



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

December 31, 2019

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

**SUBJECT: MILLSTONE POWER STATION UNITS 1, 2, AND 3); NORTH ANNA POWER STATION, UNITS 1 AND 2; SURRY POWER STATION UNITS 1 AND 2
ISSUANCE OF AMENDMENTS RE: ADOPTION OF EMERGENCY ACTION LEVEL SCHEMES PURSUANT TO NEI 99-01, REV. 6 (EPID L-2019-LLA-0003)**

Dear Mr. Stoddard:

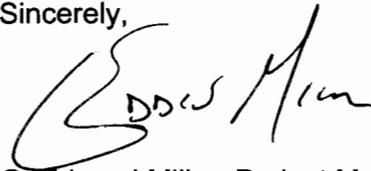
The U.S. Nuclear Regulatory Commission (NRC, the Commission) has issued the enclosed Amendment No. 119 to Facility Operating License No. DPR-21, Amendment No. 336 to Renewed Facility Operating License No. DPR-65, and Amendment No. 274 to Renewed Facility Operating License No. NPF-49 for the Millstone Power Station, Unit Nos. 1, 2, and 3 (Millstone), respectively, Amendment No. 284 to Renewed Facility Operating License No. NPF-4 and Amendment No. 267 to Renewed Facility Operating License No. NPF-7 for the North Anna Power Station, Unit Nos. 1 and 2 (North Anna), respectively, and Amendment No. 296 to Renewed Facility Operating License No. DPR-32 and Amendment No. 296 to Renewed Facility Operating License No. DPR-37 for the Surry Power Station, Unit Nos. 1 and 2 (Surry), respectively. These amendments are in response to your application dated January 4, 2019, as supplemented by letters dated August 29 and October 30, 2019.

The amendments revise the emergency action level schemes to be consistent with Nuclear Energy Institute (NEI) guidance in NEI 99-01, Revision 6, "Development of Emergency Action Levels for Non-Passive Reactors," dated November 2012, which was endorsed by the NRC by letter dated March 28, 2013.

The requested emergency plan changes also encompass the independent spent fuel storage installations (ISFSIs) at the subject sites. North Anna and Surry have separate ISFSIs under both a site-specific and a general license while the Millstone ISFSI is covered under a general license. Changes to the emergency plans for the ISFSIs are properly addressed by the amendments to the power plant licenses and separate amendments to the ISFSI licenses are not required.

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

Sincerely,

A handwritten signature in black ink, appearing to read "G. Edward Miller". The signature is fluid and cursive, with the first name "G." being particularly prominent.

G. Edward Miller, Project Manager
Plant Licensing Branch 2-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-245, 50-336, 50-423,
50-338, 50-339, 50-280, 50-281,
72-2, 72-16, 72-47, 72-55, and 72-56

Enclosures:

1. Amendment No. 119 to DPR-21
2. Amendment No. 336 to DPR-65
3. Amendment No. 274 to NPF-49
4. Amendment No. 284 to NPF-4
5. Amendment No. 267 to NPF-7
6. Amendment No. 296 to DPR-32
7. Amendment No. 296 to DPR-37
8. Safety Evaluation

cc: Listserv



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

DOMINION ENERGY NUCLEAR CONNECTICUT, INC.

DOCKET NO. 50-245

MILLSTONE POWER STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 119
License No. DPR-21

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Dominion Energy Nuclear Connecticut, Inc. (the licensee) dated January 4, 2019, as supplemented by letters dated August 29 and October 30, 2019, 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, by Amendment No. 119, Renewed Facility Operating License No. DPR-21 is hereby amended to authorize revision to the Emergency Action Level Technical Basis Document of the Millstone Power Station, Unit No. 1 Emergency Plan as set forth in the licensee's application dated January 4, 2019, as supplemented by letter dated August 29 and October 30, 2019, and evaluated in the NRC staff's safety evaluation enclosed with this amendment.
3. This license amendment is effective as of the date of its issuance and shall be implemented by March 31, 2021.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in black ink, appearing to read 'HKN for', is positioned above the printed name of the Director.

Ho K. Nieh, Director
Office of Nuclear Reactor Regulation

Date of Issuance: December 31, 2019



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

DOMINION ENERGY NUCLEAR CONNECTICUT, INC.

DOCKET NO. 50-336

MILLSTONE POWER STATION, UNIT NO. 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 336
Renewed License No. DPR-65

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Dominion Energy Nuclear Connecticut, Inc. (the licensee) dated January 4, 2019, as supplemented by letters dated August 29 and October 30, 2019, 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, by Amendment No. 336, Renewed Facility Operating License No. DPR-65 is hereby amended to authorize revision to the Emergency Action Level Technical Basis Document of the Millstone Power Station, Unit No. 2 Emergency Plan as set forth in the licensee's application dated January 4, 2019, as supplemented by letter dated August 29 and October 30, 2019, and evaluated in the NRC staff's safety evaluation enclosed with this amendment.
3. This license amendment is effective as of the date of its issuance and shall be implemented by March 31, 2021.

FOR THE NUCLEAR REGULATORY COMMISSION

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Ho K. Nieh, Director
Office of Nuclear Reactor Regulation

Date of Issuance: December 31, 2019



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

DOMINION ENERGY NUCLEAR CONNECTICUT, INC., ET AL

DOCKET NO. 50-423

MILLSTONE POWER STATION, UNIT NO. 3

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 274
Renewed License No. NPF-49

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Dominion Energy Nuclear Connecticut, Inc. (the licensee) dated January 4, 2019, as supplemented by letters dated August 29 and October 30, 2019, 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, by Amendment No. 274, Renewed Facility Operating License No. NPF-49 is hereby amended to authorize revision to the Emergency Action Level Technical Basis Document of the Millstone Power Station, Unit No. 3 Emergency Plan as set forth in the licensee's application dated January 4, 2019, as supplemented by letter dated August 29 and October 30, 2019, and evaluated in the NRC staff's safety evaluation enclosed with this amendment.
3. This license amendment is effective as of the date of its issuance and shall be implemented by March 31, 2021.

FOR THE NUCLEAR REGULATORY COMMISSION

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Ho K. Nieh, Director
Office of Nuclear Reactor Regulation

Date of Issuance: December 31, 2019



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

VIRGINIA ELECTRIC AND POWER COMPANY

DOCKET NO. 50-338

NORTH ANNA POWER STATION, UNIT NO. 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 284
Renewed License No. NPF-4

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Virginia Electric and Power Company, (the licensee) dated January 4, 2019, as supplemented by letters dated August 29 and October 30, 2019, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - 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, by Amendment No. 284, Renewed Facility Operating License No. NPF-4 is hereby amended to authorize revision to the Emergency Action Level Technical Basis Document of the North Anna Power Station, Unit No. 1 Emergency Plan as set forth in the licensee's application dated January 4, 2019, as supplemented by letter dated August 29 and October 30, 2019, and evaluated in the NRC staff's safety evaluation enclosed with this amendment.
3. This license amendment is effective as of the date of its issuance and shall be implemented by March 31, 2021.

FOR THE NUCLEAR REGULATORY COMMISSION

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Ho K. Nieh, Director
Office of Nuclear Reactor Regulation

Date of Issuance: December 31, 2019



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

VIRGINIA ELECTRIC AND POWER COMPANY

DOCKET NO. 50-339

NORTH ANNA POWER STATION, UNIT NO. 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 267
Renewed License No. NPF-7

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Virginia Electric and Power Company, (the licensee) dated January 4, 2019, as supplemented by letters dated August 29 and October 30, 2019, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - 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, by Amendment No. 267, Renewed Facility Operating License No. NPF-7 is hereby amended to authorize revision to the Emergency Action Level Technical Basis Document of the North Anna Power Station, Unit No. 2 Emergency Plan as set forth in the licensee's application dated January 4, 2019, as supplemented by letter dated August 29 and October 30, 2019, and evaluated in the NRC staff's safety evaluation enclosed with this amendment.
3. This license amendment is effective as of the date of its issuance and shall be implemented by March 31, 2021.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in black ink, appearing to read 'HKN for', is positioned above the printed name of the Director.

Ho K. Nieh, Director
Office of Nuclear Reactor Regulation

Date of Issuance: December 31, 2019



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

VIRGINIA ELECTRIC AND POWER COMPANY

DOCKET NO. 50-280

SURRY POWER STATION, UNIT NO. 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 296
Renewed License No. DPR-32

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Virginia Electric and Power Company (the licensee) dated January 4, 2019, as supplemented by letters dated August 29 and October 30, 2019, 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, by Amendment No. 296, Renewed Facility Operating License No. DPR-32 is hereby amended to authorize revision to the Emergency Action Level Technical Basis Document of the Surry Power Station, Unit No. 1 Emergency Plan as set forth in the licensee's application dated January 4, 2019, as supplemented by letter dated August 29 and October 30, 2019, and evaluated in the NRC staff's safety evaluation enclosed with this amendment.
3. This license amendment is effective as of the date of its issuance and shall be implemented by March 31, 2021.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in black ink, appearing to read 'HKN for', is written over the printed name of the Director.

Ho K. Nieh, Director
Office of Nuclear Reactor Regulation

Date of Issuance: December 31, 2019



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

VIRGINIA ELECTRIC AND POWER COMPANY

DOCKET NO. 50-281

SURRY POWER STATION, UNIT NO. 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 296
Renewed License No. DPR-37

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Virginia Electric and Power Company (the licensee) dated January 4, 2019, as supplemented by letters dated August 29 and October 30, 2019, 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, by Amendment No. 296, Renewed Facility Operating License No. DPR-37 is hereby amended to authorize revision to the Emergency Action Level Technical Basis Document of the Surry Power Station, Unit No. 2 Emergency Plan as set forth in the licensee's application dated January 4, 2019, as supplemented by letter dated August 29 and October 30, 2019, and evaluated in the NRC staff's safety evaluation enclosed with this amendment.
3. This license amendment is effective as of the date of its issuance and shall be implemented by March 31, 2021.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in black ink, appearing to read 'HKN' followed by the word 'for' in a cursive script.

Ho K. Nieh, Director
Office of Nuclear Reactor Regulation

Date of Issuance: December 31, 2019



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO

AMENDMENT NO. 119 TO FACILITY OPERATING LICENSE NO. DPR-21

AMENDMENT NO. 336 TO RENEWED FACILITY OPERATING LICENSE NO. DPR-65

AMENDMENT NO. 274 TO RENEWED FACILITY OPERATING LICENSE NO. NPF-49

AMENDMENT NO. 284 TO RENEWED FACILITY OPERATING LICENSE NO. NPF-4

AMENDMENT NO. 267 TO RENEWED FACILITY OPERATING LICENSE NO. NPF-7

AMENDMENT NO. 296 TO RENEWED FACILITY OPERATING LICENSE NO. DPR-32

AMENDMENT NO. 296 TO RENEWED FACILITY OPERATING LICENSE NO. DPR-37

DOMINION ENERGY NUCLEAR CONNECTICUT INC.

VIRGINIA ELECTRIC AND POWER COMPANY

MILLSTONE POWER STATION UNIT NOS. 1, 2, AND 3

NORTH ANNA POWER STATION, UNIT NOS. 1 AND 2

SURRY POWER STATION, UNIT NOS. 1 AND 2

DOCKET NOS. 50-245, 50-336, 50-423, AND 72-47

DOCKET NOS. 50-338, 50-339, 72-16, AND 72-56

DOCKET NOS. 50-280, 50-281, 72-2, AND 72-55

1.0 INTRODUCTION

By application dated January 4, 2019 (Reference 1), as supplemented by letters dated August 29, 2019 (Reference 2) and October 30, 2019 (Reference 3), Dominion Energy Nuclear Connecticut, Inc. and Virginia Electric and Power Company (hereafter collectively referred to as Dominion, the licensee) requested U.S. Nuclear Regulatory Commission (NRC, the Commission) approval of emergency action level (EAL) scheme changes for Millstone Power Station (Millstone), Unit Nos. 1, 2, and 3, North Anna Power Station (North Anna), Unit Nos. 1 and 2, and Surry Power Station (Surry), Unit Nos. 1 and 2. The proposed amendments would

revise the current EAL schemes to one based on Nuclear Energy Institute (NEI) guidance in NEI 99-01, Revision 6, "Development of Emergency Action Levels for Non Passive Reactors," dated November 2012 (Reference 4).

