3.4 of the TER.

In addressing Condition 3, in Enclosure 1 to its application dated June 9, 2021, the licensee indicated that the condition is not applicable to Farley and Vogtle. The TS changes described in the TER Section 3.6 describe an application of BEACON™ where it is credited for continuous monitoring and core operating limits are changed. By contrast, the licensee's proposed implementation of BEACON™ is a core power monitoring system methodology, which is implemented within the existing limits of TSs. While the TER TS 3.1.3 in question exists at Farley and Vogtle as TS 3.1.4, the licensee did not seek or credit the changes described in the TER. The NRC staff finds that licensee's implementation of BEACON™ is controlled sufficiently within the existing framework of TSs and does not require the additional TS changes described in Condition 3 and is, therefore, acceptable.

3.4 Applicability of Addenda to WCAP-12472-P-A

Subsequent to the approval of WCAP-12472-P in 1994, the NRC approved four addenda to the WCAP. Each addendum will be discussed below with respect to applicability to the proposed implementation of the BEACON™ PDMS at Farley and Vogtle.

Addendum 1

Addendum 1 of WCAP-12472-P-A/WCAP-12473-A, approved by the NRC on September 30, 1999 (ADAMS Accession No. ML003678190), describes additional features incorporated into the BEACON™ monitoring system:

1. Use of fixed incore self-powered neutron rhodium detectors, and
2. Use of three-dimensional advanced nodal codes (ANC) neutronic model code.

In addressing Addendum 1, in Enclosure 1 to its application dated June 9, 2021, the licensee stated that neither Farley nor Vogtle use fixed incore detectors, so this feature is not applicable. ANC is used for Farley and Vogtle for cycle-specific reload design analyses and will ensure consistency between the reload design and BEACON models. The NRC staff finds that the licensee's implementation methodology of ANC is acceptable and conforms to guidance of the NRC-approved Addendum.

Addendum 2

Addendum 2 of WCAP-12472-P-A/WCAP-12473-A, approved by the NRC on May 1, 2002 (ADAMS Accession No. ML021270086), extends the previously licensed BEACON™ power distribution monitoring methodology to plants containing platinum and vanadium fixed incore self-powered detectors.

In addressing Addendum 2, in Enclosure 1 to its application dated June 9, 2021, the licensee stated that neither Farley nor Vogtle use fixed platinum or vanadium incore detectors, so Addendum 2 is not applicable. The NRC staff finds that the licensee appropriately considered this addendum and determined it to be not applicable to the proposed implementation.

Addendum 3

Addendum 3 of WCAP-12472-P-A, approved by the NRC on September 26, 2005 (ADAMS Accession No. ML052620347), describes an implementation of BEACON™ at Combustion Engineering (CE) NSSS plants.

In addressing Addendum 3, in Enclosure 1 to its application dated June 9, 2021, the licensee stated that Addendum 3 is applicable to Combustion Engineering designed plants. Farley and Vogtle are Westinghouse-designed plants, so this Addendum is not applicable. The NRC staff finds that the licensee appropriately considered this addendum and determined it to be not applicable to the proposed implementation.

Addendum 4

Addendum 4 of WCAP-12472-P-A/WCAP-12472-NP-A was approved by the NRC on August 9, 2012 (ADAMS Accession No. ML12158A263). In its submittal dated June 9, 2021, the licensee noted that the addendum had the following three purposes:

1. Provide the information needed to review and approve the updated thermocouple uncertainty analysis process that will be applied in the BEACON™ on-line core monitoring system,
2. Affirm the continued use of the NRC approved Westinghouse design model methodology, currently PHOENIX-P/ANC, PARAGON/ANC, and NEXUS/ANC, in the BEACON™ system, and
3. Affirm that uncertainties applied to power distribution monitoring using fixed in-core detectors are valid using higher order polynomial fits of the detector variability and fraction of inoperable detectors.

In addressing Addendum 4, in Enclosure 1 to its application dated June 9, 2021, the licensee addressed each of the purposes.

The first purpose was to provide data to validate the uncertainty constants. SNC stated the following:

The updated thermocouple uncertainty evaluation method presented in the submitted TR is based on the licensed methodology in the BEACON topical report but uses the current plant/cycle data in the evaluation process to generate cycle-specific uncertainty constants. There are no new methods being developed for the BEACON system; this update is a change in the application of the approved method. Westinghouse stated in the submittal, that this thermocouple uncertainty methodology is only applied to plants with movable in-core detectors. These plants use thermocouples to determine the measured power distribution as described in WCAP-12472-P-A, "BEACON: Core Monitoring and Operations Support System" and the request for additional information (RAI) responses for Addendum 4.

The NRC staff finds this acceptable.

For the second purpose, the licensee is already using PARAGON/ANC, and NEXUS/ANC for its cycle-specific reload design analyses for Farley and Vogtle. Continuing to use these analytical methodologies with the BEACON™ system will provide for an effective implementation. The NRC staff finds design model methodologies currently and proposed to be used are acceptable in accordance with the NRC-approved methodology for implementation of BEACON™ under this Addendum.

The third purpose was determined to be not applicable by the licensee because neither Farley nor Vogtle use fixed incore detectors. The NRC staff finds that determination to be appropriate.

