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

December 19, 2017

Mr. Joseph W. Shea, Vice President,
Nuclear Regulatory Affairs
and Support Services
Tennessee Valley Authority
1101 Market Street, LP 3R-C
Chattanooga, Tennessee 37402-2801

SUBJECT: BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2, AND 3 - ISSUANCE OF AMENDMENTS TO REVISE NFPA 805 PERFORMANCE-BASED STANDARD FOR FIRE PROTECTION FOR LIGHT WATER REACTOR ELECTRIC GENERATING PLANTS - REVISION TO TABLE S-2 AND TABLE S-3 (CAC NOS. MF9814, M9815, AND M9816; EPID L-2017-LLA-0234)

Dear Mr. Shea:

The Nuclear Regulatory Commission (NRC, the Commission) has issued the Amendment Nos. 302, 326, and 286 to Renewed Facility Operating License Nos. DPR-33, DPR-52, and DPR-68 for the Browns Ferry Nuclear Plant, Units 1, 2, and 3, respectively.

These amendments are in response to Tennessee Valley Authority's license amendment request dated June 7, 2017, as supplemented by letters dated September 18 and October 23, 2017. The amendments change fire protection license condition 2.C.(13) for Unit 1, license condition 2.C.(14) for Unit 2, and license condition 2.C.(7) for Unit 3.

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

Sincerely,

Farideh E. Saba

Farideh E. Saba, Senior Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-259, 50-260,
and 50-296

Enclosures:
1. Amendment No. 302 to DPR-33
2. Amendment No. 326 to DPR-52
3. Amendment No. 286 to DPR-68
4. Safety Evaluation

cc: Listserv

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

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-259

BROWNS FERRY NUCLEAR PLANT, UNIT 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 302
Renewed License No. DPR-33

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

   A. The application for amendment by Tennessee Valley Authority (the licensee) dated June 7, 2017, as supplemented by letters September 18 and October 23, 2017, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the renewed license is amended by changes as indicated in the attachment to this license amendment and to the following paragraphs:

Paragraph 2.C.(2) of Renewed Facility Operating License (RFOL) No. DPR-33 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 302, are hereby incorporated in the renewed operating license. The licensee shall operate the facility in accordance with the Technical Specifications.

Paragraph 2.C.(13) of RFOL No. DPR-33 is hereby amended to read as follows:

(13) TVA Browns Ferry Nuclear Plant shall implement and maintain in effect all provisions of the approved fire protection program that comply with 10 CFR 50.48(a) and 10 CFR 50.48(c), as specified in the license amendment requests dated March 27, 2013; and June 7, 2017, as supplemented by letters dated May 16, 2013; December 20, 2013; January 10, 2014; January 14, 2014; February 13, 2014; March 14, 2014; May 30, 2014; June 13, 2014; July 10, 2014; August 29, 2014; September 16, 2014; October 6, 2014; December 17, 2014; March 26, 2015; April 9, 2015; June 19, 2015; August 18, 2015; September 8, 2015; October 20, 2015; September 18, 2017; and October 23, 2017, as approved in the Safety Evaluations dated October 28, 2015; and December 19, 2017. Except where NRC approval for changes or deviations is required by 10 CFR 50.48(c), and provided no other regulation, technical specification, license condition or requirement would require prior NRC approval, the licensee may make changes to the fire protection program without prior approval of the Commission if those changes satisfy the provisions set forth in 10 CFR 50.48(a) and 10 CFR 50.48(c), the change does not require a change to a technical specification or a license condition, and the criteria listed below are satisfied.

Items 2 and 3 Under "Transition License Conditions" on RFOL page 5b are hereby amended to read as follows:

2. The licensee shall implement modifications to its facility, as described in Table S-2, "Plant Modifications," of Tennessee Valley Authority letter CNL-17-024, dated June 7, 2017, to complete the transition to full compliance with 10 CFR 50.48(c) no later than the end of the second refueling outage (for each unit) following issuance of the NFPA 805 License Amendment dated October 28, 2015. The licensee shall maintain appropriate compensatory measures in place until completion of these modifications.

3. The licensee shall complete Implementation Items 09, 32, 33, and the second part of Implementation Item 47 as listed in Table S-3, "Implementation Items," of TVA letter CNL-17-130 dated October 23, 2017. Implementation Item 09 shall be completed by June 29, 2018. Implementation Items 32, 33, and the second part of Implementation Item 47, i.e., resolving Finding level Facts and Observations, are associated with modifications and will be completed after all procedure updates, modifications, and training are complete.

3. The license amendment is effective as of its date of issuance and shall be implemented as indicated in Items 2 and 3 under "Transition License Conditions" on RFOL page 5b in the attachment to this license amendment.

FOR THE NUCLEAR REGULATORY COMMISSION

Undine Shoop, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the RFOL DPR-33
and Technical Specifications

Date of Issuance: December 19, 2017

ATTACHMENT TO LICENSE AMENDMENT NO. 302

BROWNS FERRY NUCLEAR PLANT, UNIT 1

RENEWED FACILITY OPERATING LICENSE NO. DPR-33

DOCKET NO. 50-259

Replace the following pages of Renewed Facility Operating License DPR-33 with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of changes.

REMOVE	INSERT
3	3
5	5
5b	5b

(3) 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;

(4) 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 equipment and instrument calibration or associated with radioactive apparatus or components;

(5) Pursuant to the Act and 10 CFR Parts 30 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 operating license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations in 10 CFR Chapter I: Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Sections 50.54 and 50.59 of Part 50, and Section 70.32 of Part 70; 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

The licensee is authorized to operate the facility at steady state reactor core power levels not in excess of 3952 megawatts thermal.

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 302, are hereby incorporated in the renewed operating license. The licensee shall operate the facility in accordance with the Technical Specifications.

For Surveillance Requirements (SRs) that are new in Amendment 234 to Facility Operating License DPR-33, the first performance is due at the end of the first surveillance interval that begins at implementation of the Amendment 234. For SRs that existed prior to Amendment 234, including SRs with modified acceptance criteria and SRs whose frequency of performance is being extended, the first performance is due at the end of the first surveillance interval that begins on the date the surveillance was last performed prior to implementation of Amendment 234.

(8) Deleted.

(9) Deleted.

(10) Deleted.

(11)(a) The licensee shall fully implement and maintain in effect all provisions of the Commission-approved physical security, training and qualification, and safeguards contingency plans including amendments made pursuant to provisions of the Miscellaneous Amendments and Search Requirements revisions to 10 CFR 73.55 (51 FR 27817 and 27822) and to the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The combined set of plans, which contains Safeguards Information protected under 10 CFR 73.21, is entitled: "Browns Ferry Nuclear Plant Physical Security Plan, Training and Qualification Plan, and Contingency Plan," submitted by letter dated April 28, 2006.

(b) The licensee shall fully implement and maintain in effect all provisions of the Commission-approved cyber security plan (CSP), including changes made pursuant to the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The licensee CSP was approved by License Amendment No. 279, as amended by changes approved by License Amendment No. 286.

(12) Deleted.

(13) TVA Browns Ferry Nuclear Plant shall implement and maintain in effect all provisions of the approved fire protection program that comply with 10 CFR 50.48(a) and 10 CFR 50.48(c), as specified in the license amendment requests dated March 27, 2013, and June 7, 2017, as supplemented by letters dated May 16, 2013; December 20, 2013; January 10, 2014; January 14, 2014; February 13, 2014; March 14, 2014; May 30, 2014; June 13, 2014; July 10, 2014; August 29, 2014; September 16, 2014; October 6, 2014; December 17, 2014; March 26, 2015; April 9, 2015; June 19, 2015; August 18, 2015; September 8, 2015; October 20, 2015; September 18, 2017; and October 23, 2017, as approved in the Safety Evaluations dated October 28, 2015; and December 19, 2017. Except where NRC approval for changes or deviations is required by 10 CFR 50.48(c), and provided no other regulation, technical specification, license condition or requirement would require prior NRC approval, the licensee may make changes to the fire protection program without prior approval of the Commission if those changes satisfy the provisions set forth in 10 CFR 50.48(a) and 10 CFR 50.48(c), the change does not require a change to a technical specification or a license condition, and the criteria listed below are satisfied.

Risk-Informed Changes that May Be Made Without Prior NRC Approval

A risk assessment of the change must demonstrate that the acceptance criteria below are met. The risk assessment approach, methods, and data shall be acceptable to the NRC and shall be appropriate for the nature and scope of the change being evaluated; be based on the as-built, as-operated, and maintained plant; and reflect the operating experience at the plant. Acceptable methods to assess the risk of the change may include methods that have been used in the

2. Fire Protection Program Changes that Have No More than Minimal Risk Impact

   Prior NRC review and approval are not required for changes to the licensee's fire protection program that have been demonstrated to have no more than a minimal risk impact. The licensee may use its screening process as approved in the NRC Safety Evaluation dated October 28, 2015, to determine that certain fire protection Program changes meet the minimal criterion. The licensee shall ensure that fire Protection defense-in-depth and safety margins are maintained when changes are made to the fire protection program.

Transition License Conditions

1. Before achieving full compliance with 10 CFR 50.48(c), as specified by (2) below, risk-informed changes to the licensee's fire protection program may not be made without prior NRC review and approval unless the change has been demonstrated to have no more than a minimal risk impact, as described in (2) above.

2. The licensee shall implement modifications to its facility, as described in Table S-2, "Plant Modifications," of Tennessee Valley Authority letter CNL 17-024, dated June 7, 2017, to complete the transition to full compliance with 10 CFR 50.48(c) no later than the end of the second refueling outage (for each unit) following issuance of the NFPA 805 License Amendment dated October 28, 2015. The licensee shall maintain appropriate compensatory measures in place until completion of these modifications.

3. The licensee shall complete Implementation Items 09, 32, 33, and the second part of Implementation Item 47 as listed in Table S-3, "Implementation Items," of TVA letter CNL-17-130 dated October 23, 2017. Implementation Item 09 shall be completed by June 29, 2018. Implementation Items 32, 33, and the second part of Implementation Item 47, i.e., resolving Finding level Facts and Observations, are associated with modifications and will be completed after all procedure updates, modifications, and training are complete.