The supplemental letters dated August 29 and October 30, 2019, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the NRC staff proposed no significant hazards consideration determination as published in the Federal Register on May 21, 2019 (84 FR 23079).

2.0 REGULATORY EVALUATION

The applicable regulations and guidance for emergency plans are provided in Sections 2.1 and 2.2 below.

2.1 Regulations

Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.47, "Emergency plans," sets forth emergency plan requirements for nuclear power reactors. Section 50.47(b) of 10 CFR establishes the planning standards that the on-site and off-site emergency response plans must meet for the NRC staff to make a finding that there is reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency. Specifically, Planning Standard (4) of this section requires that on-site and off-site emergency response plans meet the following:

A standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters, is in use by the nuclear facility licensee, and State and local response plans call for reliance on information provided by facility licensees for determinations of minimum initial offsite response measures.

The use of a standard emergency classification and action level scheme ensures that implementation methods are relatively consistent throughout the industry for a given reactor and containment design but permits site-specific design considerations and preferences.

Section IV.B.1 of Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities," to 10 CFR Part 50 states, in part:

The means to be used for determining the magnitude of, and for continually assessing the impact of, the release of radioactive materials shall be described, including emergency action levels that are to be used as criteria for determining the need for notification and participation of local and State agencies, the Commission, and other Federal agencies, and the emergency action levels that are to be used for determining when and what type of protective measures should be considered within and outside the site boundary to protect health and safety. The emergency action levels shall be based on in-plant conditions and instrumentation in addition to onsite and offsite monitoring. By June 20, 2012, for nuclear power reactor licensees, these action levels must include hostile action that may adversely affect the nuclear power plant.

Section IV.B.2 of Appendix E to 10 CFR Part 50 states:

A licensee desiring to change its entire emergency action level scheme shall submit an application for an amendment to its license and receive NRC approval before

implementing the change. Licensees shall follow the change process in § 50.54(q) for all other emergency action level changes.

2.2 Guidance

The EAL development guidance was initially established in Generic Letter 79-50, dated October 10, 1979 (Reference 5). This guidance was revised subsequently in NUREG-0654/FEMA-REP-1 (NUREG-0654), Revision 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," dated November 1980 (Reference 6), which was endorsed by NRC Regulatory Guide (RG) 1.101, Revision 2, "Emergency Planning and Preparedness for Nuclear Power Reactors," dated October 1981 (Reference 7), as an approach acceptable to the NRC for the development of an EAL scheme.

As industry and regulatory experience was gained with the implementation and use of EAL schemes, the industry issued revised EAL scheme development guidance to reflect lessons learned, numerous of which have been provided to the NRC for review and endorsement as generic (i.e., non-site-specific) EAL development guidance. Most recently, the industry developed NEI 99-01, Revision 6, which was endorsed by the NRC in a letter dated March 28, 2013, as an acceptable generic EAL scheme development guidance (Reference 8).

Although the EAL development guidance contained in NEI 99-01, Revision 6, is generic and may not be entirely applicable for some non-passive, large light-water reactor designs, it bounds the most typical accident and event scenarios for which emergency response is necessary, in a format that allows for industry standardization and consistent regulatory oversight. Licensees may choose to develop site-specific EAL schemes using NEI 99-01, Revision 6, with appropriate site-specific alterations as applicable.

NRC Regulatory Issue Summary (RIS) 2003-18, Revision 4, "Use of NEI 99-01, 'Methodology for Development of Emergency Action Levels,'" dated October 8, 2003, including Supplements 1 and 2 (Reference 9), also provides guidance for developing or changing a standard EAL scheme. In addition, this RIS and its supplements provide recommendations to assist licensees, consistent with Section IV.B.2 of Appendix E to 10 CFR Part 50, in determining whether to seek prior NRC approval of deviations from the guidance.

The NRC staff considers NEI 99-01, Revision 6, as an acceptable method to develop site-specific EALs that meet the requirements of Section IV.B of Appendix E to 10 CFR Part 50 and planning standard 10 CFR 50.47(b)(4), with the understanding that licensees may want to develop EALs that differ from the guidance document as allowed in RG 1.101 (Reference 7).

2.3 NRC Staff Review Methodology

In its application dated January 4, 2019, as supplemented by letters dated August 29 and October 30, 2019, the licensee proposed to revise the EAL schemes for Millstone, North Anna, and Surry based on NEI 99-01, Revision 6. The licensee submitted the proposed EAL scheme, the technical basis containing an evaluation and rationale for each proposed EAL change, and a comparison matrix providing a comparison of the proposed initiating conditions, mode applicability, and EAL wording to that found in NEI 99-01, Revision 6. The comparison matrix also included a description of global changes applicable to the EAL scheme and a justification for any differences or deviations from NEI 99-01, Revision 6. The application states that the licensee used the terms "difference" and "deviation" as defined in RIS 2003-18, as

supplemented, when comparing its proposed site-specific EALs to the generic EALs in NEI 99-01, Revision 6.

The NRC staff reviewed the application, as supplemented, and verified the proposed EAL schemes for consistency with the guidance provided in NEI 99-01, Revision 6, to ensure that the proposed EAL schemes meet the requirements of Section IV.B of Appendix E to 10 CFR Part 50 and planning standard 10 CFR 50.47(b)(4). However, the NRC staff found that both the current and proposed EALs have modifications from the NEI 99-01, Revision 6, guidance due to specific plant designs and licensee preferences.

The NRC staff also verified that the instrumentation and setpoints derived for the proposed EAL scheme are consistent with the overall EAL scheme development guidance, address the site-specific implementation strategies provide, and are consistent with a standard EAL scheme.

Although EALs must be site-specific, the NRC staff reviewed the proposed EALs for the following key characteristics of an effective EAL scheme to ensure:

- Consistency, including standardization of intent, if not in actual wording (i.e., the EALs would lead to similar decisions under similar circumstances at different plants);
- Human factors engineering and user friendliness;
- Potential for emergency classification level upgrade only when there is an increasing threat to public health and safety;
- Ease of upgrading and downgrading the emergency classification level;
- Thoroughness in addressing issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654 (i.e., the EALs are unambiguous and are based on site-specific indicators);
- Technical completeness for each classification level;
- Logical progression in classification for multiple events; and
- The use of objective and observable values.

The NRC staff verified that the proposed EAL scheme uses objective and observable values; are worded in a manner that addresses human factors engineering and user friendliness concerns; follows logical progressions for escalating events and allows for event downgrading and upgrading based upon the potential risk to the public health and safety. The NRC staff verified that risk assessments were appropriately used to set the boundaries of the emergency classification levels and ensure that all EALs that trigger the declaration of an emergency classification level are in the same range of relative risk. In addition, the NRC staff verified that the proposed EAL schemes are technically complete for each emergency classification level, accurate and consistent with EAL schemes implemented at similarly designed plants.

To aid in understanding the nomenclature used in this safety evaluation, the following conventions are used (e.g., RU1, RA1, etc.):

- the first letter signifies the EAL recognition category:
 - A or R – Abnormal Radiation Levels/Radiological Effluent,
 - C – Cold Shutdown/Refueling System Malfunction,
 - E – Independent Spent Fuel Storage Installation,
 - F – Fission Product Barrier,

- H – Hazards and Other Conditions Affecting Plant Safety, and
- S or M – System Malfunction.

- the second letter signifies the emergency classification level:
 - U = Notification of Unusual Event (Unusual Event),
 - A = Alert,
 - S = Site Area Emergency, and
 - G = General Emergency.

- the number is the applicable number from the site-specific EAL scheme.

An EAL set refers to EALs within an EAL Recognition Category that include an escalation path for one or more emergency classification levels. Not all EAL Recognition Categories require an EAL set.

This safety evaluation uses the numbering system from the proposed site-specific EAL scheme; however, the numbering system from the generic EAL scheme development guidance contained in NEI 99-01, Revision 6, is annotated in [brackets] to aid in cross-referencing the site-specific EAL numbering convention with that of the guidance, where applicable.

3.0 TECHNICAL EVALUATION FOR MILLSTONE UNIT NO. 1 (MPS1)

MPS1 is currently in decommissioning SAFSTOR status with all fuel removed from the reactor vessel and stored in the spent fuel pool (SFP).

3.1 Recognition Category 'R' – Abnormal Radiation Levels / Rad Effluent

3.1.1 EAL Set RU1/RA1 [AU1/AA1]

The intent of this EAL set is to ensure that an emergency classification level is declared upon site-specific indications of a release of radioactivity (gaseous or liquid). In recognition of the lower possible radioactivity concentrations for a permanently defueled reactor, the assessment is limited to the Unusual Event and Alert classification levels. This set provides for accident assessments using pre-calculated values based on assumed conditions, real-time parameters, and field monitoring results.

The NRC staff verified that the progression from an Unusual Event to an Alert classification level is appropriate and consistent with EAL scheme development guidance.

- RU1 – This EAL addresses a potential decrease in the level of safety of the plant as indicated by a low-level radiological release that exceeds regulatory commitments for an extended period (e.g., an uncontrolled release).

- RA1 – This EAL addresses a release of gaseous or liquid radioactivity that results in projected or actual off-site doses greater than or equal to 1 percent of the U.S. Environmental Protection Agency (EPA) early phase protective action guides (PAGs) (Reference 10).

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, ease of upgrading/downgrading, and instrumentation and setpoints for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

The committed dose equivalent (CDE) dose component for thyroid has been eliminated as a threshold value from the MPS1 Abnormal Radiation/Radiation Effluent Category. This is consistent with the EPA early phase PAGs provided in the January 2017 EPA PAG Manual and with an agreement provided to Dominion by the States of Connecticut and New York.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

3.1.2 EAL Set RU2/RA2 [AU2/AA2]

The intent of this EAL set is to ensure that an emergency classification level is declared upon site-specific indications of potential or actual damage to an irradiated fuel assembly or multiple assemblies. It addresses a lowering of water level over irradiated fuel or fuel uncover (i.e., level below the top of the fuel) and a spectrum of fuel handling accidents that result in mechanical damage to irradiated fuel (e.g., a dropped fuel assembly).

The NRC staff has verified that the progression from an Unusual Event to an Alert classification level is appropriate and consistent with EAL scheme development guidance.

- RU2 – This EAL addresses elevated radiation levels caused by a decrease in water level above irradiated (spent) fuel or other unplanned events.
- RA2 – This EAL addresses increased radiation levels that impede necessary access to areas containing equipment that must be operated manually or that requires local monitoring to maintain systems needed to maintain spent fuel integrity.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, ease of upgrading/downgrading, and instrumentation and setpoints for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency

classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

3.2 Recognition Category 'M' – System Malfunction

3.2.1 EAL MU1 [SU1]

This stand-alone EAL is intended primarily to ensure that key licensee emergency response organization (ERO) members and off-site response organizations (OROs) are aware of any issues inhibiting a restoration of spent fuel pool cooling capabilities. The escalation of the emergency classification level, if needed, is bounded by indications available in the initiating conditions of Recognition Category R [A].