3.5 NRC Staff Determination

The NRC staff reviewed the licensee's responses to the three conditions of WCAP-12472-P-A as well as the four addenda to WCAP-12472-P-A and concludes that the responses are acceptable. The licensee has not proposed changes to the Core Operating Limits Report (COLR) or the core safety limits for Farley or Vogtle. The proposed TS changes are to allow the core power distribution to be determined at Farley or Vogtle by the BEACON™ system and will provide equivalent if not enhanced information capability to the reactor operators as compared to the existing movable incore detectors capability alone. Also, as stated by the licensee, and identified in the Technical Requirements Manuals (TRM) in Attachments 8 and 9 to the June 9, 2021 letter, the BEACON™ PDMS is not required to be operable below 25-percent rated thermal power (RTP) but is required to be operable at all other times in MODE 1, when used for the surveillances described in the requested TS changes. Furthermore, Required Action A.1 associated with TRM Technical Requirements (TR) 13.3.10 at Farley and TR 13.3.9 at Vogtle requires that the PDMS be suspended when RTP is below 25-percent. This is because the accuracy of the calculated core power distribution may not be bounded by the uncertainties in WCAP-12472-P-A at these reduced power levels. Based on this Technical Requirement, and on the discussion provided above, the NRC staff concludes that the licensee has provided an acceptable disposition of the WCAP-12472-P-A conditions, and is, therefore, acceptable for use of the BEACON™ system described in WCAP-12472-P-A at Farley and Vogtle.

In its application dated June 9, 2021, the licensee outlined a process to use BEACON™ to augment the functional capability of its core flux mapping system for the purpose of power distribution surveillances. Although WCAP-12472-P-A discusses an application of BEACON™ in which there is continuous flux monitoring by control room operators, the licensee is proposing a more conservative application of BEACON™ in which the core power distribution limits themselves remain unchanged. The licensee intends to use the BEACON™ PDMS as the primary method for performing power distribution surveillances, and to use the existing movable in-core detectors as an alternative.

In Attachment 1 to its June 9, 2021 application, the licensee addressed whether the PDMS needed to have an LCO added to the TS to state that the system is required to be operable.

The licensee concluded that an LCO for the PDMS was not required, because it did not meet the criteria set forth in 10 CFR 50.36(c)(2)(ii).

The PDMS instrumentation provides the capability to monitor core parameters at more frequent intervals than is currently required by the TS. The PDMS combines inputs from currently installed plant instrumentation and design data for each fuel cycle. The addition of PDMS does not modify or eliminate existing plant instrumentation. It provides a continuous means to monitor the power distribution limits including limiting peaking factors and quadrant power tilt ratio. The PDMS is used for periodic measurement of the core power distribution to confirm operation within design limits, and for periodic calibration of the ex-core detectors, and it does not initiate any automatic protection action. The PDMS instrumentation does not change any of the key safety parameter limits or levels of margin as considered in the reference design basis evaluations. These limits are not revised by this license amendment and can continue to be determined independently of the operability of the PDMS. Based on these considerations, the NRC staff also concludes that the PDMS itself does not meet any of the 10 CFR 50.36(c)(2)(ii) selection criteria for inclusion in the TS. Therefore, the NRC staff concludes that 10 CFR 50.36 does not require the PDMS to have its own LCO in the TS and instead should be monitored via the associated TRM Technical Requirements. The TRM is maintained by the licensee in accordance with 10 CFR 50.59, "Changes, tests, and experiments."

Based on its review of the proposed changes to TS 3.1.7, 3.2.1, and 3.3.1, identified in Section 2.2 of this SE, the NRC staff concludes that replacing the current TS references to movable incore detectors, power distribution maps, and flux maps, with references to core power distribution measurement information (from either the movable incore detector system or the BEACON™ system) is consistent with the technical requirements of the NRC-approved WCAP-12472-P-A. Based on the above, the NRC staff further concludes that the proposed changes meet the requirements of 50.36(c)(2) and 50.36(c)(3) because when the LCOs are not met, the revised remedial actions will continue to provide an acceptable alternative to shutting down the reactor and the SRs will continue to provide assurance that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the LCO will be met. Therefore, the NRC concludes that proposed amendments are acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Georgia State and Alabama State officials were notified on December 9, 2021, of the proposed issuance of the amendments. On December 10, 2021, the State officials confirmed that the States of Alabama and Georgia had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to the installation or use of facility components 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 (86 FR 43691, dated August 10, 2021), and there has been no public comment on such finding. 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.

Principal Contributor: Charles Peabody Jr., NRR/DSS

Date: January 26, 2022

SUBJECT: JOSEPH M. FARLEY NUCLEAR PLANT, UNITS 1 AND 2; AND VOGTLE ELECTRIC GENERATING PLANT, UNITS 1 AND 2, ISSUANCE OF AMENDMENTS REGARDING REVISION TO USE BEACON POWER DISTRIBUTION MONITORING SYSTEM (EPID L-2021-LLA-0109) DATED JANUARY 26, 2022

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ADAMS Accession No.: ML21344A003

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DATE	12/9/2021	12/15/2021	12/16/2021	12/9/2021
OFFICE	OGC – NLO	NRR/DORL/LPL2-1/BC	NRR/DORL/LPL2-1/PM	
NAME	JAzeizat	MMarkley	JLamb	
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