(14) The licensee shall maintain the Augmented Quality Program for the Standby Liquid Control System to provide quality control elements to ensure component reliability for the required alternative source term function defined in the Updated Final Safety Analyses Report (UFSAR).

(15) The licensee is required to confirm that the conclusions made in TVA's letter dated September 17, 2004, for the turbine building remain acceptable using seismic demand accelerations based on dynamic seismic analysis prior to the restart of Unit 1.

(16) Upon implementation of Amendment No. 275, adopting TSTF-448, Revision 3, the determination of control room envelope (CRE) unfiltered air inleakage as required by SR 3.7.3.4, in accordance with TS 5.5.13.c.(i), the assessment of the CRE habitability as required by TS 5.5.13.c.(ii), and the measure of CRE pressure as required by TS 5.5.13.d, shall be considered met.

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

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-260

BROWNS FERRY NUCLEAR PLANT, UNIT 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 326
Renewed License No. DPR-52

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

   A. The application for amendment by Tennessee Valley Authority (the licensee) dated June 7, 2017, as supplemented by letters September 18 and October 23, 2017, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the renewed license is amended by changes as indicated in the attachment to this license amendment and to the following paragraphs:

Paragraph 2.C.(2) of Renewed Facility Operating License (RFOL) No. DPR-52 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No.326, are hereby incorporated in the renewed operating license. The licensee shall operate the facility in accordance with the Technical Specifications.

Paragraph 2.C.(14) of RFOL No. DPR-52 is hereby amended to read as follows:

(14) TVA Browns Ferry Nuclear Plant shall implement and maintain in effect all provisions of the approved fire protection program that comply with 10 CFR 50.48(a) and 10 CFR 50.48(c), as specified in the license amendment requests dated March 27, 2013; and June 7, 2017, as supplemented by letters dated May 16, 2013; December 20, 2013; January 10, 2014; January 14, 2014; February 13, 2014; March 14, 2014; May 30, 2014; June 13, 2014; July 10, 2014; August 29, 2014; September 16, 2014; October 6, 2014; December 17, 2014; March 26, 2015; April 9, 2015; June 19, 2015; August 18, 2015; September 8, 2015; October 20, 2015; September 18, 2017; and October 23, 2017, as approved in the Safety Evaluations dated October 28, 2015; and December 19, 2017. Except where NRC approval for changes or deviations is required by 10 CFR 50.48(c), and provided no other regulation, technical specification, license condition or requirement would require prior NRC approval, the licensee may make changes to the fire protection program without prior approval of the Commission if those changes satisfy the provisions set forth in 10 CFR 50.48(a) and 10 CFR 50.48(c), the change does not require a change to a technical specification or a license condition, and the criteria listed below are satisfied.

Items 2 and 3 Under "Transition License Conditions" on RFOL page 5b are hereby amended to read as follows:

2. The licensee shall implement modifications to its facility, as described in Table S-2, "Plant Modifications," of Tennessee Valley Authority letter CNL-17-024, dated June 7, 2017, to complete the transition to full compliance with 10 CFR 50.48(c) no later than the end of the second refueling outage (for each unit) following issuance of the NFPA 805 License Amendment dated October 28, 2015. The licensee shall maintain appropriate compensatory measures in place until completion of these modifications.

3. The licensee shall complete Implementation Items 09, 32, 33, and the second part of Implementation Item 47 as listed in Table S-3, "Implementation Items," of TVA letter CNL-17-130 dated October 23, 2017. Implementation Item 09 shall be completed by June 29, 2018. Implementation Items 32, 33, and the second part of Implementation Item 47, i.e., resolving Finding level Facts and Observations, are associated with modifications and will be completed after all procedure updates, modifications, and training are complete.

3. The license amendment is effective as of its date of issuance and shall be implemented as indicated in Items 2 and 3 under "Transition License Conditions" on RFOL page 5b in the attachment to this license amendment.

FOR THE NUCLEAR REGULATORY COMMISSION

Undine Shoop, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the RFOL DPR-52
and Technical Specifications

Date of Issuance: December 19, 2017

ATTACHMENT TO LICENSE AMENDMENT NO. 326

BROWNS FERRY NUCLEAR PLANT, UNIT 2

TO RENEWED FACILITY OPERATING LICENSE NO. DPR-52

DOCKET NO. 50-260

Replace the following pages of Renewed Facility Operating License DPR-52 with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of changes.

REMOVE	INSERT
3	3
5	5
5b	5b

sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;

(4) 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 equipment and instrument calibration or associated with radioactive apparatus or components;

(5) Pursuant to the Act and 10 CFR Parts 30 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 operating license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations in 10 CFR Chapter I: Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Sections 50.54 and 50.59 of Part 50, and Section 70.32 of Part 70; 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

The licensee is authorized to operate the facility at steady state reactor core power levels not in excess of 3952 megawatts thermal.

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 326, are hereby incorporated in the renewed operating license. The licensee shall operate the facility in accordance with the Technical Specifications.

For Surveillance Requirements (SRs) that are new in Amendment 253 to Facility Operating License DPR-52, the first performance is due at the end of the first surveillance interval that begins at implementation of the Amendment 253. For SRs that existed prior to Amendment 253, including SRs with modified acceptance criteria and SRs whose frequency of performance is being extended, the first performance is due at the end of the first surveillance interval that begins on the date the surveillance was last performed prior to implementation of Amendment 253.

(3) The licensee is authorized to relocate certain requirements included in Appendix A and the former Appendix B to licensee-controlled documents. Implementation of this amendment shall include the relocation of these requirements to the appropriate documents, as described in the licensee's

(8) Deleted.

(9) Deleted.

(10) Deleted.

(11)(a) The licensee shall fully implement and maintain in effect all provisions of the commission-approved physical security, training and qualification, and safeguards contingency plans including amendments made pursuant to provisions of the Miscellaneous Amendments and Search Requirements revisions to 10 CFR 73.55 (51 FR 27817 and 27822) and to the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The combined set of plans, which contains Safeguards Information protected under 10 CFR 73.21, is entitled: "Browns Ferry Nuclear Plant Physical Security Plan, Training and Qualification Plan, and Contingency Plan," submitted by letter dated April 28, 2006.

(b) The licensee shall fully implement and maintain in effect all provisions of the Commission-approved cyber security plan (CSP), including changes made pursuant to the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The licensee CSP was approved by License Amendment No. 306, as amended by changes approved by License Amendment 312.

(12) Deleted.

(13) Deleted.

(14) TVA Browns Ferry Nuclear Plant shall implement and maintain in effect all provisions of the approved fire protection program that comply with 10 CFR 50.48(a) and 10 CFR 50.48(c), as specified in the license amendment requests dated March 27, 2013; and June 7, 2017, as supplemented by letters dated May 16, 2013; December 20, 2013; January 10, 2014; January 14, 2014; February 13, 2014; March 14, 2014; May 30, 2014; June 13, 2014; July 10, 2014; August 29, 2014; September 16, 2014; October 6, 2014; December 17, 2014; March 26, 2015; April 9, 2015; June 19, 2015; August 18, 2015; September 8, 2015; October 20, 2015; September 18, 2017; and October 23, 2017, as approved in the Safety Evaluations dated October 28, 2015; and December 19, 2017. Except where NRC approval for changes or deviations is required by 10 CFR 50.48(c), and provided no other regulation, technical specification, license condition or requirement would require prior NRC approval, the licensee may make changes to the fire protection program without prior approval of the Commission if those changes satisfy the provisions set forth in 10 CFR 50.48(a) and 10 CFR 50.48(c), the change does not require a change to a technical specification or a license condition, and the criteria listed below are satisfied.

Risk-Informed Changes that May Be Made Without Prior NRC Approval

A risk assessment of the change must demonstrate that the acceptance criteria below are met. The risk assessment approach, methods, and data shall be

- Automatic and Manual Water-Based Fire Suppression Systems (Section 3.9);
- Gaseous Fire Suppression Systems (Section 3.10); and
- Passive Fire Protection Features (Section 3.11).

This License Condition does not apply to any demonstration of equivalency under Section 1.7 of NFPA 805.

1. Fire Protection Program Changes that Have No More than Minimal Risk Impact

Prior NRC review and approval are not required for changes to the licensee's fire protection program that have been demonstrated to have no more than a minimal risk impact. The licensee may use its screening process as approved in the NRC Safety Evaluation dated October 28, 2015, to determine that certain fire protection program changes meet the minimal criterion. The licensee shall ensure that fire protection defense-in-depth and safety margins are maintained when changes are made to the fire protection program.

Transition License Conditions

1. Before achieving full compliance with 10 CFR 50.48(c), as specified by (2) below, risk-informed changes to the licensee's fire protection program may not be made without prior NRC review and approval unless the change has been demonstrated to have no more than a minimal risk impact, as described in (2) above.

2. The licensee shall implement modifications to its facility, as described in Table S-2, "Plant Modifications," of Tennessee Valley Authority letter CNL-17-024, dated June 7, 2017, to complete the transition to full compliance with 10 CFR 50.48(c) no later than the end of the second refueling outage (for each unit) following issuance of the NFPA 805 License Amendment dated October 28, 2015. The licensee shall maintain appropriate compensatory measures in place until completion of these modifications.

3. The licensee shall complete Implementation Items 09, 32, 33, and the second part of Implementation Item 47 as listed in Table S-3, "Implementation Items," of TVA letter CNL-17-130 dated October 23, 2017. Implementation Item 09 shall be completed by June 29, 2018. Implementation Items 32, 33, and the second part of Implementation Item 47, i.e., resolving Finding level Facts and Observations, are associated with modifications and will be completed after all procedure updates, modifications, and training are complete.

(15) The licensee shall maintain the Augmented Quality Program for the Standby Liquid Control System to provide quality control elements to ensure component reliability for the required alternative source term function defined in the Updated Final Safety Analysis Report (UFSAR).