The threshold criterion specified in the EAL is consistent with the expected critical characteristics of a standard emergency classification scheme.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, and instrumentation and setpoints for this EAL is consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and is, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified this EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

3.3 Recognition Category 'H' – Hazards and Other Conditions Affecting Plant Safety

Security-based events for MPS1 would be assessed and declared by Millstone Unit 3, as appropriate. Therefore, the MPS1 EAL scheme does not include security-based events in the MPS1 EALs.

3.3.1 EAL HU1 [HU2]

This EAL addresses an unplanned or hazardous event that results in damage to safety system equipment needed to cool spent fuel. This stand-alone EAL is intended primarily to ensure that the licensee's ERO is activated to support the Control Room in understanding the event impacts and restoring affected equipment to service. The escalation of the emergency classification

level, if needed, is bounded by indications available in EALs RA1, RA2, or HA2. The threshold criterion specified in the EAL is consistent with the expected critical characteristics of a standard emergency classification level scheme.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, and instrumentation and setpoints for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

The licensee modified HU1.1 EAL wording to remove wording related to "at least one train" and specifically provide that a loss of either the spent fuel pool cooling system or the decay heat removal system due to the occurrence of a hazardous event would warrant classification under EAL HU1.1. The licensee further provided that a loss of off-site alternating current (AC) power would be excluded from EAL HU1.1. As changed, EAL HU1.1 clearly identifies which MPS1 systems would require a classification of HU1.1.

Excluding off-site AC power from this EAL is reasonable considering that off-site AC power is not an MPS1 safety system and that MU1.1 would be declared if spent fuel pool temperature would have an unplanned rise to above 140°F.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

3.3.2 EAL Set HU2/HA2 [HU3/HA3]

The intent of this EAL set is to provide decision-makers with an escalating emergency classification level path to consider when, in their judgment, entry into the site's emergency plan and mobilization of the licensee's ERO and OROs is warranted.

The NRC staff verified that the progression from an Unusual Event to an Alert classification level is appropriate and consistent with EAL scheme development guidance.

- HU2 – This EAL addresses unanticipated conditions not addressed explicitly elsewhere but, in the judgement of the Emergency Director, warrant declaration of an emergency due to conditions existing that are believed to fall under the emergency classification level description for an Unusual Event.
- HA2 – This EAL addresses unanticipated conditions not addressed explicitly elsewhere but, in the judgement of the Emergency Director, warrant declaration of an emergency due to conditions existing that are believed to fall under the emergency classification level description for an Alert.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, and ease of upgrading/downgrading for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

3.4 Review Summary

The NRC staff has reviewed the technical bases for the proposed MPS1 EAL scheme, the modifications from NEI 99-01, Revision 6, and the licensee's evaluation of the proposed changes. The licensee chose to modify its proposed EAL scheme from the generic EAL scheme development guidance provided in NEI 99-01, Revision 6, to adopt a format that is better aligned with how it currently implements its EALs, as well as with site-specific writer's guides and preferences. The NRC staff verified that these modifications do not alter the intent of any specific EAL within a set, recognition category, or within the entire EAL scheme described in NEI 99-01, Revision 6. Thus, the proposed changes meet the requirements in Appendix E to 10 CFR Part 50 and planning standard 10 CFR 50.47(b)(4).

The NRC staff determined that the proposed EAL scheme uses objective and observable values, is worded in a manner that addresses human factors engineering and user-friendliness concerns, follows logical progressions for escalating events, and allows for event downgrading and upgrading based upon the potential risk to the public health and safety. Risk assessments were used appropriately to set the boundaries of the emergency classification levels and ensure that all EALs that trigger an emergency classification are in the same range of relative risk. In addition, the NRC staff determined that the proposed EAL scheme is technically complete and consistent with EAL schemes implemented at similarly designed plants.

The NRC staff verified that the instrumentation and setpoints derived for this proposed EAL scheme are consistent with the overall EAL scheme development guidance, address the site-specific implementation strategies provided, and are consistent with a standard EAL scheme.

Based on its review, the NRC staff finds that the licensee's proposed MPS1 EAL scheme is acceptable and provides reasonable assurance that the licensee can and will take adequate protective measures in the event of a radiological emergency. Specifically, the staff concludes that the licensee's proposed EAL scheme and site-specific EAL technical basis document provided by letter dated January 4, 2019, as supplemented by letters dated August 29 and October 30, 2019, is acceptable for implementation.

4.0 TECHNICAL EVALUATION FOR MILLSTONE UNITS 2 and 3 (MPS2/MPS3)

4.1 Recognition Category 'R' – Abnormal Radiation Levels/Radiological Effluent

4.1.1 EAL Set RU1/RA1/RS1/RG1 [AU1/AA1/AS1/AG1]

The intent of this EAL set is to ensure that an emergency classification level is declared upon site-specific indications of a release of radioactivity (gaseous or liquid). In recognition of the lower possible radioactivity concentrations, the assessment of liquid releases is limited to the Unusual Event and Alert classification levels. This set provides for accident assessments using pre-calculated values based on assumed conditions, real-time parameters, and field monitoring results.

The NRC staff verified that the progression from an Unusual Event to a General Emergency classification level is appropriate and consistent with EAL scheme development guidance.

- RU1 – This EAL addresses a potential decrease in the level of safety of the plant as indicated by a low-level radiological release that exceeds regulatory commitments for an extended period (e.g., an uncontrolled release).
- RA1 – This EAL addresses a release of gaseous or liquid radioactivity that results in projected or actual off-site doses greater than or equal to 1 percent of the EPA early phase PAGs.
- RS1 – This EAL addresses a release of gaseous radioactivity that results in projected or actual off-site doses greater than or equal to 10 percent of the EPA early phase PAGs.
- RG1 – This EAL addresses a release of gaseous radioactivity that results in projected or actual off-site doses greater than or equal to the EPA early phase PAGs.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, ease of upgrading/downgrading, and instrumentation and setpoints for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

In its supplemental letter dated August 29, 2019, Dominion verified that using setpoints based on two times the Off-site Dose Calculation Manual (ODCM) limits for North Anna Radiation Monitor GW-RM-178 and Surry Radiation Monitor GW-RM-170 would result in Unusual Event calculated values that are greater than the Alert EAL threshold values. Additionally, other detectors did not provide a factor of 10 separation from the Alert EAL threshold. Because of the

above issues associated with GW-RM-178 and GW-RM-170, the licensee proposed to use allocated ODCM limits as a threshold value where an allocation factor will be determined by maintaining a release rate at least an order of magnitude lower than corresponding Alert release rates for all Dominion sites. The licensee further provided that this approach is the basis of the current North Anna and Surry EAL schemes and will be applied to Millstone Unit Nos. 2 and 3. Considering that the proposed methodology provides ODCM-based setpoints that provide adequate discrimination between the Unusual Event and Alert classification levels that is consistent with the currently approved North Anna and Surry EAL schemes, the NRC staff finds this change to be acceptable.

The NRC staff has reviewed the proposed removal of the main steam radiation monitors from the respective effluent monitor threshold tables. Considering that the main steam radiation monitors are not effluent monitors and that a steam generator tube leak would be bounded by the fission product barrier, and off-site dose assessment or field monitoring, the NRC staff finds this change to be acceptable.

The CDE component for thyroid has been eliminated as a threshold value from the Millstone Unit Nos. 2 and 3 Abnormal Radiation / Radiation Effluent Category. This is consistent with the EPA early phase PAGs provided in the January 2017 EPA PAG Manual and with agreement provided by the States of Connecticut and New York.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

4.1.2 EAL Set RU2/RA2/RS2/RG2 [AU2/AA2/AS2/AG2]

The intent of this EAL set is to ensure that an emergency classification level is declared upon site-specific indications of potential or actual damage to an irradiated fuel assembly or multiple assemblies. It addresses a lowering of water level over irradiated fuel or fuel uncover (i.e., level below the top of the fuel), a spectrum of fuel handling accidents that result in mechanical damage to irradiated fuel (e.g., a dropped fuel assembly). Some of these EALs rely on the SFP water level instrumentation required by NRC Order EA-12-051, "Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," dated March 12, 2012 (Reference 11).

The NRC staff has verified that the progression from an Unusual Event to a General Emergency classification level is appropriate and consistent with EAL scheme development guidance.

- RU2 – This EAL addresses a decrease in water level above irradiated fuel that causes elevated radiation levels.
- RA2 – This EAL addresses events that have caused imminent or actual damage to an irradiated fuel assembly or a significant lowering of water level within the SFP.
- RS2 – This EAL addresses a significant loss of SFP water inventory control and makeup capability leading to imminent fuel damage and addresses NRC Order EA-12-051.

- RG2 – This EAL addresses a significant loss of SFP water inventory control and makeup capability leading to a prolonged uncover of irradiated fuel and addresses NRC Order EA-12-051.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, ease of upgrading/downgrading, and instrumentation and setpoints for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

4.1.3 EAL RA3 [AA3]

The intent of this EAL is to ensure that an emergency classification level is declared when elevated radiation levels in certain plant rooms and areas are enough to preclude or impede personnel from performing actions necessary to maintain normal plant operation or to perform a normal plant cooldown and shutdown. This includes equipment in the control room and the central alarm station. The Alert classification level is intended primarily to ensure that the licensee's ERO is activated to support the control room in removing the impediment to normal access, as well as assisting in quantifying potential damage to the fuel. Indications of increasing radiation levels in the plant are bounded by Recognition Category 'F,' as well as EALs RS1 and RG1.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, and instrumentation and setpoints for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

4.2 Recognition Category 'C' – Cold Shutdown/Refueling System Malfunction

4.2.1 EAL Set CU1/CA1/CS1/CG1 [CU1/CA1/CS1/CG1]

The intent of this EAL set is to ensure an emergency classification level is declared upon a loss of reactor pressure vessel (RPV) inventory and/or reactor coolant system (RCS) leakage.

The NRC staff verified that the progression from an Unusual Event to a General Emergency classification level is appropriate and consistent with EAL scheme development guidance.

- CU1 – This EAL addresses the inability to restore and maintain water level to a required minimum level (or the lower limit of a level band) or a loss of the ability to monitor RPV/RCS level concurrent with indications of reactor coolant leakage.
- CA1 – This EAL addresses conditions that are precursors to a loss of the ability to adequately cool irradiated fuel in the RPV/RCS (i.e., a precursor to a challenge to the fuel clad barrier).
- CS1 – This EAL addresses a significant and prolonged loss of RPV/RCS inventory control and makeup capability leading to imminent fuel damage.
- CG1 – This EAL addresses the inability to restore and maintain RPV/RCS level above the top of active fuel with containment challenged.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, ease of upgrading/downgrading, and instrumentation and setpoints for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

4.2.2 EAL Set CU2/CA2 [CU2/CA2]

The intent of this EAL set is to ensure that an emergency classification level is declared upon a loss of available AC power to emergency power electrical busses.

The NRC staff verified that the progression from an Unusual Event to an Alert classification level is appropriate and consistent with EAL scheme development guidance. The Site Area

Emergency and General Emergency classification levels for this specific accident progression are bounded by EALs RS1 and RG1.

- CU2 – This EAL describes a significant degradation of off-site and on-site AC power sources such that any additional single failure would result in a loss of all AC power to safety systems.
- CA2 – This EAL addresses a loss of all AC power that compromises the performance of all safety systems requiring electric power, including those necessary for emergency core cooling, containment heat removal/pressure control, irradiated fuel heat removal, and the ultimate heat sink.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, and ease of upgrading/downgrading for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

4.2.3 EAL Set CU3/CA3 [CU3/CA3]

The intent of this EAL set is to ensure that an emergency classification level is declared based on the inability to maintain control of decay heat removal.

The NRC staff verified that the progression from an Unusual Event to an Alert classification level is appropriate and consistent with EAL scheme development guidance. The progression to a Site Area Emergency and/or a General Emergency classification level is bounded by EALs RS1 and RG1.

- CU3 – This EAL addresses an unplanned increase in RCS temperature above the technical specification cold shutdown temperature limit or the inability to determine RCS temperature and level.
- CA3 – This EAL addresses conditions involving a loss of decay heat removal capability or an addition of heat to the RCS in excess of that which can currently be removed.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, and ease of upgrading/downgrading for this EAL set are

consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

4.2.4 EAL CU4 [CU4]

The intent of this EAL is to ensure that an emergency classification level is declared upon a loss of vital direct current (DC) power that compromises the ability to monitor and control operable safety systems. This EAL is intended primarily to ensure that key licensee ERO members and OROs are aware of the event, resources necessary to respond to the event are mobilized, and any necessary compensatory measures are promptly implemented. The Alert, Site Area Emergency, and General Emergency classification levels for a protracted loss of vital DC power are bounded by EALs CA1, CA3, CS1, CG1, RA1, RS1, and RG1.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, formatting, logical progression, and instrumentation and setpoints for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

4.2.5 EAL CU5 [CU5]

The intent of this EAL is to highlight the importance of emergency communications by ensuring that an emergency classification level is declared if normal communication methods for on-site and off-site personnel, or with OROs, including the NRC, are lost. This EAL is intended primarily to ensure that key licensee ERO members and OROs are aware of the loss of communications capabilities, the resources necessary to restore communications are mobilized, and compensatory measures are promptly implemented. Considering that a loss of emergency communications capability would not involve an actual or potential substantial degradation to the level of safety of the plant, no escalation path is necessary for this EAL.

The communication methods derived for this EAL are consistent with the overall EAL scheme development guidance.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, and logical progression for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

4.2.6 EAL CA6 [CA6]

The intent of this EAL is to ensure that an emergency classification level is declared when hazardous events lead to potential damage to safety systems. The hazardous events of interest include, but are not limited to, an earthquake, flooding, high winds, tornado strike, explosion, fire, or any other hazard applicable for the site. This EAL is intended primarily to ensure that the licensee's ERO is activated to support the control room in understanding the event impacts and restoring affected safety system equipment to service. Indications of hazard-induced damage to components containing radioactive materials are bounded by EALs CS1, CG1, RS1 and RG1.

As described in NEI 99-01, Revision 6, an Alert classification level exists when events are in process or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant. Any releases are expected to be limited to small fractions of the EPA early phase PAG exposure levels. The guidance in NEI 99-01, Revision 6, is intended to ensure that an Alert classification level should be declared only when an actual or potential substantial degradation of the level of safety of the plant has occurred because of a hazardous event. However, there may be cases where a hazardous event only causes damage to a single safety system component or a single safety system train. Additionally, an Alert classification level should not be declared if the damage from the hazardous event is limited to a safety system component or a safety system train that was inoperable or out of service prior to the event occurring.

The licensee proposed that an Alert classification level will be declared when a hazardous event results in indications of degraded performance to one train of a safety system with either indications of degraded performance on a second safety system train or visible damage to a second safety system train, such that the operability or reliability of the second safety system train is a concern. Although different from the guidance in NEI 99-01, Revision 6, this change is acceptable, considering that the guidance in NEI 99-01, Revision 6, is intended to ensure that an Alert classification level should be declared only when an actual or potential substantial degradation of the level of safety of the plant has occurred because of a hazardous event.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, and logical progression for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

4.3 Recognition Category 'E' – Independent Spent Fuel Storage Installation

4.3.1 EAL EU1 [E-HU1]

This EAL applies to an event that results in damage to the confinement boundary of a storage cask containing irradiated fuel. This EAL is intended primarily to ensure that key licensee ERO members and OROs are aware of the cask damage, resources necessary to respond to the event are mobilized, and protective measures, if warranted, are promptly implemented.

MPS3 currently has three spent fuel casks that have different external dose rate limits than the remainder of the MPS3 spent fuel casks. Dominion proposed EAL threshold values that are based on the lower of the MPS3 cask dose rate limits. Considering that both MPS3 spent fuel cask dose rate limits are reasonably close and that using a single threshold value will eliminate potential human factor concerns, the NRC staff finds the proposed threshold values for MPS3 to be acceptable.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, and logical progression for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

4.4 Recognition Category 'F' – Fission Product Barrier Matrix

4.4.1 EAL Set FA1/FS1/FG1 [FA1/FS1/FG1]

The intent of this EAL set is to ensure that an emergency classification level is declared upon a loss or potential loss of one or more fission product barriers.

This EAL set uses plant condition-based thresholds as triggers within a particular logic configuration needed to reflect a loss or potential loss of a fission product barrier. Non-passive, large light-water reactors in the United States have three fission product barriers: fuel cladding, the RCS, and primary containment. Licensees are to develop thresholds that provide EAL decision-makers input into making an event declaration based upon degradation of one or more of these fission product barriers.

There are numerous triggers used as logic inputs to decide on the appropriate emergency classification level based upon the number of loss and/or potential loss indicators that are met for each barrier. These indicators are redundant with other similar indicators in Recognition Categories 'R' and 'M.'

The NRC staff verified that the logic used to determine the appropriate emergency classification level is consistent with the generic EAL scheme development guidance in NEI 99-01, Revision 6. The progression from an Alert to a General Emergency classification level is appropriate and consistent with EAL scheme development guidance.

- FA1 – This EAL addresses any loss or any potential loss of either the fuel clad or RCS barrier.
- FS1 – This EAL addresses loss or potential loss of any two barriers.
- FG1 – This EAL addresses loss of any two barriers and loss or potential loss of the third barrier.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, ease of upgrading/downgrading, and instrumentation and setpoints for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

4.5 Recognition Category 'H' – Hazards and Other Conditions Affecting Plant Safety

4.5.1 EAL Set HU1/HA1/HS1 [HU1/HA1/HS1/HG1]

The intent of this EAL set is to ensure that an emergency classification level is declared based upon a security-related event. This EAL set was developed in accordance with the guidance from NRC Bulletin 2005-02, "Emergency Preparedness and Response Actions for Security-Based Events," dated July 18, 2005 (Reference 12), and RIS 2006-12, "Endorsement of Nuclear Energy Institute Guidance 'Enhancements to Emergency Preparedness Programs for Hostile Action,'" dated July 19, 2006 (Reference 13), for licensees to implement, regardless of the specific version of the generic EAL scheme development guidance used, or if the particular licensee developed its EAL scheme using an alternative approach. Based upon lessons learned from the implementation and use of this EAL set, particularly the insights gained from combined security and emergency preparedness drills, Dominion proposed to not develop EAL HG1, as provided in NEI 99-01, Revision 6.

EAL HG1 of NEI 99-01, Revision 6, addresses a hostile action that results in the loss of physical control of the facility. Such an action can reasonably be expected to exceed EPA early phase PAG exposure levels off-site for more than the immediate site area, which is the criteria for EAL HG7 in NEI 99-01, Revision 6. Therefore, in NEI 99-01, Revision 6, EAL HG1 is bounded by EAL HG7. Additionally, any event that could result in a radiological release in excess of EPA early phase PAGs would be bounded by EALs RG1 [AG1] or RG2 [AG2] in NEI 99-01, Revision 6. The NRC staff verified that the Dominion EALs RG1, RG2, and HG7 bound the events addressed by EAL HG1 in NEI 99-01, Revision 6.

The NRC staff also verified that the progression from an Unusual Event to a Site Area Emergency classification level is appropriate and consistent with EAL scheme development guidance.

- HU1 – This EAL addresses events that pose a threat to plant personnel or safety system equipment.
- HA1 – This EAL addresses the occurrence of a hostile action within the Owner Controlled Area or notification of an aircraft attack threat.
- HS1 – This EAL addresses the occurrence of a hostile action within the Protected Area.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, and ease of upgrading/downgrading for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

4.5.2 EAL HU2 [HU2]

The intent of this EAL is to ensure that an emergency classification level is declared based upon a seismic event that results in accelerations at the site greater than specified for an operating basis earthquake. This EAL is intended primarily to ensure that key licensee ERO members and OROs are aware of the earthquake magnitude at the site and that post-event damage assessments are implemented promptly. This EAL is considered part of an EAL set containing EALs CA6 and MA9, depending on the operating mode applicable at the time of the event. Indications of earthquake-induced damage to components containing radioactive materials are bounded by Recognition Category 'F,' as well as EALs RA1, RS1, or RG1.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, and instrumentation and setpoints for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

4.5.3 EAL HU3 [HU3]

The intent of this EAL is to ensure that an emergency classification level is declared based upon the effects that natural or technological hazard events may have on the facility that are considered to be precursors to a more significant event or condition or have potential impacts that warrant emergency notification to local, State, and Federal authorities. Specific hazards addressed include:

- Tornado striking within the protected area;
- Internal room or area flooding requiring the electrical isolation of a safety system component;
- Movement of personnel within the protected area that is impeded due to an off-site event involving hazardous materials;
- A hazardous event that results in on-site conditions that are sufficient to prohibit the plant staff from accessing the site via personal vehicles, and
- Other site-specific events.

This EAL is intended primarily to ensure that key licensee ERO members and OROs are aware of the hazardous event affecting the site, and post-event damage assessments are implemented promptly. In addition, other site-specific events that may impact the effective implementation of the site emergency plan are considered. This EAL is considered part of an EAL set containing EALs CA6 and MA9, depending on the operating mode applicable at the time of the event. Indications of hazard-induced damage to components containing radioactive materials are bounded by Recognition Category 'F,' as well as EALs RA1, RS1, or RG1.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, and logical progression for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

4.5.4 EAL HU4 [HU4]

The intent of this EAL is to ensure that an emergency classification level is declared based upon the effect that a fire may have on the facility, which would be indicative of a potential degradation of the level of safety of the plant. This EAL is intended primarily to ensure that key licensee ERO members and OROs are aware of the fire, and post-event damage assessments are implemented promptly. This EAL is considered part of an EAL set containing EALs CA6 and MA9, depending on the operating mode applicable at the time of the event. Indications of a protracted fire involving radioactive materials are bounded by Recognition Category 'F,' as well as EALs RS1 and RG1.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, and logical progression for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in

Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

4.5.5 EAL HA5 [HA5]

The intent of this EAL is to ensure that an emergency classification level is declared based upon the effect that toxic, corrosive, asphyxiating or flammable gases may have on the facility, which precludes or impedes access to equipment necessary to maintain normal plant operation or required for a normal plant cooldown and shutdown. This EAL is intended primarily to ensure that the licensee's ERO is activated to support the control room in removing the impediment to normal access to the affected area or room. Indications of a protracted loss of access to equipment necessary for normal plant operations, cooldown, or shutdown are bounded by Recognition Category 'F,' as well as EALs RS1 and RG1.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, and formatting for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

4.5.6 EAL Set HA6/HS6 [HA6/HS6]

The intent of this EAL set is to ensure that an emergency classification level is declared based upon a control room evacuation with the inability to control critical plant systems remotely.

The NRC staff verified that the progression from an Alert to a Site Area Emergency classification level is appropriate and consistent with EAL scheme development guidance. A General Emergency classification level for this specific accident progression is bounded by Recognition Category 'F,' as well as EAL RG1.