(16) Upon complementation of Amendment No. 302, adopting TSTF-448, Revision 3, the determination of control room envelope (CRE) unfiltered air inleakage as required by SR 3. 7.3.4, in accordance with TS 5.5.13.c(i), the assessment of the CRE habitability as required by TS 5.5.13.c(ii), and the measure of CRE pressure as required by TS 5.5.13.d, shall be considered met.

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TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-296

BROWNS FERRY NUCLEAR PLANT, UNIT 3

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 286
Renewed License No. DPR-68

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

   A. The application for amendment by Tennessee Valley Authority (the licensee) dated June 7, 2017, as supplemented by letters September 18 and October 23, 2017, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the renewed license is amended by changes as indicated in the attachment to this license amendment and to the following paragraphs:

Paragraph 2.C.(2) of Renewed Facility Operating License (RFOL) No. DPR-68 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 286, are hereby incorporated in the renewed operating license. The licensee shall operate the facility in accordance with the Technical Specifications.

Paragraph 2.C.(7) of RFOL No. DPR-68 is hereby amended to read as follows:

(7) TVA Browns Ferry Nuclear Plant shall implement and maintain in effect all provisions of the approved fire protection program that comply with 10 CFR 50.48(a) and 10 CFR 50.48(c), as specified in the license amendment requests dated March 27, 2013; and June 7, 2017, as supplemented by letters dated May 16, 2013; December 20, 2013; January 10, 2014; January 14, 2014; February 13, 2014; March 14, 2014; May 30, 2014; June 13, 2014; July 10, 2014; August 29, 2014; September 16, 2014; October 6, 2014; December 17, 2014; March 26, 2015; April 9, 2015; June 19, 2015; August 18, 2015; September 8, 2015; October 20, 2015; September 18, 2017; and October 23, 2017, as approved in the Safety Evaluations dated October 28, 2015; and December 19, 2017. Except where NRC approval for changes or deviations is required by 10 CFR 50.48(c), and provided no other regulation, technical specification, license condition or requirement would require prior NRC approval, the licensee may make changes to the fire protection program without prior approval of the Commission if those changes satisfy the provisions set forth in 10 CFR 50.48(a) and 10 CFR 50.48(c), the change does not require a change to a technical specification or a license condition, and the criteria listed below are satisfied.

Items 2 and 3 Under "Transition License Conditions" on RFOL pages 4b and 5 are hereby amended to read as follows:

2. The licensee shall implement modifications to its facility, as described in Table S-2, "Plant Modifications," of Tennessee Valley Authority letter CNL-17-024, dated June 7, 2017, to complete the transition to full compliance with 10 CFR 50.48(c) no later than the end of the second refueling outage (for each unit) following issuance of the NFPA 805 License Amendment dated October 28, 2015. The licensee shall maintain appropriate compensatory measures in place until completion of these modifications.

3. The licensee shall complete Implementation Items 09, 32, 33, and the second part of Implementation Item 47 as listed in Table S-3, "Implementation Items," of TVA letter CNL-17-130 dated October 23, 2017. Implementation Item 09 shall be completed by June 29, 2018. Implementation Items 32, 33, and the second part of Implementation Item 47, i.e., resolving Finding level Facts and Observations, are associated with modifications and will be completed after all procedure updates, modifications, and training are complete.

3. The license amendment is effective as of its date of issuance and shall be implemented as indicated in Items 2 and 3 under "Transition License Conditions" on RFOL pages 4b and 5 in the attachment to this license amendment.

FOR THE NUCLEAR REGULATORY COMMISSION

Undine Shoop, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the RFOL DPR-68
and Technical Specifications

Date of Issuance: December 19, 2017

ATTACHMENT TO LICENSE AMENDMENT NO. 286

BROWNS FERRY NUCLEAR PLANT, UNIT 3

TO RENEWED FACILITY OPERATING LICENSE NO. DPR-68

DOCKET NO. 50-296

Replace the following pages of Renewed Facility Operating License DPR-68 with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of changes.

REMOVE	INSERT
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4	4
4b	4b
5	5

(3) 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;

(4) 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 equipment and instrument calibration or associated with radioactive apparatus or components;

(5) Pursuant to the Act and 10 CFR Parts 30 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 operating license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations in 10 CFR Chapter I: Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Sections 50.54 and 50.59 of Part 50, and Section 70.32 of Part 70; 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

The licensee is authorized to operate the facility at steady state reactor core power levels not in excess of 3952 megawatts thermal.

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 286, are hereby incorporated in the renewed operating license. The licensee shall operate the facility in accordance with the Technical Specifications.

For Surveillance Requirements (SRs) that are new in Amendment 212 to Facility Operating License DPR-68, the first performance is due at the end of the first surveillance interval that begins at implementation of the Amendment 212. For SRs that existed prior to Amendment 212, including SRs with modified acceptance criteria and SRs whose frequency of performance is being extended, the first performance is due at the end of the first surveillance interval that begins on the date the surveillance was last performed prior to implementation of Amendment 212.

(3) The licensee is authorized to relocate certain requirements included in Appendix A and the former Appendix B to licensee-controlled documents. Implementation of this amendment shall include the relocation of these requirements to the appropriate documents, as described in the licensee's application dated September 6, 1996; as supplemented May 1, August 14, November 5 and 14, December 3, 4, 11, 22, 23, 29, and 30, 1997; January 23, March 12, April 16, 20, and 28, May 7, 14, 19, and 27, and June 2, 5, 10 and 19, 1998; evaluated in the NRC staff's Safety Evaluation enclosed with this amendment. This amendment is effective immediately and shall be implemented within 90 days of the date of this amendment.

(4) Deleted.

(5) Classroom and simulator training on all power uprate related changes that affect operator performance will be conducted prior to operating at uprated conditions. Simulator changes that are consistent with power uprate conditions will be made and simulator fidelity will be validated in accordance with ANSI/ANS 3.5-1985. Training and the plant simulator will be modified, as necessary, to incorporate changes identified during startup testing. This amendment is effective immediately.

(6)(a) The licensee shall fully implement and maintain in effect all provisions of the Commission-approved physical security, training and qualification, and safeguards contingency plans including amendments made pursuant to provisions of the Miscellaneous Amendments and Search Requirements revisions to 10 CFR 73.55 (51 FR 27817 and 27822) and to the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The combined set of plans, which contains Safeguards Information protected under 10 CFR 73.21, is entitled: "Browns Ferry Nuclear Plant Physical Security Plan, Training and Qualification Plan, and Contingency Plan," Revision 4, submitted by letter dated April 28, 2006.

(b) The licensee shall fully implement and maintain in effect all provisions of the Commission-approved cyber security plan (CSP), including changes made pursuant to the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The licensee CSP was approved by License Amendment No. 265, as amended by changes approved by License Amendment Nos. 271 and 281.

(7) TVA Browns Ferry Nuclear Plant shall implement and maintain in effect all provisions of the approved fire protection program that comply with 10 CFR 50.48(a) and 10 CFR 50.48(c), as specified in the license amendment requests dated March 27, 2013 and June 7, 2017, as supplemented by letters dated May 16, 2013; December 20, 2013; January 10, 2014; January 14, 2014; February 13, 2014; March 14, 2014; May 30, 2014; June 13, 2014; July 10, 2014; August 29, 2014; September 16, 2014; October 6, 2014; December 17, 2014; March 26, 2015; April 9, 2015; June 19, 2015; August 18, 2015; September 8, 2015; October 20, 2015; September 18, 2017; and October 23, 2017, as approved in the Safety Evaluations dated October 28, 2015; and December 19, 2017. Except where NRC approval for changes or deviations is required by 10 CFR 50.48(c), and provided no other regulation, technical specification, license condition or requirement would require prior NRC approval, the licensee

The licensee may use an engineering evaluation to demonstrate that changes to certain NFPA 805, Chapter 3 elements are acceptable because the alternative is "adequate for the hazard." Prior NRC review and approval would not be required for alternatives to four specific sections of NFPA 805, Chapter 3, for which an engineering evaluation demonstrates that the alternative to the Chapter 3 element is adequate for the hazard. A qualified fire protection engineer shall perform the engineering evaluation and conclude that the change has not affected the functionality of the component, system, procedure, or physical arrangement, using a relevant technical requirement or standard. The four specific sections of NFPA 805, Chapter 3, are as follows:

- Fire Alarm and Detection Systems (Section 3.8);
- Automatic and Manual Water-Based Fire Suppression Systems (Section 3.9);
- Gaseous Fire Suppression Systems (Section 3.10); and
- Passive Fire Protection Features (Section 3.11).

This License Condition does not apply to any demonstration of equivalency under Section 1.7 of NFPA 805.

2. Fire Protection Program Changes that Have No More than Minimal Risk Impact

   Prior NRC review and approval are not required for changes to the licensee's fire protection program that have been demonstrated to have no more than a minimal risk impact. The licensee may use its screening process as approved in the NRC Safety Evaluation dated October 28, 2015, to determine that certain fire protection program changes meet the minimal criterion. The licensee shall ensure that fire protection defense-in-depth and safety margins are maintained when changes are made to the fire protection program.

Transition License Conditions

1. Before achieving full compliance with 10 CFR 50.48(c), as specified by (2) below, risk-informed changes to the licensee's fire protection program may not be made without prior NRC review and approval unless the change has been demonstrated to have no more than a minimal risk impact, as described in (2) above.

2. The licensee shall implement modifications to its facility, as described in Table S-2, "Plant Modifications," of Tennessee Valley Authority letter CNL-17-024, dated June 7, 2017, to complete the transition to full compliance with 10 CFR 50.48(c) no later than the end of the second refueling outage (for each unit) following issuance of the NFPA 805 License Amendment dated October 28, 2015. The licensee shall maintain appropriate compensatory measures in place until completion of these modifications.

3. The licensee shall complete Implementation Items 09, 32, 33, and the second part of Implementation Item 47 as listed in Table S-3, "Implementation Items," of TVA letter CNL-17-130 dated October 23, 2017. Implementation Item 09 shall be completed by June 29, 2018. Implementation Items 32, 33, and the second part of Implementation Item 47, i.e., resolving Finding level Facts and Observations, are associated with modifications and will be completed after all procedure updates, modifications, and training are complete.

(8) Deleted.

(9) The licensee shall maintain the Augmented Quality Program for the Standby Liquid Control System to provide quality control elements to ensure component reliability for the required alternative source term function defined in the Updated Final Safety Analyses Report (UFSAR).

(10) Mitigation Strategy License Condition

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 of 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
   7. Spent fuel pool mitigation measures

(c) Actions to minimize release to include consideration of:
   1. Water spray scrubbing
   2. Dose to onsite responders

(11) The licensee shall implement and maintain all Actions required by Attachment 2 to NRC Order EA-06-137, issued June 20, 2006, except the last action that requires incorporation of the strategies into the site security plan, contingency plan, emergency plan and/or guard training and qualification plan, as appropriate.

(12) Upon completion of Amendment No. 261, adopting TSTF-448, Revision 3, the determination of control room envelope (CRE) unfiltered air inleakage as required by SR 3.7.3.4, in accordance with TS 5.S.13.c(i), the assessment of the CRE habitability as required by TS 5.S.13.c(ii), and the measurement of the CRE pressure as required by TS 5.S.13.d. shall be considered met.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 302

TO RENEWED FACILITY OPERATING LICENSE NO. DPR-33,

AMENDMENT NO. 326 TO RENEWED FACILITY OPERATING LICENSE NO. DPR-52, AND

AMENDMENT NO. 286 TO RENEWED FACILITY OPERATING LICENSE NO. DPR-68

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2, AND 3

DOCKET NOS. 50-259, 50-260, AND 50-296

1.0 INTRODUCTION

By letter dated June 7, 2017 (Reference 1), as supplemented by letters dated September 18, 2017 (Reference 2), and October 23, 2017 (Reference 3), Tennessee Valley Authority (TVA, the licensee), submitted a license amendment request (LAR) regarding the Browns Ferry Nuclear Plant (BFN) Units 1, 2, and 3. Specifically, the licensee requested to change the fire protection license condition 2.C.(13) for Unit 1, license condition 2.C.(14) for Unit 2, and license condition 2.C.(7) for Unit 3. Items 2 and 3 under "Transition License Condition" title were included in these license conditions. The licensee proposed to update Items 2 and 3 that referenced Table S-2, "Plant Modifications," and Table S-3, "Implementation Items," of the licensee's letters dated September 8, 2015 (Reference 4), and October 20, 2015 (Reference 5). Table S-2 describes the plant modifications that the licensee must complete by the end of the second refueling outage for each unit that occurs after October 28, 2015. Table S-3 describes the implementation items such as procedure updates, process changes, and training that the licensee should have completed within 240 days of October 28, 2015 (with the exception of two items that were scheduled to be completed after all the modifications are completed).

The supplemental letters dated September 18 and October 23, 2017, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the Nuclear Regulatory Commission (NRC or the Commission) staff's original proposed no significant hazards consideration determination as published in the *Federal Register* (FR) on September 5, 2017 (82 FR 41997).

1.1 Background

On March 27, 2013 (Reference 6), TVA requested to revise the BFN Units 1, 2, and 3, fire protection program (FPP) in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.48(c). On October 28, 2015 (Reference 7), the NRC issued Amendment No. 290 to Renewed Facility Operating License (RFOL) No. DPR-33 for Unit 1, Amendment No. 315 to RFOL No. DPR-52 for Unit 2, and Amendment No. 273 to RFOL No. DPR-68 for

Unit 3. The amendments consisted of changes to the operating licenses to transition the BFN FPP to a risk-informed, performance-based (RI/PB) program based on National Fire Protection Association (NFPA) 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants" (2001 Edition) (NFPA 805) (Reference 8), in accordance with 10 CFR 50.48(c). NFPA 805 allows the use of PB methods such as fire modeling and RI methods such as fire probabilistic risk assessment (FPRA) to demonstrate compliance with the nuclear safety performance criteria.

2.0 REGULATORY EVALUATION

The following regulations address fire protection:

- Section 50.48(a)(1) of 10 CFR requires that each holder of an operating license have a fire protection plan that satisfies General Design Criterion (GDC) 3, "Fire Protection," of Appendix A to 10 CFR 50, "General Design Criteria for Nuclear Power Plants."

- Section 50.48(c) of 10 CFR incorporates NFPA 805 (2001 Edition) by reference, with certain exceptions, modifications, and supplementation. This regulation establishes the requirements for using an RI/PB FPP in conformance with NFPA 805 as an alternative to the requirements associated with 10 CFR 50.48(b) and Appendix R, "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979," to 10 CFR Part 50, or the specific plant fire protection license condition.

- Appendix A to 10 CFR Part 50, GDC 3, states, in part, that:

  Structures, systems, and components important to safety shall be designed and located to minimize, consistent with other safety requirements, the probability and effect of fires and explosions. Noncombustible and heat resistant materials shall be used wherever practical throughout the unit, particularly in locations such as the containment and control room. Fire detection and fighting systems of appropriate capacity and capability shall be provided and designed to minimize the adverse effects of fires on structures, systems, and components important to safety. Firefighting systems are designed to assure that their rupture or inadvertent operation does not significantly impair the safety capability of these structures, systems, and components.

- Section 50.48, "Fire protection," of 10 CFR, provides the NRC requirements for nuclear power plant fire protection. The NRC regulations include specific requirements for requesting approval for an RI/PB FPP based on the provisions of NFPA 805.

- Section 50.48(a)(1) requires each holder of an operating license, and holders of a combined license issued under Part 52 to have a fire protection plan that satisfies GDC 3 of Appendix A to 10 CFR Part 50 and states that the fire protection plan must describe the overall fire protection program; identify the positions responsible for the program and the authority delegated to those positions; and outline the plans for fire protection, fire detection and suppression capability, and limitation of fire damage. Section 50.48(a)(2) states that the fire protection plan must describe the specific features necessary to implement the program described in paragraph (a)(1) including administrative controls and personnel requirements for fire prevention and manual suppression activities; automatic and manual fire detection and suppression

systems; and the means to limit fire damage to structures, systems, and components to ensure the capability to safely shut down the plant. Section 50.48(a)(3) requires that the licensee retain the fire protection plan and each change to the plan as a record until the Commission terminates the license and that the licensee retain each superseded revision of the procedures for 3 years.

- Paragraph 50.48(c)(3)(i) of 10 CFR states, in part, that:

  A licensee may maintain a fire protection program that complies with NFPA 805 as an alternative to complying with [10 CFR 50.48(b)] for plants licensed to operate before January 1, 1979, or the fire protection license conditions for plants licensed to operate after January 1, 1979. The licensee shall submit a request to comply with NFPA 805 in the form of an application for license amendment under § 50.90. The application must identify any orders and license conditions that must be revised or superseded, and contain any necessary revisions to the plant's technical specifications and the bases thereof.

- Pursuant to 10 CFR 50.90, whenever a holder of a license desires to amend the license or permit, an application for an amendment must be filed with the Commission describing the changes desired, and following, as far as applicable, the form prescribed for original applications. Accordingly, a licensee who seeks to amend its NFPA 805 authorizations must file an amendment stating, as applicable, the desired changes to orders, license conditions, and technical specifications.

- 10 CFR 50.48(c)(3)(i) states, in part, that:

  The Director of the Office of Nuclear Reactor Regulation, or a designee of the Director, may approve the application if the Director or designee determines that the licensee has identified orders, license conditions, and the technical specifications that must be revised or superseded, and that any necessary revisions are adequate. Any approval by the Director or the designee must be in the form of a license amendment approving the use of NFPA 805 together with any necessary revisions to the technical specifications.

- 10 CFR 50.48(c)(3)(ii) states that:

  The licensee shall complete its implementation of the methodology in Chapter 2 of NFPA 805 (including all required evaluations and analyses) and, upon completion, modify the fire protection plan required by paragraph (a) of this section to reflect the licensee's decision to comply with NFPA 805, before changing its fire protection program or nuclear power plant as permitted by NFPA 805.

- The purpose of 10 CFR 50.48(c)(3)(ii) is explained in the statement of considerations for the Final Rule, "Voluntary Fire Protection Requirements for Light Water Reactors; Adoption of NFPA 805 as a Risk-Informed, Performance-Based Alternative" (69 FR 33536 through 69 FR 33548; June 16, 2004), which states, in part, that:

  This paragraph requires licensees to complete all of the Chapter 2 methodology (including evaluations and analyses) and to modify their fire protection plan

before making changes to the fire protection program or to the plant configuration. This process ensures that the transition to an NFPA 805 configuration is conducted in a complete, controlled, integrated, and organized manner. This requirement also precludes licensees from implementing NFPA 805 on a partial or selective basis (e.g., in some fire areas and not others, or truncating the methodology within a given fire area).

- Pursuant to 10 CFR 50.92(a), in determining whether an amendment to a license will be issued to the applicant, the Commission will be guided by the considerations, which govern the issuance of initial licenses to the extent applicable and appropriate. Under 10 CFR 50.40, common standards for issuance of licenses include considerations of safety and satisfaction of the requirements of the National Environmental Policy Act of 1969 as implemented in 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions." Under 10 CFR 50.57(a), to issue an operating license, the Commission must find, among other things, that (1) there is reasonable assurance that the activities authorized by the operating license can be conducted without endangering the health and safety of the public; (2) there is reasonable assurance that such activities will be conducted in compliance with the regulations in this chapter; and (3) the issuance of the license will not be inimical to the common defense and security or to the health and safety of the public. Additional findings required to issue amendments related to fire protection are provided in 10 CFR 50.48, as discussed below.

The regulations also allow for flexibility that was not included in the NFPA 805 standard. Licensees who choose to adopt 10 CFR 50.48(c) but wish to use the PB methods permitted elsewhere in the standard to meet the fire protection requirements of NFPA 805, Chapter 3, "Fundamental Fire Protection Program and Design Elements," may do so by submitting an LAR in accordance with 10 CFR 50.48(c)(2)(vii). This regulation further provides that:

> The Director of the Office of Nuclear Reactor Regulation, or a designee of the Director, may approve the application if the Director or designee determines that the performance-based approach;
>
> (A) Satisfies the performance goals, performance objectives, and performance criteria specified in NFPA 805 related to nuclear safety and radiological release;
>
> (B) Maintains safety margins; and
>
> (C) Maintains fire protection defense-in-depth (fire prevention, fire detection, fire suppression, mitigation, and post-fire safe shutdown capability).