- HA6 – This EAL addresses an evacuation of the control room that results in transfer of plant control to alternate locations outside the control room.
- HS6 – This EAL addresses an evacuation of the control room that results in transfer of plant control to alternate locations, and the control of a key safety function cannot be reestablished in a timely manner.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, and ease of upgrading/downgrading for this EAL set are consistent with the overall

EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

4.5.7 EAL Set HU7/HA7/HS7/HG7 [HU7/HA7/HS7/HG7]

The intent of this EAL set is to provide decision-makers with an escalating emergency classification level path to consider when, in their judgment, entry into the site's emergency plan and mobilization of the licensee's ERO and ORO is warranted.

The NRC staff verified that the progression from an Unusual Event to a General Emergency classification level is appropriate and consistent with EAL scheme development guidance.

- HU7 – This EAL addresses unanticipated conditions not addressed explicitly elsewhere but, in the judgement of the Emergency Director, warrant declaration of an emergency due to conditions existing that are believed to fall under the emergency classification level description for an Unusual Event.
- HA7 – This EAL addresses unanticipated conditions not addressed explicitly elsewhere but, in the judgement of the Emergency Director, warrant declaration of an emergency due to conditions existing that are believed to fall under the emergency classification level description for an Alert.
- HS7 – This EAL addresses unanticipated conditions not addressed explicitly elsewhere but, in the judgement of the Emergency Director, warrant declaration of an emergency due to conditions existing that are believed to fall under the emergency classification level description for a Site Area Emergency.
- HG7 – This EAL addresses unanticipated conditions not addressed explicitly elsewhere but, in the judgement of the Emergency Director, warrant declaration of an emergency due to conditions existing that are believed to fall under the emergency classification level description for a General Emergency.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, and ease of upgrading/downgrading for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically

complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

4.6 Recognition Category 'M' – System Malfunction

4.6.1 EAL Set MU1/MA1/MS1/MG1 [SU1/SA1/SS1/SG1]

The intent of this EAL set is to ensure that an emergency classification level is declared based upon a loss of available AC power sources to the emergency busses.

The NRC staff reviewed the licensee's evaluation and justification for site-specific changes associated with this EAL set and verified that the progression from an Unusual Event to a General Emergency classification level is appropriate and consistent with EAL scheme development guidance.

- MU1 – This EAL addresses a prolonged loss of off-site AC power.
- MA1 – This EAL describes a significant degradation of off-site and on-site AC power sources such that any additional single failure would result in a loss of all AC power to safety systems.
- MS1 – This EAL addresses a loss of all AC power that compromises the performance of all safety systems requiring electric power, including those necessary for emergency core cooling, containment heat removal/pressure control, irradiated fuel heat removal, and the ultimate heat sink.
- MG1 – This EAL addresses a prolonged loss of all power sources to AC emergency busses.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, ease of upgrading/downgrading, and instrumentation and setpoints for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Dominion proposed to deviate from the guidance provided in NEI 99-01, Revision 6, by replacing the MG1 generic threshold condition of "restoration of at least one AC emergency bus

in less than (site-specific hours) is not likely,” with “long-term heat removal capability is not likely to be established and maintained per procedure.” Dominion provides that current plant emergency operating procedures (EOPs) and associated support guidelines will restore or maintain core cooling and heat removal, containment, and spent fuel pool cooling capabilities even if AC power cannot be restored.

The EAL coping times were developed based on Section 10 CFR 50.63 “Loss of all alternating current power,” Specifically, 10 CFR 50.63(a) “Requirements,” states, in part, that station blackout duration shall be based on the following factors:

- i. The redundancy of the onsite emergency AC power sources;
- ii. The reliability of the onsite emergency AC power sources;
- iii. The expected frequency of loss of offsite power; and
- iv. The probable time needed to restore offsite power.

Considering that the above Requirements for determining station blackout duration (i.e., coping time) do not take credit for current plant capabilities and procedures, making a declaration based on the guidance provided by NEI 99-01, Revision 6, could result in the declaration of a General Emergency based on exceeding coping times when long-term heat removal capability is likely to be established and maintained per procedure. This declaration would not be consistent with the NEI 99-01, Revision 6, definition of a general emergency which states, in part, that “events are in progress or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity.” Additionally, the NRC staff finds that the proposed condition of “long-term heat removal capability is not likely to be established and maintained per procedure,” is consistent with NEI 99-01, Revision 6, which provides that a general emergency should be declared pursuant to MG1 prior to meeting the thresholds for EAL FG1. As such, the NRC staff finds Dominion’s proposed deviation for MG1 acceptable.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

4.6.2 EAL Set MU3/MA3 [SU2/SA2]

The intent of this EAL set is to ensure that an emergency classification level is declared based upon the effect that a loss of available indicators in the control room has on the facility.

The NRC staff verified that the progression from an Unusual Event to an Alert classification level is appropriate and consistent with EAL scheme development guidance. The Site Area Emergency and General Emergency classification levels for this specific accident progression are bounded by Recognition Category ‘F,’ as well as EALs RS1 and RG1.

- MU3 – This EAL addresses the difficulty associated with monitoring normal plant conditions without the ability to obtain safety system parameters from within the control room.
- MA3 – This EAL addresses the difficulty associated with monitoring rapidly changing plant conditions during a transient without the ability to obtain safety system parameters from within the control room.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, ease of upgrading/downgrading, and instrumentation and setpoints for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

4.6.3 EAL MU4 [SU3]

The intent of this EAL is to ensure that an emergency classification level is declared when RCS activity is greater than technical specification allowable limits. This EAL is intended primarily to ensure that key licensee ERO members are aware of the elevated reactor coolant activity and support the control room in implementation of appropriate response measures. Escalation from this emergency classification level is bounded by Recognition Category 'F,' as well as EALs RA1, RS1, and RG1.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, and instrumentation and setpoints for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

4.6.4 EAL MU5 [SU4]

The intent of this EAL is to ensure that an emergency classification level is declared when the plant has indications of RCS leakage. By design, the indications for this EAL are redundant to corresponding indicators for a loss or potential loss of fission product barriers, as well as radiation monitoring, to ensure reactor and/or fission product barrier events are recognized.

This EAL is intended primarily to ensure that key licensee ERO members are aware of the RCS leakage and support the control room in implementation of appropriate response measures. Escalation from this emergency classification level is bounded by Recognition Category 'F,' as well as EALs RA1, RS1, and RG1.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, and instrumentation and setpoints for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

4.6.5 EAL Set MU6/MA6/MS6 [SU5/SA5/SS5]

The intent of this EAL set is to ensure that an emergency classification level is declared based upon the effect that a failure of the reactor protection system (RPS) may have on the plant.

The NRC staff verified that the progression from an Unusual Event to a Site Area Emergency classification level is appropriate and consistent with EAL scheme development guidance. A General Emergency classification level for this event is bounded by Recognition Category 'F,' as well as EAL RG1.

- MU6 – This EAL addresses a failure of the RPS to initiate or complete an automatic or manual reactor trip that results in a reactor shutdown, and either a subsequent operator manual action taken at the reactor control consoles or a subsequent automatic trip is successful in shutting down the reactor.
- MA6 – This EAL addresses a failure of the RPS to initiate or complete an automatic or manual reactor trip that results in a reactor shutdown, and subsequent operator manual actions taken at the reactor control consoles to shut down the reactor are also unsuccessful.
- MS6 – This EAL addresses a failure of the RPS to initiate or complete an automatic or manual reactor trip that results in a reactor shutdown, all subsequent operator actions to manually shut down the reactor are unsuccessful, and continued power generation is challenging the capability to adequately remove heat from the core and/or the RCS.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing,

formatting, logical progression, ease of upgrading/downgrading, and instrumentation and setpoints for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

For the MPS3 EAL scheme, the licensee chose to add the condition "as indicated by reactor power > 5%." Considering that Dominion continues to use the Subcategory of "RPS Failure" and the Initiating condition of "Automatic or manual trip fails to shut down the reactor," the NRC staff finds that adding the condition of reactor power being less than 5% to the condition of the reactor being shutdown acceptable.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

4.6.6 EAL MU7 [SU6]

The intent of this EAL is to highlight the importance of emergency communications by ensuring that an emergency classification level is declared if normal communication methods for on-site and off-site personnel, or with OROs, including the NRC, are lost. This EAL is intended primarily to ensure that key licensee ERO members, OROs, and the NRC are aware of the loss of communication capabilities, the resources necessary to restore communications are mobilized, and compensatory measures are implemented promptly. Considering that a loss of emergency communications capability would not involve an actual or potential substantial degradation to the level of safety of the plant, no escalation path is necessary for this EAL.

The communication methods derived for this EAL are consistent with the overall EAL scheme development guidance.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, and logical progression for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

4.6.7 EAL MU8 [SU7]

The intent of this EAL is to ensure that an emergency classification level is declared when the plant has indications of containment barrier degradation. It also addresses an event that results in high containment pressure with a concurrent failure of containment pressure control systems. The indications for this EAL are redundant to corresponding indicators from a loss or potential loss of fission product barriers, as well as radiation monitoring, to ensure reactor and/or fission product barrier events are recognized.

This EAL is intended primarily to ensure that key licensee ERO members, OROs, and the NRC are aware of significant challenges to containment integrity, and compensatory measures are promptly implemented. Escalation is bounded by Recognition Category 'F', as well as EALs RA1, RS1, and RG1.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, and instrumentation and setpoints for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are therefore consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns; is technically complete for this emergency classification level; addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

4.6.8 EAL Set MS2/MG1 [SS8/SG8]

The intent of this EAL set is to ensure that an emergency classification level is declared when a loss of DC power occurs, as this condition compromises the ability of the licensee to monitor and control safety systems.

The NRC staff verified that the progression from a Site Area Emergency to a General Emergency classification level is appropriate and consistent with EAL scheme development guidance.

- MS2 – This EAL addresses a loss of vital DC power that compromises the ability to monitor and control safety systems.
- MG1 – This EAL addresses a concurrent and prolonged loss of both AC and vital DC power.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing,

formatting, logical progression, ease of upgrading/downgrading, and instrumentation and setpoints for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

4.6.9 EAL MA9 [SA9]

The intent of this EAL is to ensure that an emergency classification level is declared when hazardous events lead to potential damage to safety systems needed for the current operating mode. The hazardous events of interest include, but are not limited to, an earthquake, flooding, high winds, tornado strike, explosion, fire, or any other hazard applicable for Millstone. This EAL is intended primarily to ensure that the licensee's ERO is activated to support the control room in understanding the event impacts and restoring affected safety system equipment to service. Indications of hazard-induced damage to components containing radioactive materials are bounded by Recognition Category 'F,' as well as EALs RS1 and RG1.

As described in NEI 99-01, Revision 6, an Alert classification level exists when events are in process or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant. Any releases are expected to be limited to small fractions of the EPA early phase PAG exposure levels. The guidance in NEI 99-01, Revision 6, is intended to ensure that an Alert classification level should be declared only when an actual or potential substantial degradation of the level of safety of the plant has occurred because of a hazardous event. However, there may be cases where a hazardous event only causes damage to a single safety system component or a single safety system train. Additionally, an Alert classification level should not be declared if the damage from the hazardous event is limited to a safety system component or a safety system train that was inoperable or out of service prior to the event occurring.

The licensee proposed that an Alert classification level be declared when a hazardous event results in indications of degraded performance to one train of a safety system with either indications of degraded performance on a second safety system train or visible damage to a second safety system train, such that the operability or reliability of the second safety system train is a concern. Although different from the guidance in NEI 99-01, Revision 6, this change is acceptable, considering that the guidance in NEI 99-01, Revision 6, is intended to ensure that an Alert classification level should be declared only when an actual or potential substantial degradation of the level of safety of the plant has occurred because of a hazardous event.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, and instrumentation and setpoints for this EAL are consistent

with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG 0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

4.7 Review Summary

The NRC staff has reviewed the technical bases for the proposed EAL scheme; the modifications from NEI 99-01, Revision 6, and the licensee's evaluation of the proposed changes. The licensee chose to modify its proposed EAL scheme from the generic EAL scheme development guidance provided in NEI 99-01, Revision 6, to adopt a format that is better aligned with how it currently implements its EALs, as well as with site-specific writer's guides and preferences. The NRC staff verified that these modifications do not alter the intent of any specific EAL within a set, recognition category, or within the entire EAL scheme described in NEI 99-01, Revision 6. Thus, the proposed changes meet the requirements in Appendix E to 10 CFR Part 50 and planning standard 10 CFR 50.47(b)(4).