Alternatively, licensees may choose to use RI or PB alternatives to comply with NFPA 805 by submitting an LAR in accordance with 10 CFR 50.48(c)(4), which states, in part, that:

> The Director of the Office of Nuclear Reactor Regulation, or designee of the Director, may approve the application if the Director or designee determines that the proposed alternatives:

(i) Satisfy the performance goals, performance objectives, and performance criteria specified in NFPA 805 related to nuclear safety and radiological release;

(ii) Maintain safety margins; and

(iii) Maintain fire protection defense-in-depth (fire prevention, fire detection, fire suppression, mitigation, and post-fire safe shutdown capability).

In addition to the conditions outlined by the rule that require licensees to submit an LAR for NRC review and approval in order to adopt an RI/PB FPP, a licensee may submit additional elements of its FPP for which it wishes to receive specific NRC review and approval, as set forth in Regulatory Position C.2.2.1 of Regulatory Guide (RG) 1.205, Revision 1, "Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants" (Reference 9). Inclusion of these elements in the NFPA 805 LAR is meant to alleviate uncertainty in portions of the current FPP licensing bases as a result of the lack of specific NRC approval of these elements. RGs are not substitutes for regulations, and compliance with them is not required. Methods and solutions that differ from those set forth in RGs will be deemed acceptable if they provide a basis for the findings required for the issuance or continuance of a permit or license by the Commission. Accordingly, any submittal addressing these additional FPP elements needs to include sufficient detail to allow the NRC staff to assess whether the licensee's treatment of these elements meets the 10 CFR 50.48(c) requirements.

The purpose of the FPP established by NFPA 805, is to provide assurance through a defense-in-depth (DID) philosophy, that the NRC's fire protection objectives are satisfied.

NFPA 805 Section 1.2, "Defense-in-Depth," states that:

> Protecting the safety of the public, the environment, and plant personnel from a plant fire and its potential effect on safe reactor operations is paramount to this standard. The fire protection standard shall be based on the concept of defense-in-depth. Defense-in-depth shall be achieved when an adequate balance of each of the following elements is provided:
>
> (1) Preventing fires from starting;
>
> (2) Rapidly detecting fires and controlling and extinguishing promptly those fires that do occur, thereby limiting fire damage; and
>
> (3) Providing an adequate level of fire protection for structures, systems and components important to safety, so that a fire that is not promptly extinguished will not prevent essential plant safety functions from being performed.

In accordance with 10 CFR Part 50, Appendix A, GDC 3, fire detection and fighting systems must be designed such that their rupture or inadvertent operation does not significantly impair the ability of the structures, systems, and components important to safety to perform their intended safety functions.

In addition, 10 CFR 50.32, "Elimination of repetition," states, in part, that the applicant may incorporate by reference information contained in previous applications, statements or reports filed with the Commission: Provided that such references are clear and specific.

The NRC staff review of this LAR also relied on the following additional codes, RGs, and standards:

- RG 1.205, Revision 1, "Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants," issued December 2009 (Reference 9), provides guidance for use in complying with the requirements that the NRC has promulgated for RI/PB FPPs that comply with 10 CFR 50.48 and the referenced 2001 Edition of the NFPA standard. RG 1.205 sets forth regulatory positions, emphasizes certain issues, clarifies the requirements of 10 CFR 50.48(c) and NFPA 805, clarifies the guidance in Nuclear Energy Institute (NEI) 04-02 (Reference 10), and provides exceptions to the NEI-04-02 guidance where required. Should a conflict occur between NEI 04-02 and this RG, the regulatory positions in RG 1.205 govern.

- RG 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," Revision 2, issued May 2011 (Reference 11), provides the NRC staff's recommendations for using risk information in support of licensee-initiated licensing basis changes to a nuclear power plant that require such review and approval.

- NUREG/CR-6850, "EPRI[Electric Power Research Institute] /NRC-RES Fire PRA Methodology for Nuclear Power Facilities," Volumes 1 and 2 and Supplement 1, September 2005 and September 2010 (Reference 12), (Reference 13), and (Reference 14), respectively, present a compendium of methods, data, and tools to perform an FPRA and develop associated insights.

3.0 TECHNICAL EVALUATION

3.1 Maintaining Defense-in-Depth and Safety Margins

NFPA 805, Section 4.2.4.2, requires that the "use of fire risk evaluation for the PB approach shall consist of an integrated assessment of the acceptability of risk, defense-in-depth, and safety margins."

3.1.1 Defense-in-Depth

As a supplement to the definition of DID provided in NFPA 805, Section 1.2, the NRC-endorsed guidance in NEI 04-02, Section 5.3.5.2, states that:

> In general, the defense-in-depth requirement is satisfied if the proposed change does not result in a substantial imbalance in:
>
> - Preventing fires from starting;
>
> - Detecting fires quickly and extinguishing those that do occur, thereby limiting fire damage; and

- Providing adequate level of fire protection for structures, systems and components important to safety, so that a fire that is not promptly extinguished will not prevent essential plant safety functions [from] being performed.

3.1.2 Safety Margins

Although not a part of the requirements of NFPA 805, and thus not required under 10 CFR 50.48(c), NFPA 805, Appendix A, Section A.2.4.4.3, provides the following background related to the meaning of the term "safety margins":

> An example of maintaining sufficient safety margins occurs when the existing calculated margin between the analysis and the performance criteria compensates for the uncertainties associated with the analysis and data. Another way that safety margins are maintained is through the application of codes and standards. Consensus codes and standards are typically designed to ensure such margins exist.

NEI 04-02, Section 5.3.5.3, "Safety Margins," lists two specific criteria that should be addressed when considering the impact of plant changes on safety margins:

- Codes and standards or their alternatives accepted for use by the NRC are met; and,
- Safety analysis acceptance criteria in the licensing basis (e.g., FSAR [Final Safety Analysis Report], supporting analyses, etc.) are met, or provides sufficient margin to account for analysis and data uncertainty.

3.2 Discussion

Amendment No. 290 to RFOL No. DPR-33 for BFN, Unit 1; Amendment No. 315 to RFOL No. DPR-52 for BFN, Unit 2; and, Amendment No. 273 to RFOL No. DPR-68 for BFN, Unit 3, implemented the licensee's transition to an RI/PB FPP based on NFPA 805, in accordance with 10 CFR 50.48(c). As part of the transition license conditions the licensee is to complete plant modifications and implementation items as listed in Attachment S, Tables S-2 and S-3, of the licensee's letters dated September 8, 2015 (Reference 4), and October 20, 2015 (Reference 5).

Subsequent to the issuance of the amendments, the licensee indicated that the wording of two modifications needed to be revised for clarification, one modification should be deleted, and one implementation item should be deleted. The licensee requested to change the following modifications and implementation items:

1. Clarify the descriptions of Modifications 52a and 52;
2. Delete Modification 84;
3. Revise Implementation Item 09; and,
4. Revise completion date for the second part of Implementation Item 47

For BFN, the licensee stated that the plant modifications have been evaluated using the accepted FPRA methods and approaches as summarized in the safety evaluation (SE) dated October 28, 2015 (Reference 7). As permitted by 10 CFR 50.32, the LAR clearly and specifically references the methods and approaches as those used in support of Amendment No. 290 for BFN, Unit 1, Amendment No. 315 for BFN, Unit 2, and Amendment No. 273 for Unit 3. Additionally, because the NRC staff has found these methods and approaches

acceptable for evaluating changes to the FPP as described in the October 28, 2015, SE, the NRC staff review in support of this proposed license amendment need not reevaluate the approved methods and approaches.

3.3 Revise the Descriptions of Modifications 52a and 52b

In the LAR dated March 27, 2013, to adopt NFPA 805, the licensee included Modification 52a to provide isolation of associate circuits and make an appropriate power supply available for drywell wide range pressure instruments P-64-160A and B, so that both division instruments are not lost in the same fire scenario. The licensee also included Modification 52b to provide containment pressure indication on the backup control panel. Both modifications are required to be completed in accordance with the fire protection transition license condition.

In the LAR dated June 7, 2017, the licensee proposed to revise Modifications 52a and 52b for clarification. The licensee proposed to revise Modification 52a to state: modify power supplies and associated circuits for drywell pressure indication instruments such that indication is available in the main control room for all fire scenarios except those in FA [Fire Area] 16.

The licensee proposed to revise Modification 52b to state: provide isolation from circuits in FA 16 for containment pressure indication on the backup control panel.

The licensee stated that the basis for modifications 52a, 52b, and 52c is to ensure one drywell pressure indication is available for all fire scenarios in order to support operator actions to vent the containment as one means of decay heat removal. The licensee stated that the revised Modification 52a corrects power supply separation and associated circuit issues, for fire scenarios outside FA 16, that Modification 52b corrects separation issues for FA 16 scenarios, and that Modification 52c does not change as its purpose is to reroute instrument loop cables to address the non-FA 16 scenarios that Modification 52a does not resolve. The licensee further stated that the original Modification 52 concept was to separate the P-064-0160A and P-064-0160B instrument loops for these indication requirements, however, by considering the availability of additional instrument loops in various fire scenarios, it was determined that separation of P-064-0160A and P-064-0160B was not necessary. The licensee further stated that two additional instrument loops (P-064-0050 and P-064-0067B), which were also credited in the FPRA model, provide the required drywell pressure indication, and concluded that the four instrument loops (P-064-0050, P-064-0067B, P-064-0160A, and P-064-0160B), provide the required drywell pressure indication in a fire event. The licensee further stated that the original wording in Modifications 52a and 52b is being changed to more accurately describe the modification being performed.

3.3.1 Risk Evaluation

The licensee stated that the FPRA model utilized to support the NFPA 805 LAR included the additional two drywell pressure indication instrument loops (P-064-0050 and P-064-0067B) and that no modeling changes were required to include these loops as additional sources of the drywell pressure information needed for hardened wetwell vent (HWWV) initiation. The licensee further stated that the final modification is expected to be equal to or better than the modification originally described in Table S-2 of the NFPA 805 LAR with respect to fire risk. The licensee further reported that it used only accepted FPRA methods and approaches as summarized in its NFPA 805 SE (Reference 7), approving the BFN NFPA 805 LAR.

3.3.2 Defense-in-Depth/Safety Margins

The licensee stated that the changes to drywell pressure instrumentation made available through Modification 52 do not affect any of the DID echelons which are to (1) prevent fires from starting, (2) rapidly detect, control, and extinguish promptly those fires that do occur thereby preventing fire damage, and (3) provide adequate level of fire protection for systems and structures so that a fire will not prevent essential safety functions from being performed.

In its Request for Additional Information (RAI) dated August 18, 2017 (Reference 15), in PRA RAI 02, the NRC staff requested the licensee to provide a discussion regarding DID that includes the basis for why the proposed changes do not impact each echelon of DID. In its response dated September 18, 2017 (Reference 2), the licensee indicated that echelons 1 and 2 for preventing fires and detecting and extinguishing fires respectively are not affected by the modifications related to drywell pressure indication and operation of the HWWV. For echelon 3, the licensee indicated that these modifications, combined with the existing Modification 52c that was not changed, supports one option to achieve decay heat removal as was the intent of the original modification approved in the NFPA 805 SE. The licensee indicated that the modification ensures through separation and electrical isolation that drywell pressure indication free of fire damage to support operator actions to vent containment using HWWV would be available should HWWV for decay heat removal be required. The NRC staff concludes that the licensees response to PRA RAI 02 is acceptable because the licensee demonstrated that echelons 1 and 2 are unaffected and echelon 3 is maintained; therefore, maintaining the balance between DID echelons.

With respect to safety margin, the licensee stated that the changes to drywell pressure instrumentation made available through Modification 52 do not affect safety margin but provided no basis for this statement. In PRA RAI 02 the NRC staff requested that the licensee provide the basis for why it believes the proposed change has no effect on safety margin. In its response to PRA RAI 02, the licensee indicated that instruments affected by Modification 52 and the changes to Modifications 52a and 52b are classified as nuclear safety related and designed to applicable codes and standards. The licensee indicated that the FPRA and fire modeling used to evaluate changes to Modification 52 applies the same methodologies and inherent safety margins that were used for the final risk values submitted to the staff in support of the NFPA 805 SE.

3.3.3 Conclusion

In accordance with 10 CFR 50.48(c)(3)(i), the licensee submitted a LAR to revise its NFPA 805 license conditions 2.C.(13), 2.C.(14) and 2.C.(7). The NRC staff reviewed the information provided by the licensee in its LAR that included discussions of the impact of the proposed change on DID and safety margins as required by NFPA 805, Section 4.2.4.2.

In regard to DID, the NRC staff agrees that the proposed change has no impact on DID echelons 1 and 2 because the modifications on drywell pressure indication and operation of the HWWV do not cause fires to occur, nor delay or prevent fires from being detected or extinguished. With respect to DID echelon 3, the NRC staff concludes from the licensee's description that the changes in Modification 52 provide at least one drywell pressure instrumentation to support decay heat removal for each fire scenario as the original modifications that were approved in the NFPA 805 SE. Because echelons 1 and 2 are unaffected and DID echelon 3 is maintained, the NRC staff concludes that the balance between DID echelons is maintained.

In regard to safety margins, the NRC staff agrees that the proposed changes continue to maintain adequate safety margins, because the licensee indicated that Modifications 52a and 52b were designed to the applicable codes and standards, and the same methodologies and the safety margin accepted in the NFPA 805 SE were maintained. Thus the NRC staff concludes that the changes do not impact any codes and standards or their alternatives accepted for use by the NRC, and the changes do not impact any safety analysis acceptance criteria used in the licensing basis.

Based on the licensee's statement that the FPRA model utilized to support the NFPA 805 LAR included the additional two drywell pressure indication instrument loops (P-064-0050 and P-064-0067B) and that no modeling changes were required to include these loops as additional sources of the drywell pressure information needed for HWWV initiation, the NRC staff concludes that the risk from revising Modifications 52a and 52b can be assessed using the methods and approaches accepted previously by the NRC staff in the NFPA 805 SE.

In addition, the NRC staff concludes that the licensee has identified the appropriate license condition that must be revised as a result of the proposed change and that the revision is adequate; therefore, it satisfies the requirements of 10 CFR 50.48(c)(3)(i).

3.4 Delete Modification 84

In the LAR dated March 27, 2013, to adopt NFPA 805, the licensee included Modification 84 to reduce the overcurrent setting for certain 4 kilovolt (kV) shutdown bus feeder breakers to protect the shutdown bus from overload. This modification is required to be completed in accordance with the fire protection transition license condition.

In the LAR dated June 7, 2017, the licensee proposed to delete Modification 84.

The licensee stated that its analysis performed for the BFN NFPA 805 transition identified scenarios in which fire induced spurious operation of 4 kV circuit breakers could overload the off-site power (OSP) circuits feeding the safety related electrical distribution system (4 kV Shutdown Boards) and that such an overload is assumed to result in a failure of OSP supply to inventory makeup and decay heat removal systems. The licensee further stated that the original goal of Modification 84 was to allow for manual recovery of the affected OSP success path as a means of risk reduction and to reduce the time overcurrent (TOC) setting for breakers (1126, 1132, 1226, and 1232) in these OSP circuits so that the breakers would trip prior to incurring any thermal damage. The licensee further stated that the modification would enable subsequent recovery actions to clear the spurious loads and reclose the OSP breakers.

The licensee stated that competing design elements were identified during the design process that limit the amount that the TOC settings could be reduced, including coordination with other breakers and margin to unwanted trip during loss-of-coolant accident/emergency core cooling system initiation and that when the effect of these limitations is considered on the risk model, the risk worth of the modification is not as large as anticipated. The licensee further stated that the relatively small fire-risk improvement together with the negative effects on engineering margins for non-fire events make Modification 84 implementation inadvisable.

3.4.1 Risk Evaluation

The licensee stated that a sensitivity analysis was performed to determine the risk impact of removing Modification 84 from the FPRA model and that in the process, non-conservative modeling was identified in the FPRA logic related to Modification 84. The licensee further stated that the FPRA logic did not recognize that overload of a Unit 1/2 4-kV shutdown board could result in overload of the normally connected 4-kV shutdown bus, and as a result, the FPRA model did not recognize that an overload condition on one shutdown board would also cause the loss of OSP to the other shutdown board supplied from the same shutdown bus. The licensee further stated that this logic deficiency underestimated the impact of an individual shutdown board overload, and therefore underestimated the worth of Modification 84. The licensee further stated that in order to quantify the risk worth of Modification 84, a corrected base model was created such that spurious overloading of a shutdown board would also cause the loss of the other shutdown board supplied from the same shutdown bus and that permanent changes to correct this deficiency will be included in the FPRA update discussed in Table S-3, Item 32.

3.4.2 Defense-In-Depth/Safety Margin

The licensee stated that deletion of Modification 84 has no effect on any of the DID echelons, which are to (1) prevent fires from starting, (2) rapidly detect, control, and extinguish promptly those fires that do occur thereby preventing fire damage, and (3) provide adequate level of fire protection for systems and structures so that a fire will not prevent essential safety functions from being performed.

The licensee stated that there is no effect on fire initiation (echelon 1) because the existing OSP breaker settings protect against cable self-ignition events, and that Modification 84 was originally conceived as an aid to retain or restore equipment function under some postulated overload conditions. The licensee also stated that echelons 2 and 3 were unaffected by removal of this modification. In PRA RAI 03 the NRC staff requested that the licensee provide justification that echelon 3 was still sufficiently robust. In its response to PRA RAI 03, the licensee indicated that other NFPA 805 modifications being installed offset the removal of Modification 84. The licensee further indicated that the NFPA 805 modifications support core cooling and decay heat removal in fire scenarios affected by the loss of shutdown busses where OSP recovery may not occur due to the removal of Modification 84 and that other modifications reduce the instance of spurious operation that contribute to the fire induced overload of OSP circuits feeding the particular shutdown boards. The licensee stated that adequate safety margins are maintained because the change does not affect any codes and standards or their alternatives accepted for use by the NRC, and because the change does not affect any safety analysis acceptance criteria used in the licensing basis. The NRC staff concludes that the licensees response to PRA RAI 03 is acceptable because the licensee demonstrated that echelons 1 and 2 are unaffected and echelon 3 is maintained, therefore maintaining the balance between DID echelons.

3.4.3 Conclusion

In accordance with 10 CFR 50.48(c)(3)(i), the licensee submitted a LAR to revise its NFPA 805 license conditions 2.C.(13), 2.C.(14), and 2.C.(7). The NRC staff reviewed the information provided by the licensee in its LAR that included discussions of the impact of the proposed change on DID and safety margins as required by NFPA 805, Section 4.2.4.2.

In regard to DID, the NRC staff agrees that the proposed change has no impact on the DID echelon 1 because the existing OSP breaker settings protect against cable self-ignition events, and no impact on echelon 2 since preventing the thermal damage to specific OSP circuits has no effect on quick detection or extinguishing fires. The NRC staff agrees that echelon 3 is maintained since the function potentially affected in some fire scenarios by not performing Modification 84 can be performed by other modifications being installed and the instance of shutdown bus overload is reduced. Because echelons 1 and 2 are unaffected and echelon 3 is maintained, the NRC staff concludes that the balance between DID echelons is maintained.

In regard to safety margins, the NRC staff agrees that the proposed change continues to maintain adequate safety margins, because the licensee indicated that the change does not impact any codes and standards, or their alternatives accepted for use by the NRC, and the change does not impact any safety analysis acceptance criteria used in the licensing basis.