The NRC staff determined that the proposed EAL scheme uses objective and observable values, is worded in a manner that addresses human factors engineering and user-friendliness concerns, follows logical progressions for escalating events, and allows for event downgrading and upgrading based upon the potential risk to the public health and safety. Risk assessments were appropriately used to set the boundaries of the emergency classification levels and ensure that all EALs that trigger an emergency classification are in the same range of relative risk. In addition, the NRC staff determined that the proposed EAL scheme is technically complete and consistent with EAL schemes implemented at similarly designed plants.

The NRC staff verified that the instrumentation and setpoints derived for this proposed EAL scheme are consistent with the overall EAL scheme development guidance, address the site-specific implementation strategies provided, and are consistent with a standard EAL scheme.

Based on the above, the NRC staff finds that the licensee's proposed EAL scheme is acceptable and provides reasonable assurance that the licensee can and will take adequate protective measures in the event of a radiological emergency. Specifically, the NRC staff concludes that the licensee's proposed EAL scheme and site-specific EAL technical basis document provided by letter dated January 4, 2019, as supplemented by letters dated August 29 and October 30, 2019, is acceptable for implementation.

5.0 TECHNICAL EVALUATION FOR NORTH ANNA UNIT NOS. 1 AND 2 (NAPS1/NAPS2)

5.1 Recognition Category 'R' – Abnormal Radiation Levels/Radiological Effluent

5.1.1 EAL Set RU1/RA1/RS1/RG1 [AU1/AA1/AS1/AG1]

The intent of this EAL set is to ensure that an emergency classification level is declared upon site-specific indications of a release of radioactivity (gaseous or liquid). In recognition of the lower possible radioactivity concentrations, the assessment of liquid releases is limited to the Unusual Event and Alert classification levels. This set provides for accident assessments using pre-calculated values based on assumed conditions, real-time parameters, and field monitoring results.

The NRC staff verified that the progression from an Unusual Event to a General Emergency classification level is appropriate and consistent with EAL scheme development guidance.

- RU1 – This EAL addresses a potential decrease in the level of safety of the plant as indicated by a low-level radiological release that exceeds regulatory commitments for an extended period (e.g., an uncontrolled release).
- RA1 – This EAL addresses a release of gaseous or liquid radioactivity that results in projected or actual off-site doses greater than or equal to 1 percent of the EPA early phase PAGs.
- RS1 – This EAL addresses a release of gaseous radioactivity that results in projected or actual off-site doses greater than or equal to 10 percent of the EPA early phase PAGs.
- RG1 – This EAL addresses a release of gaseous radioactivity that results in projected or actual off-site doses greater than or equal to the EPA early phase PAGs.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, ease of upgrading/downgrading, and instrumentation and setpoints for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

In its supplemental letter dated August 29, 2019, Dominion verified that using setpoints based on two times the Off-site Dose Calculation Manual (ODCM) limits for North Anna Radiation Monitor GW-RM-178 and Surry Radiation Monitor GW-RM-170 would result in Unusual Event calculated values that are greater than the Alert EAL threshold values. Additionally, other detectors did not provide a factor of 10 separation from the Alert EAL threshold. Because of the

above issues associated with GW-RM-178 and GW-RM-170, the licensee proposed to use allocated ODCM limits as a threshold value where an allocation factor will be determined by maintaining a release rate at least an order of magnitude lower than corresponding Alert release rates for all Dominion sites. Considering that the proposed methodology provides ODCM based setpoints that provide adequate discrimination between an Unusual Event and an Alert that is consistent with the currently approved North Anna EAL scheme, the NRC staff finds this change to be acceptable.

The NRC staff has reviewed the proposed removal of the main steam radiation monitors from their respective effluent monitor threshold tables. Considering that the main steam radiation monitors are not effluent monitors and that a steam generator tube leak would be bounded by the fission product barrier and off-site dose assessment or field monitoring, the NRC staff finds this change to be acceptable.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

5.1.2 EAL Set RU2/RA2/RS2/RG2 [AU2/AA2/AS2/AG2]

The intent of this EAL set is to ensure that an emergency classification level is declared upon site-specific indications of potential or actual damage to an irradiated fuel assembly or multiple assemblies. It addresses a lowering of water level over irradiated fuel or fuel uncover (i.e., level below the top of the fuel), a spectrum of fuel handling accidents that result in mechanical damage to irradiated fuel (e.g., a dropped fuel assembly). Some of these EALs rely on the SFP water level instrumentation required by NRC Order EA-12-051.

The NRC staff has verified that the progression from an Unusual Event to a General Emergency classification level is appropriate and consistent with EAL scheme development guidance.

- RU2 – This EAL addresses a decrease in water level above irradiated fuel that causes elevated radiation levels.
- RA2 – This EAL addresses events that have caused imminent or actual damage to an irradiated fuel assembly or a significant lowering of water level within the SFP.
- RS2 – This EAL addresses a significant loss of SFP water inventory control and makeup capability leading to imminent fuel damage and addresses NRC Order EA-12-051.
- RG2 – This EAL addresses a significant loss of SFP water inventory control and makeup capability leading to a prolonged uncover of irradiated fuel and addresses NRC Order EA-12-051.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, ease of upgrading/downgrading, and instrumentation and

setpoints for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

5.1.3 EAL RA3 [AA3]

The intent of this EAL is to ensure that an emergency classification level is declared when elevated radiation levels in certain plant rooms and areas are enough to preclude or impede personnel from performing actions necessary to maintain normal plant operation or to perform a normal plant cooldown and shutdown. This includes equipment in the control room and the central alarm station. The Alert classification level is intended primarily to ensure that the licensee's ERO is activated to support the control room in removing the impediment to normal access, as well as assisting in quantifying potential damage to the fuel. Indications of increasing radiation levels in the plant are bounded by Recognition Category 'F,' as well as EALs RS1 and RG1.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, and instrumentation and setpoints for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

5.2 Recognition Category 'C' – Cold Shutdown/Refueling System Malfunction

5.2.1 EAL Set CU1/CA1/CS1/CG1 [CU1/CA1/CS1/CG1]

The intent of this EAL set is to ensure an emergency classification level is declared upon a loss of RPV inventory and/or RCS leakage.

The NRC staff verified that the progression from an Unusual Event to a General Emergency classification level is appropriate and consistent with EAL scheme development guidance.

- CU1 – This EAL addresses the inability to restore and maintain water level to a required minimum level (or the lower limit of a level band) or a loss of the ability to monitor RPV/RCS level concurrent with indications of reactor coolant leakage.
- CA1 – This EAL addresses conditions that are precursors to a loss of the ability to adequately cool irradiated fuel in the RPV/RCS (i.e., a precursor to a challenge to the fuel clad barrier).
- CS1 – This EAL addresses a significant and prolonged loss of RPV/RCS inventory control and makeup capability leading to imminent fuel damage.
- CG1 – This EAL addresses the inability to restore and maintain RPV/RCS level above the top of active fuel with containment challenged.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, ease of upgrading/downgrading, and instrumentation and setpoints for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

5.2.2 EAL Set CU2/CA2 [CU2/CA2]

The intent of this EAL set is to ensure that an emergency classification level is declared upon a loss of available AC power to emergency power electrical busses.

The NRC staff verified that the progression from an Unusual Event to an Alert classification level is appropriate and consistent with EAL scheme development guidance. The Site Area Emergency and General Emergency classification levels for this specific accident progression are bounded by EALs RS1 and RG1.

- CU2 – This EAL describes a significant degradation of off-site and on-site AC power sources such that any additional single failure would result in a loss of all AC power to safety systems.

- CA2 – This EAL addresses a loss of all AC power that compromises the performance of all safety systems requiring electric power, including those necessary for emergency core cooling, containment heat removal/pressure control, irradiated fuel heat removal, and the ultimate heat sink.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, and ease of upgrading/downgrading for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

5.2.3 EAL Set CU3/CA3 [CU3/CA3]

The intent of this EAL set is to ensure that an emergency classification level is declared based on the inability to maintain control of decay heat removal.

The NRC staff verified that the progression from an Unusual Event to an Alert classification level is appropriate and consistent with EAL scheme development guidance. The Site Area Emergency and General Emergency classification levels for this specific accident progression are bounded by EALs RS1 and RG1.

- CU3 – This EAL addresses an unplanned increase in RCS temperature above the technical specification cold shutdown temperature limit or the inability to determine RCS temperature and level.
- CA3 – This EAL addresses conditions involving a loss of decay heat removal capability or an addition of heat to the RCS in excess of that which can currently be removed.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, and ease of upgrading/downgrading for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

5.2.4 EAL CU4 [CU4]

The intent of this EAL is to ensure that an emergency classification level is declared upon a loss of vital DC power that compromises the ability to monitor and control operable safety systems. This EAL is intended primarily to ensure that key licensee ERO members and OROs are aware of the event, resources necessary to respond to the event are mobilized, and any necessary compensatory measures are promptly implemented. The Alert, Site Area Emergency and General Emergency classification levels for a protracted loss of vital DC power are bounded by EALs CA1, CA3, CS1, CG1, RA1, RS1, and RG1.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, formatting, logical progression, and instrumentation and setpoints for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

5.2.5 EAL CU5 [CU5]

The intent of this EAL is to highlight the importance of emergency communications by ensuring that an emergency classification level is declared if normal communication methods for on-site and off-site personnel, or with OROs, including the NRC, are lost. This EAL is intended primarily to ensure that key licensee ERO members and OROs are aware of the loss of communications capabilities, the resources necessary to restore communications are mobilized, and compensatory measures are promptly implemented. Considering that a loss of emergency communications capability would not involve an actual or potential substantial degradation to the level of safety of the plant, no escalation path is necessary for this EAL.

The communication methods derived for this EAL are consistent with the overall EAL scheme development guidance.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, and logical progression for this EAL are consistent with the overall EAL scheme

development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

5.2.6 EAL CA6 [CA6]

The intent of this EAL is to ensure that an emergency classification level is declared when hazardous events lead to potential damage to safety systems. The hazardous events of interest include, but are not limited to, an earthquake, flooding, high winds, tornado strike, explosion, fire, or any other hazard applicable for the site. This EAL is intended primarily to ensure that the licensee's ERO is activated to support the control room in understanding the event impacts and restoring affected safety system equipment to service. Indications of hazard-induced damage to components containing radioactive materials are bounded by EALs CS1, CG1, RS1, and RG1.

As described in NEI 99-01, Revision 6, an Alert classification level exists when events are in process or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant. Any releases are expected to be limited to small fractions of the EPA early phase PAG exposure levels. The guidance in NEI 99-01, Revision 6, is intended to ensure that an Alert classification level should be declared only when an actual or potential substantial degradation of the level of safety of the plant has occurred because of a hazardous event. However, there may be cases where a hazardous event only causes damage to a single safety system component or a single safety system train. Additionally, an Alert classification level should not be declared if the damage from the hazardous event is limited to a safety system component or a safety system train that was inoperable or out of service prior to the event occurring.

The licensee proposed that an Alert classification level will be declared when a hazardous event results in indications of degraded performance to one train of a safety system with either indications of degraded performance on a second safety system train or visible damage to a second safety system train, such that the operability or reliability of the second safety system train is a concern. Although different from the guidance in NEI 99-01, Revision 6, this change is acceptable, considering that the guidance in NEI 99-01, Revision 6, is intended to ensure that an Alert classification level should be declared only when an actual or potential substantial degradation of the level of safety of the plant has occurred because of a hazardous event.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, and logical progression for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses

human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

5.3 Recognition Category 'E' – Independent Spent Fuel Storage Installation

5.3.1 EAL EU1 [E-HU1]

This EAL applies to an event that results in damage to the confinement boundary of a storage cask containing irradiated fuel. This EAL is intended primarily to ensure that key licensee ERO members and OROs are aware of the cask damage, resources necessary to respond to the event are mobilized, and protective measures, if warranted, are promptly implemented.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, and logical progression for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

5.4 Recognition Category 'F' – Fission Product Barrier Matrix

5.4.1 EAL Set FA1/FS1/FG1 [FA1/FS1/FG1]

The intent of this EAL set is to ensure that an emergency classification level is declared upon a loss or potential loss of one or more fission product barriers.

This EAL set uses plant condition-based thresholds as triggers within a particular logic configuration needed to reflect a loss or potential loss of a fission product barrier. Non-passive, large light-water reactors in the United States have three fission product barriers: fuel cladding, the RCS, and primary containment. Licensees are to develop thresholds that provide EAL decision-makers input into making an event declaration based upon degradation of one or more of these fission product barriers.

There are numerous triggers used as logic inputs to decide on the appropriate emergency classification level based upon the number of loss and/or potential loss indicators that are met for each barrier. These indicators are redundant with other similar indicators in Recognition Categories 'R' and 'M.'

The NRC staff verified that the logic used to determine the appropriate emergency classification level is consistent with the generic EAL scheme development guidance in NEI 99-01, Revision 6. The progression from an Alert to a General Emergency classification level is appropriate and consistent with EAL scheme development guidance.

- FA1 – This EAL addresses any loss or any potential loss of either the fuel clad or RCS barrier.
- FS1 – This EAL addresses loss or potential loss of any two barriers.
- FG1 – This EAL addresses loss of any two barriers and loss or potential loss of the third barrier.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, ease of upgrading/downgrading, and instrumentation and setpoints for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

5.5 Recognition Category 'H' – Hazards and Other Conditions Affecting Plant Safety

5.5.1 EAL Set HU1/HA1/HS1 [HU1/HA1/HS1/HG1]

The intent of this EAL set is to ensure that an emergency classification level is declared based upon a security-related event.

This EAL set was developed in accordance with the guidance from NRC Bulletin 2005-02 and RIS 2006-12 for licensees to implement, regardless of the specific version of the generic EAL scheme development guidance used, or if the licensee developed its EAL scheme using an alternative approach. Based upon lessons learned from the implementation and use of this EAL set, particularly the insights gained from combined security and emergency preparedness drills, Dominion proposed to not develop EAL HG1, as provided in NEI 99-01, Revision 6.

EAL HG1 of NEI 99-01, Revision 6, addresses a hostile action that results in the loss of physical control of the facility. Such an action can reasonably be expected to exceed EPA early phase PAG exposure levels off-site for more than the immediate site area, which is the criteria for EAL HG7 in NEI 99-01, Revision 6. Therefore, in NEI 99-01, Revision 6, EAL HG1 is bounded by EAL HG7. Additionally, any event that could result in a radiological release in excess of EPA early phase PAGs would be bounded by EALs RG1 [AG1] or RG2 [AG2] in NEI 99-01, Revision 6. The NRC staff verified that the Dominion EALs RG1, RG2, and HG7 bound the events addressed by EAL HG1 in NEI 99-01, Revision 6.

The NRC staff also verified that the progression from an Unusual Event to a Site Area Emergency classification level is appropriate and consistent with EAL scheme development guidance.

- HU1 – This EAL addresses events that pose a threat to plant personnel or safety system equipment.
- HA1 – This EAL addresses the occurrence of a hostile action within the Owner Controlled Area or notification of an aircraft attack threat.
- HS1 – This EAL addresses the occurrence of a hostile action within the Protected Area.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, and ease of upgrading/downgrading for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

5.5.2 EAL HU2 [HU2]

The intent of this EAL is to ensure that an emergency classification level is declared based upon a seismic event that results in accelerations at the site greater than specified for an operating basis earthquake. This EAL is intended primarily to ensure that key licensee ERO members and OROs are aware of the earthquake magnitude at the site and that post-event damage assessments are promptly implemented. This EAL is considered part of an EAL set containing EALs CA6 and MA9, depending on the operating mode applicable at the time of the event. Indications of earthquake-induced damage to components containing radioactive materials are bounded by Recognition Category 'F,' as well as EALs RA1, RS1, or RG1.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, and instrumentation and setpoints for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

5.5.3 EAL HU3 [HU3]

The intent of this EAL is to ensure that an emergency classification level is declared based upon the effects that natural or technological hazard events may have on the facility that are precursors to a more significant event or condition or have potential impacts that warrant emergency notification to local, State, and Federal authorities. Specific hazards addressed include:

- Tornado striking within the protected area;
- Internal room or area flooding requiring the electrical isolation of a safety system component;
- Movement of personnel within the protected area that is impeded due to an off-site event involving hazardous materials;
- A hazardous event that results in on-site conditions that are sufficient to prohibit the plant staff from accessing the site via personal vehicles; and
- Other site-specific events.

This EAL is intended primarily to ensure that key licensee ERO members and OROs are aware of the hazardous event affecting the site, and post-event damage assessments are promptly implemented. In addition, other site-specific events that may impact the effective implementation of the site emergency plan are considered.

This EAL is considered part of an EAL set containing EALs CA6 and MA9, depending on the operating mode applicable at the time of the event. Indications of hazard-induced damage to components containing radioactive materials are bounded by Recognition Category 'F,' as well as EALs RA1, RS1, or RG1.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, and logical progression for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The

NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

5.5.4 EAL HU4 [HU4]

The intent of this EAL is to ensure that an emergency classification level is declared based upon the effect that a fire may have on the facility, which would be indicative of a potential degradation of the level of safety of the plant. This EAL is intended primarily to ensure that key licensee ERO members and OROs are aware of the fire, and post-event damage assessments are promptly implemented. This EAL is considered part of an EAL set containing EALs CA6 and MA9, depending on the operating mode applicable at the time of the event. Indications of a protracted fire involving radioactive materials are bounded by Recognition Category 'F,' as well as EALs RS1 and RG1.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, and logical progression for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

5.5.5 EAL HA5 [HA5]

The intent of this EAL is to ensure that an emergency classification level is declared based upon the effect that toxic, corrosive, asphyxiating or flammable gases may have on the facility, which precludes or impedes access to equipment necessary to maintain normal plant operation or required for a normal plant cooldown and shutdown. This EAL is intended primarily to ensure that the licensee ERO is activated to support the control room in removing the impediment to normal access to the affected area or room. Indications of a protracted loss of access to equipment necessary for normal plant operations, cooldown, or shutdown are bounded by Recognition Category 'F,' as well as EALs RS1 and RG1.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, and formatting for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

5.5.6 EAL Set HA6/HS6 [HA6/HS6]

The intent of this EAL set is to ensure that an emergency classification level is declared based upon a control room evacuation with the inability to control critical plant systems remotely.

The NRC staff verified that the progression from an Alert to a Site Area Emergency classification level is appropriate and consistent with EAL scheme development guidance. A General Emergency classification level for this specific accident progression is bounded by Recognition Category 'F,' as well as EAL RG1.

- HA6 – This EAL addresses an evacuation of the control room that results in transfer of plant control to alternate locations outside the control room.
- HS6 – This EAL addresses an evacuation of the control room that results in transfer of plant control to alternate locations, and the control of a key safety function cannot be reestablished in a timely manner.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, and ease of upgrading/downgrading for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

5.5.7 EAL Set HU7/HA7/HS7/HG7 [HU7/HA7/HS7/HG7]

The intent of this EAL set is to provide decision-makers with an escalating emergency classification level path to consider when, in their judgment, entry into the site's emergency plan and mobilization of the ERO and ORO is warranted.

The NRC staff verified that the progression from an Unusual Event to a General Emergency classification level is appropriate and consistent with EAL scheme development guidance.

- HU7 – This EAL addresses unanticipated conditions not addressed explicitly elsewhere but, in the judgement of the Emergency Director, warrant declaration of an emergency due to conditions existing that are believed to fall under the emergency classification level description for an Unusual Event.
- HA7 – This EAL addresses unanticipated conditions not addressed explicitly elsewhere but, in the judgement of the Emergency Director, warrant declaration of an emergency due to conditions existing that are believed to fall under the emergency classification level description for an Alert.
- HS7 – This EAL addresses unanticipated conditions not addressed explicitly elsewhere but, in the judgement of the Emergency Director, warrant declaration of an emergency due to conditions existing that are believed to fall under the emergency classification level description for a Site Area Emergency.
- HG7 – This EAL addresses unanticipated conditions not addressed explicitly elsewhere but, in the judgement of the Emergency Director, warrant declaration of an emergency due to conditions existing that are believed to fall under the emergency classification level description for a General Emergency.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, and ease of upgrading/downgrading for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

5.6 Recognition Category 'M' – System Malfunction

5.6.1 EAL Set MU1/MA1/MS1/MG1 [SU1/SA1/SS1/SG1]

The intent of this EAL set is to ensure that an emergency classification level is declared based upon a loss of available AC power sources to the emergency busses.

The NRC staff reviewed the licensee's evaluation and justification for site-specific changes associated with this EAL set and verified that the progression from an Unusual Event to a General Emergency classification level is appropriate and consistent with EAL scheme development guidance.

- MU1 – This EAL addresses a prolonged loss of off-site AC power.
- MA1 – This EAL describes a significant degradation of off-site and on-site AC power sources such that any additional single failure would result in a loss of all AC power to safety systems.
- MS1 – This EAL addresses a loss of all AC power that compromises the performance of all safety systems requiring electric power, including those necessary for emergency core cooling, containment heat removal/pressure control, irradiated fuel heat removal, and the ultimate heat sink.
- MG1 – This EAL addresses a prolonged loss of all power sources to AC emergency busses.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, ease of upgrading/downgrading, and instrumentation and setpoints for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Dominion proposed to deviate from the guidance provided in NEI 99-01, Revision 6, by replacing the MG1 generic threshold condition of "restoration of at least one AC emergency bus in less than (site-specific hours) is not likely," with "long-term heat removal capability is not likely to be established and maintained per procedure." Dominion provides that current plant emergency operating procedures (EOPs) and associated support guidelines will restore or maintain core cooling and heat removal, containment, and spent fuel pool cooling capabilities even if AC power cannot be restored.

The EAL coping times were developed based on 10 CFR 50.63 "Loss of all alternating current power," Specifically, 10 CFR 50.63(a) "Requirements," states, in part, that station blackout duration shall be based on the following factors:

- i. The redundancy of the onsite emergency AC power sources;
- ii. The reliability of the onsite emergency AC power sources;
- iii. The expected frequency of loss of offsite power; and
- iv. The probable time needed to restore offsite power.