The licensee indicates that no methods beyond those accepted in its NFPA 805 SE were used in this change to its PRA. The removal of Modification 84 no longer allows manual recovery of the affected OSP breakers and, thus, that manual recovery is removed from the PRA and the appropriate OSP circuits failed. The separate correction to the PRA model logic, identified as needed as a part of removing this modification, now allows spurious overloading of a shutdown board that would cause the loss of the other shutdown board supplied from the same shutdown bus.

The NRC staff agrees that loss of shutdown boards are already modeled in the PRA, aside from the addition due to this correction. The NRC staff concludes that removal of Modification 84 and the correction to the PRA logic model identified when removing this modification can be modelled using the methods and approaches accepted previously by the NRC staff in the NFPA 805 SE.

In addition, the NRC staff concludes that the licensee has identified the appropriate license condition that must be revised as a result of the proposed change and that the revision is adequate; therefore, it satisfies the requirements of 10 CFR 50.48(c)(3)(i).

3.5 Delete Implementation Item 09

In the LAR dated March 27, 2013, to adopt NFPA 805, the licensee included Implementation Item 09 to revise one of its design specifications to state that flexible conduit shall only be used in lengths up to three feet. This implementation item is required to be completed in accordance with the fire protection transition license condition.

In the LAR dated June 7, 2017, the licensee proposed to delete Implementation Item 09 because it is overly restrictive due to the short conduit lengths. In its letter dated October 23, 2017 (Reference 3), the licensee revised its proposed change to delete Implementation Item 09, and instead proposed to revise Implementation Item 09 to specify that 6 feet is the maximum length for flexible conduit.

The licensee stated that it compared BFN with the guidelines in NRC Branch Technical Position (BTP) CMEB 9.5.1.e(1), "Guidelines for Fire Protection for Nuclear Power Plants," dated July 1981 (Reference 16), which states:

> Only metal should be used for cable trays. Only metallic tubing should be used for conduit. Thin-wall metallic tubing should not be used. Flexible metallic tubing

> should only be used in short lengths to connect components to equipment. Other raceways should be made of noncombustible material.

The licensee stated that its implementation of the BTP was provided in the BFN fire protection report as part of BFN's implementation of Generic Letter (GL) 86-10, "Implementation of Fire Protection Requirements" (Reference 17), and GL 88-12, "Removal of Fire Protection Requirements from the Technical Specification" (Reference 18), as follows:

> Only metal is used for cable tray and conduit construction. Thin-wall metallic tubing is not used. Flexible metallic tubing is only used in short lengths of six feet or less.

The licensee stated that the NRC staff issued a Safety Evaluation stated, in part:

> Only metal is used for cable tray construction. Flexible metal components are used in lengths of six feet or less. Thin wall metallic tubing is not used. Separation and fire protection features for those cables required to achieve and maintain safe shutdown are in compliance with the requirements of Section III.G of 10 CFR 50 Appendix R.

The licensee stated that the NFPA 805 transition process allows for deviations based on prior NRC approval and that BFN was previously granted approval for utilizing flexible metallic conduits in lengths up to 6 feet.

The licensee stated that the NFPA 805 "Electrical" requirement in Section 3.3.5.2 states that:

> Flexible metallic conduits shall only be used in short lengths to connect components.

The licensee stated that its previously approved requirement from TVA Specification G-40 to limit flexible conduit lengths to 6 feet maximum, meets the NFPA 805, Section 3.3.5.2 requirement.

3.5.1 Risk Evaluation

The licensee stated that the flexible conduit protects the cable and allows for proper termination of the cable and that the protection provided to the cable from the longer flexible conduit is no different from that of the shorter flexible conduit. The licensee further stated that the proposed deletion does not affect the FPRA and the risk insights presented in the LAR.

3.5.2 Defense-in-Depth/Safety Margins

The licensee stated that this change provides clarification on the identification of the flexible conduit lengths acceptable for use with NFPA 805 cables and that prior approval has been obtained from NRC to utilize 6-foot conduit lengths; therefore, this does not result in a change in DID, nor represent a reduction in safety margin.

3.5.3 NRC Staff Evaluation

In accordance with 10 CFR 50.48(c)(3)(i), the licensee submitted a LAR to revise its NFPA 805 license conditions 2.C.(13), 2.C.(14), and 2.C.(7). The NRC staff reviewed the information provided by the licensee in its LAR, which included discussions of previous approval, and the impact of the proposed change on risk, DID, and safety margins.

NFPA 805, Section 3.1, states, in part, that:

> Previously approved alternatives from the fundamental protection program attributes of this chapter by the AHJ [authority having jurisdiction] take precedence over the requirements contained herein.

NFPA 805, Section 3.3.5.2 states that:

> Only metal tray and metal conduits shall be used for electrical raceways. Thin wall metallic tubing shall not be used for power, instrumentation, or control cables. Flexible metallic conduits shall only be used in short lengths to connect components.

In regard to risk, the NRC staff confirmed that the proposed change does not impact the FPRA and risk insights presented in the NFPA 805 LAR because the change is compliance based and not included in the FPRA.

In regards to DID and safety margins, the NRC staff determined that both DID and safety margin do not need to be evaluated because the proposed change is compliance based and not considered a PB approach; therefore, NFPA 805, Section 4.2.4.2 concerning fire risk evaluations (FREs) that requires evaluations of DID and safety margins is not applicable.

3.5.4 Conclusion

Based on the above, the NRC staff concludes that the licensee's decision to revise Implementation Item 09 to specify that 6 feet is the maximum length for flexible conduit is acceptable because the licensee demonstrated previous approval, which is allowed by NFPA 805, Section 3.1 for fundamental fire protection program and design elements, and also demonstrated compliance with NFPA 805, Section 3.3.5.2. The NRC staff concludes that because the modification is compliance based, is not included in the FPRA, and is not considered a PB approach, that a risk evaluation is not applicable to evaluate acceptability of the proposed change, nor are evaluations of DID and safety margin, which are only required per NFPA 805, Section 4.2.4.2 when a FRE is used.

In addition, the NRC staff concludes that the licensee has identified the appropriate license condition that must revised as a result of the proposed change and the revision is adequate and, therefore, satisfies the requirements of 10 CFR 50.48(c)(3)(i).

3.6 Conclusion Regarding Technical Evaluation

The NRC staff reviewed the licensee's application to revise two plant modifications and one plant implementation item related to the RI/PB FPP in accordance with the requirements of 10 CFR 50.48(c) and NFPA 805. The licensee's application identified revisions to license conditions in accordance 10 CFR 50.48(c)(3)(i). The changes proposed by the licensee

included a review of compliance, risk, DID, and safety margin (as applicable), as required by NFPA 805, Section 4.2.4.2. The NRC staff concludes that the licensee's application provided the appropriate license conditions that must be revised as a result of the proposed changes, and that the revisions are sufficient, thereby satisfying the requirements of 10 CFR 50.48(c)(3)(i). In addition, the NRC staff concludes that the effect of the proposed changes on the FPP can be assessed using the methods and approaches previously approved by the NRC staff. The NRC staff concludes the proposed amendments include an assessment of risk, DID, and safety margin, thereby meeting the requirements of NFPA 805, Section 4.2.4.2 (as applicable).

In PRA RAI 01, the NRC staff requested that the licensee update its risk impact discussion to include information regarding the compliant PRA model supporting the NFPA 805 SE. In its response to PRA RAI 01, the licensee indicated that it adopted the compliant plant model accepted by the NRC staff in the NFPA 805 SE for its change in risk calculation. The licensee indicated that its compliant plant model was not modified for the correction to the PRA logic identified as needed during the removal of Modification 84, as was the post transition model. The licensee further indicated that this correction would increase the compliant plant risk, and the correct larger compliant risk would decrease the change in risk. The NRC staff agrees that addition of this correction to the compliant plant model would increase the compliant plant risk since additional shutdown boards would fail for certain fire scenarios.

Also, in its response to PRA RAI 01, the licensee provided the integrated change in risk from Modifications 52a and 52b, from the removal of Modification 84, and from the correction to the PRA logic identified as needed when removing Modification 84. The licensee indicated that the large compliant plant risk taken from the NFPA 805 SE and the change in core damage frequency (CDF) and large early release frequency (LERF) for all three units at Browns Ferry was negative. The licensee further indicated that the change in CDF for Unit 1, Unit 2, and Unit 3 were -1.30E-4, -1.02E-4, and -1.20E-4 respectively, and that the change in LERF for Unit 1, Unit 2, and Unit 3 were -2.19E5, -1.78E-5, and -1.86E-5 respectively.

The NRC staff concludes that the licensee's response to the RAI is acceptable because the licensee demonstrated that the compliant plant model as used in this LAR is conservative for the change in risk calculation, and thus acceptable for comparison with RG 1.174 acceptance guidelines. In addition, because the change in risk was a risk decrease for each unit, the NRC staff did not consider the total risk in its evaluation since RG 1.174 allows modifications to the licensing basis that represent risk decreases regardless of total risk.

The NRC staff concludes that the results of the licensee's evaluation in regard to risk, DID, and safety margin for the modification changes 52a, 52b, and removal of 84 are acceptable because (1) the changes when integrated into the PRA produce a decrease in the change in CDF and in the change in LERF at Units 1, 2, and 3, and thus, do not challenge the RG 1.174 risk acceptance guidelines; (2) the licensee's process and result followed guidance approved by the NRC staff in its NFPA 805 SE; and (3) the results of the changes are consistent with guidance in NEI 04-02, Revision 2; RG 1.205, Revision 1; and RG 1.174, Revision 2.

The NRC staff concludes that the licensee's proposed change to Implementation Item 09 is acceptable because the change is being made in accordance with NFPA 805, Sections 3.1 and 3.3.5.2. The NRC staff also concludes that because the change is compliance based, is not included in the FPRA, and is not considered a PB approach, that a risk evaluation is not applicable to evaluate acceptability of the proposed change nor are evaluations of DID and safety margin, which are only required per NFPA 805, Section 4.2.4.2 when a FRE is used.

Implementation of the RI/PB FPP under 10 CFR 50.48(c) must be in accordance with the fire protection license condition, which identifies the list of modifications and implementation items that must be completed in order to support the NRC staff's conclusion and establishes a date by which full compliance with 10 CFR 50.48(c) must be achieved. Before the licensee is able to fully implement the transition to an FPP based on NFPA 805 and apply the new fire protection license condition to its full extent, the modifications and implementation items must be completed within the timeframe specified.

4.0 FIRE PROTECTION LICENSE CONDITION

On October 28, 2015 (Reference 7), the NRC issued Amendment No. 290 to RFOL No. DPR-33 for BFN, Unit 1; Amendment No. 315 to RFOL No. DPR-52 for BFN, Unit 2; and Amendment No. 273 to RFOL No. DPR-68 for BFN, Unit 3, which revised the existing fire protection license conditions to ones that address the transition to a RI/PB FPP under NFPA 805 in accordance with 10 CFR 50.48(c)(3)(i). The new license conditions adopted the guidelines of the standard fire protection license condition promulgated in RG 1.205, Revision 1, Regulatory Position C.3.1, as issued on December 18, 2009 (74 FR 67253). Plant-specific changes were made to the sample license condition; however, the plant-specific FPP license conditions are consistent with the standard fire protection license condition and incorporated all of the relevant features of the transition to NFPA 805 at BFN.

In the letter dated June 7, 2017, the licensee submitted a LAR for license amendments to change fire protection license condition 2.C.(13) for Unit 1, license condition 2.C.(14) for Unit 2, and license condition 2.C.(7) for Unit 3. The changes made to the license conditions include adding the licensee's LAR date of June 7, 2017 (Reference 1), adding the issuance date of this SE, and revising transition license conditions 2 and 3. No other changes to the license conditions were requested by the licensee or identified by the NRC staff.

The approved amendments would, in part, revise License Conditions 2.C.(13), 2.C.(14), and 2.C.(7) for BFN, Units 1, 2, and 3, respectively, as follow:

> Tennessee Valley Authority shall implement and maintain in effect all provisions of the approved fire protection program that comply with 10 CFR 50.48(a) and 10 CFR 50.48(c), as specified in the licensee amendment requests dated March 27, 2013, and June 7, 2017, as supplemented by letters dated May 16, 2013, December 20, 2013, January 10, 2014, January 14, 2014, February 13, 2014, March 14, 2014, May 30, 2014, June 13, 2014, July 10, 2014, August 29, 2014, September 16, 2014, October 6, 2014, December 17, 2014, March 26, 2015, April 9, 2015, June 19, 2015, August 18, 2015, September 8, 2015, October 20, 2015, September 18, 2017, and October 23, 2017, as approved in the Safety Evaluations dated October 28, 2015, and December 19, 2017 Except where NRC approval for changes or deviations is required by 10 CFR 50.48(c), and provided no other regulation, technical specification, license condition or requirement would require prior NRC approval, the licensee may make changes to the fire protection program without prior approval of the Commission if those changes satisfy the provisions set forth in 10 CFR 50.48(a) and 10 CFR 50.48(c), the change does not require a change to a technical specification or a license condition, and the criteria listed below are satisfied.

In addition, the amendments would revise Items 2 and 3 under "Transition License Conditions," of the above License Conditions 2.C.(13), 2.C.(14), and 2.C.(7), as follows:

2. The licensee shall implement the modifications to its facility, as described in Table S-2, "Plant Modifications," of Tennessee Valley Authority letter CNL-17-024, dated June 7, 2017, to complete the transition to full compliance with 10 CFR 50.48(c) no later than the end of the second refueling outage (for each unit) following issuance of the NFPA 805 License Amendment dated October 28, 2015. The licensee shall maintain appropriate compensatory measures in place until completion of these modifications.

    1. The licensee shall complete implementation items 09, 32 and 33, and the second part of implementation item 47, as listed in Table S-3, "Implementation Items," of Tennessee Valley Authority letter CNL-17-130, dated October 23, 2017. Implementation item 09 shall be completed by June 29, 2018. Implementation items 32, 33, and the second part of implementation 1
    2. 47 (i.e., resolve finding level facts and observations), are associated with modifications and will be completed after all procedure updates, modifications, and training are complete.

5.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Tennessee State official was notified of the proposed issuance of the amendments on November 27, 2017. The State official had no comments.

6.0 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 September 5, 2017 (82 FR 41997). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

7.0 CONCLUSION

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

8.0 REFERENCES

1 Shea, J. W, TVA letter to NRC, "Browns Ferry Nuclear Plant, Units 1, 2, & 3, RFOL Nos. DPR-33, DPR-52, and DPR-68, Docket Nos. 50-259, 50-260, and 50-296, Update to LAR to Revise NFPA 805 Performance-Based Standard for Fire Protection for Light Water Reacor Electric Generating Plants," June 7, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17158B285).

2 Shea, J. W, TVA letter to NRC, "Browns Ferry Nuclear Plant, Units 1, 2, and 3, RFOL Nos. DPR-33, DPR-52, and DPR-68, NRC Docket Nos. 50-259, 50-260, and 50-296, Response to NRC RAI for LAR to Revise Modifications and an Implementation Item Related to NFPA 805," September 18, 2017 (ADAMS Accession No. ML17261B179).

3 Shea, J. W, TVA letter to NRC, "Browns Ferry Nuclear Plant, Units 1, 2, and 3, RFOL Nos. DPR-33, DPR-52, and DPR-68, NRC Docket Nos. 50-259, 50-260, and 50-296, Update to Response to NRC RAI for LAR to Revise Modifications and an Implementation Item Related to NFPA 805," October 23, 2017 (ADAMS Accession No. ML17297A039).

4 Shea, J. W, TVA letter to NRC, "Update to License Amendment Request to Adopt NFPA 805 Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants for the Browns Ferry Nuclear Plant, Units 1, 2, and 3 (TAC Nos. MF1185, MF1186, and MF1187) - Revised Safe Shutdown Analysis Request for Additional Information 15," September 8, 2015 (ADAMS Accession No. ML15251A598).

5 Shea, J. W, TVA letter to NRC, "Browns Ferry Nuclear Plant, Units 1, 2, and 3, Renewed Facility Operating License Nos. DPR-33, DPR-52, and DPR-68, NRC Docket Nos. 50-259, 50-260, and 50-296, Update to LAR to Adopt NFPA 805, Revised LAR Attachment S," dated October 20, 2015 (ADAMS Accession No. ML15293A527).

6 Shea, J. W., TVA letter to NRC, "Browns Ferry Nuclear Plant, Units 1, 2, and 3, License Amendment Request to Adopt NFPA 805 Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants (2001 Edition) (Technical Specification Change TS-480)," March 27, 2013 (ADAMS Accession No. ML13092A393).

7 Saba, F. E., NRC letter to Shea, J. W., TVA, "Browns Ferry Nuclear Plant, Units 1, 2, and 3 - issuance of Amendments Regarding Transition to a Risk-Informed, Performance-Based Fire Protection program in Accordance with 10 CFR 50.48(c) (CAC Nos. MF1185, MF1186, and MF1187)," October 28, 2015 (ADAMS Accession No. ML15212A796).

8 National Fire Protection Association, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," Standard 805 (NFPA 805), 2001 Edition, Quincy, Massachusetts.

9 U.S. Nuclear Regulatory Commission, "Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants," Regulatory Guide 1.205, Revision 1, December 2009 (ADAMS Accession No. ML092730314).

10 Nuclear Energy Institute, "Guidance for Implementing a Risk-Informed, Performance-Based Fire Protection Program Under 10 CFR 50.48(c)," Washington, DC, NEI 04-02, Revision 2, April 2008 (ADAMS Accession No. ML081130188).

11 U.S. Nuclear Regulatory Commission, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," Regulatory Guide 1.174, Revision 2, May 2011 (ADAMS Accession No. ML100910006).

12 U.S. Nuclear Regulatory Commission NUREG/CR-6850, "EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities, Volume 1: Summary and Overview," NUREG/CR-6850, September 2005 (ADAMS Accession No. ML052580075).

13 U.S. Nuclear Regulatory Commission, "EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities, Volume 2: Detailed Methodology," NUREG/CR-6850, September 2005

(ADAMS Accession No. ML052580118).

14 U.S. Nuclear Regulatory Commission, "Fire Probabilistic Risk Assessment Methods Enhancements," NUREG/CR-6850, Supplement 1, September 2010 (ADAMS Accession No. ML103090242).

15 Saba, F. E., NRC letter to Shea, J. W., TVA, "Browns Ferry Nuclear Plant, Units 1, 2 and 3, RAI Related to LAR to Revise Modifications and Implementations Related to NFPA Standard 805 Performance-Based Standard for Fire Protection for Light Water Reactor Generating Plants (CAC Nos. MF9814, 15, & 16)," August 18, 2017 (ADAMS Accession No. ML17216A006).

16 U.S. Nuclear Regulatory Commission, "Fire Protection for Nuclear Power Plants," Branch Technical Position, CMEB 9.5-1, Revision 2, dated July 1981 (ADAMS Accession No. ML070660454).

17 U.S. Nuclear Regulatory Commission, "Implementation of Fire Protection Requirements," GL 86-10, April 24, 1986.

18 U.S. Nuclear Regulatory Commission, "Removal of Fire Protection Requirements from Technical Specifications," GL 88-12, August 2, 1988 (ADAMS Accession No. ML031150471).

Principal Contributors: Jay Robinson
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Date: December 19, 2017

SUBJECT: BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2, AND 3; - ISSUANCE OF AMENDMENTS TO REVISE NFPA 805 PERFORMANCE - BASED STANDARD FOR FIRE PROTECTION FOR LIGHT WATER REACTOR ELECTRIC GENERATING PLANTS - REVISION TO TABLE S-2 AND TABLE S-3 (CAC NOS. MF9814, M9815, AND M9816; EPID L-2017-LLA-0234) DATED DECEMBER 19, 2017

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NAME	FSaba	BClayton	GCasto	DRoth	UShoop	FSaba
DATE	11/28/2017	11/28/2017	10/25/2017	12/06/2017	12/19/2017	12/19/2017

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