Considering that the above Requirements for determining station blackout duration [coping time] do not take credit for current plant capabilities and procedures, making a declaration based on the guidance provided by NEI 99-01, Revision 6, could result in the declaration of a general emergency based on exceeding coping times when long-term heat removal capability is likely to be established and maintained per procedure. This declaration would not be consistent with the NEI 99-01, Revision 6, definition of a general emergency which states, in part, that "events are in progress or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity." Additionally, the NRC staff finds that the proposed condition of "long-term heat removal capability is not likely to be established and maintained per procedure," is consistent with NEI 99-01, Revision 6, which provides that a general emergency should be declared pursuant to MG1 prior to meeting the thresholds for EAL FG1. As such, the NRC staff finds Dominion's proposed deviation for MG1 acceptable.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

5.6.2 EAL Set MU3/MA3 [SU2/SA2]

The intent of this EAL set is to ensure that an emergency classification level is declared based upon the effect that a loss of available indicators in the control room has on the facility.

The NRC staff verified that the progression from an Unusual Event to an Alert classification level is appropriate and consistent with EAL scheme development guidance. The Site Area Emergency and General Emergency classification levels for this specific accident progression are bounded by Recognition Category 'F,' as well as EALs RS1 and RG1.

- MU3 – This EAL addresses the difficulty associated with monitoring normal plant conditions without the ability to obtain safety system parameters from within the control room.
- MA3 – This EAL addresses the difficulty associated with monitoring rapidly changing plant conditions during a transient without the ability to obtain safety system parameters from within the control room.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, ease of upgrading/downgrading, and instrumentation and setpoints for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent

with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

5.6.3 EAL MU4 [SU3]

The intent of this EAL is to ensure that an emergency classification level is declared when RCS activity is greater than technical specification allowable limits. This EAL is intended primarily to ensure that key licensee ERO members are aware of the elevated reactor coolant activity and support the control room in implementation of appropriate response measures. Escalation from this emergency classification level is bounded by Recognition Category 'F,' as well as EALs RA1, RS1, and RG1.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, and instrumentation and setpoints for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

5.6.4 EAL MU5 [SU4]

The intent of this EAL is to ensure that an emergency classification level is declared when the plant has indications of RCS leakage. By design, the indications for this EAL are redundant to corresponding indicators for a loss or potential loss of fission product barriers, as well as radiation monitoring, to ensure reactor and/or fission product barrier events are recognized. This EAL is intended primarily to ensure that key licensee ERO members are aware of the RCS leakage and support the control room in implementation of appropriate response measures. Escalation from this emergency classification level is bounded by Recognition Category 'F,' as well as EALs RA1, RS1, and RG1.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic

EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, and instrumentation and setpoints for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

5.6.5 EAL Set MU6/MA6/MS6 [SU5/SA5/SS5]

The intent of this EAL set is to ensure that an emergency classification level is declared based upon the effect that a failure of the RPS may have on the plant.

The NRC staff verified that the progression from an Unusual Event to a Site Area Emergency classification level is appropriate and consistent with EAL scheme development guidance. A General Emergency classification level for this event is bounded by Recognition Category 'F,' as well as EAL RG1.

- MU6 – This EAL addresses a failure of the RPS to initiate or complete an automatic or manual reactor trip that results in a reactor shutdown, and either a subsequent operator manual action taken at the reactor control consoles or a subsequent automatic trip is successful in shutting down the reactor.
- MA6 – This EAL addresses a failure of the RPS to initiate or complete an automatic or manual reactor trip that results in a reactor shutdown, and subsequent operator manual actions taken at the reactor control consoles to shut down the reactor are also unsuccessful.
- MS6 – This EAL addresses a failure of the RPS to initiate or complete an automatic or manual reactor trip that results in a reactor shutdown, all subsequent operator actions to manually shut down the reactor are unsuccessful, and continued power generation is challenging the capability to adequately remove heat from the core and/or the RCS.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, ease of upgrading/downgrading, and instrumentation and setpoints for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in

Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

For the NAPS1/NAPS2 EAL schemes, the licensee chose to add the condition “as indicated by reactor power > 5%.” Considering that Dominion continues to use the Subcategory of “RPS Failure” and the Initiating condition of “Automatic or manual trip fails to shut down the reactor,” the NRC staff finds that adding the condition of reactor power being less than 5% to the condition of the reactor being shutdown is acceptable.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

5.6.6 EAL MU7 [SU6]

The intent of this EAL is to highlight the importance of emergency communications by ensuring that an emergency classification level is declared if normal communication methods for on-site and off-site personnel, or with OROs, including the NRC, are lost. This EAL is intended primarily to ensure that key licensee ERO members, OROs, and the NRC are aware of the loss of communication capabilities, the resources necessary to restore communications are mobilized, and compensatory measures are promptly implemented. Considering that a loss of emergency communications capability would not involve an actual or potential substantial degradation to the level of safety of the plant, no escalation path is necessary for this EAL.

The communication methods derived for this EAL are consistent with the overall EAL scheme development guidance.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, and logical progression for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

5.6.7 EAL MU8 [SU7]

The intent of this EAL is to ensure that an emergency classification level is declared when the plant has indications of containment barrier degradation. It also addresses an event that results in high containment pressure with a concurrent failure of containment pressure control systems. The indications for this EAL are redundant to corresponding indicators from a loss or potential

loss of fission product barriers, as well as radiation monitoring, to ensure reactor and/or fission product barrier events are recognized.

This EAL is intended primarily to ensure that key licensee ERO members, OROs, and the NRC are aware of significant challenges to containment integrity, and compensatory measures are promptly implemented. Escalation is bounded by Recognition Category 'F', as well as EALs RA1, RS1, and RG1.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, and instrumentation and setpoints for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are therefore consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

5.6.8 EAL Set MS2/MG1 [SS8/SG8]

The intent of this EAL set is to ensure that an emergency classification level is declared when a loss of DC power occurs, as this condition compromises the ability of the licensee to monitor and control safety systems.

The NRC staff verified that the progression from a Site Area Emergency to a General Emergency classification level is appropriate and consistent with EAL scheme development guidance.

- MS2 – This EAL addresses a loss of vital DC power that compromises the ability to monitor and control safety systems.
- MG1 – This EAL addresses a concurrent and prolonged loss of both AC and vital DC power.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, ease of upgrading/downgrading, and instrumentation and setpoints for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in

Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

5.6.9 EAL MA9 [SA9]

The intent of this EAL is to ensure that an emergency classification level is declared when hazardous events lead to potential damage to safety systems needed for the current operating mode. The hazardous events of interest include, but are not limited to, an earthquake, flooding, high winds, tornado strike, explosion, fire, or any other hazard applicable for North Anna. This EAL is intended primarily to ensure that the licensee's ERO is activated to support the control room in understanding the event impacts and restoring affected safety system equipment to service. Indications of hazard-induced damage to components containing radioactive materials are bounded by Recognition Category 'F,' as well as EALs RS1 and RG1.

As described in NEI 99-01, Revision 6, an Alert classification level exists when events are in process or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant. Any releases are expected to be limited to small fractions of the EPA early phase PAG exposure levels. The guidance in NEI 99-01, Revision 6, is intended to ensure that an Alert classification level should be declared only when an actual or potential substantial degradation of the level of safety of the plant has occurred because of a hazardous event. However, there may be cases where a hazardous event only causes damage to a single safety system component or a single safety system train. Additionally, an Alert classification level should not be declared if the damage from the hazardous event is limited to a safety system component or a safety system train that was inoperable or out of service prior to the event occurring.

The licensee proposed that an Alert classification level be declared when a hazardous event results in indications of degraded performance to one train of a safety system with either indications of degraded performance on a second safety system train or visible damage to a second safety system train, such that the operability or reliability of the second safety system train is a concern. Although different from the guidance in NEI 99-01, Revision 6, this change is acceptable, considering that the guidance in NEI 99-01, Revision 6, is intended to ensure that an Alert classification level should be declared only when an actual or potential substantial degradation of the level of safety of the plant has occurred because of a hazardous event.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, and instrumentation and setpoints for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG 0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

5.7 Review Summary

The NRC staff has reviewed the technical bases for the proposed EAL scheme; the modifications from NEI 99-01, Revision 6, and the licensee's evaluation of the proposed changes. The licensee chose to modify its proposed EAL scheme from the generic EAL scheme development guidance provided in NEI 99-01, Revision 6, to adopt a format that is better aligned with how it currently implements its EALs, as well as with site-specific writer's guides and preferences. The NRC staff verified that these modifications do not alter the intent of any specific EAL within a set, recognition category, or within the entire EAL scheme described in NEI 99-01, Revision 6. Thus, the proposed changes meet the requirements in Appendix E to 10 CFR Part 50 and planning standard 10 CFR 50.47(b)(4).

The NRC staff determined that the proposed EAL scheme uses objective and observable values, is worded in a manner that addresses human factors engineering and user-friendliness concerns, follows logical progressions for escalating events, and allows for event downgrading and upgrading based upon the potential risk to the public health and safety. Risk assessments were appropriately used to set the boundaries of the emergency classification levels and ensure that all EALs that trigger an emergency classification are in the same range of relative risk. In addition, the NRC staff determined that the proposed EAL scheme is technically complete and consistent with EAL schemes implemented at similarly designed plants.

The NRC staff verified that the instrumentation and setpoints derived for this proposed EAL scheme are consistent with the overall EAL scheme development guidance, address the site-specific implementation strategies provided, and are consistent with a standard EAL scheme.

Based on the above, the NRC staff finds that the licensee's proposed EAL scheme is acceptable and provides reasonable assurance that the licensee can and will take adequate protective measures in the event of a radiological emergency. Specifically, the staff concludes that the licensee's proposed EAL scheme and site-specific EAL technical basis document provided by letter dated January 4, 2019, as supplemented by letters dated August 29 and October 30, 2019, is acceptable for implementation.

6.0 TECHNICAL EVALUATION FOR SURRY UNIT NOS. 1 AND 2 (SPS1 / SPS2)

6.1 Recognition Category 'R' – Abnormal Radiation Levels/Radiological Effluent

6.1.1 EAL Set RU1/RA1/RS1/RG1 [AU1/AA1/AS1/AG1]

The intent of this EAL set is to ensure that an emergency classification level is declared upon site-specific indications of a release of radioactivity (gaseous or liquid). In recognition of the lower possible radioactivity concentrations, the assessment of liquid releases is limited to the Unusual Event and Alert classification levels. This set provides for accident assessments using pre-calculated values based on assumed conditions, real-time parameters, and field monitoring results.

The NRC staff verified that the progression from an Unusual Event to a General Emergency classification level is appropriate and consistent with EAL scheme development guidance.

- RU1 – This EAL addresses a potential decrease in the level of safety of the plant as indicated by a low-level radiological release that exceeds regulatory commitments for an extended period (e.g., an uncontrolled release).
- RA1 – This EAL addresses a release of gaseous or liquid radioactivity that results in projected or actual off-site doses greater than or equal to 1 percent of the EPA early phase PAGs.
- RS1 – This EAL addresses a release of gaseous radioactivity that results in projected or actual off-site doses greater than or equal to 10 percent of the EPA early phase PAGs.
- RG1 – This EAL addresses a release of gaseous radioactivity that results in projected or actual off-site doses greater than or equal to the EPA early phase PAGs.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, ease of upgrading/downgrading, and instrumentation and setpoints for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

In its supplemental letter dated August 29, 2019, Dominion verified that using setpoints based on two times the ODCM limits for North Anna Radiation Monitor GW-RM-178 and Surry Radiation Monitor GW-RM-170 would result in Unusual Event calculated values that are greater than the Alert EAL threshold values. Additionally, other detectors did not provide a factor of 10 separation from the Alert EAL threshold. Because of the above issues associated with GW-RM-178 and GW-RM-170, the licensee proposed to use allocated ODCM limits as a threshold value where an allocation factor will be determined by maintaining a release rate at least an order of magnitude lower than corresponding Alert release rates for all Dominion sites. The licensee further provided that this approach is the basis of the current Surry EAL scheme. Considering that the proposed methodology provides ODCM based setpoints that provide adequate discrimination between an Unusual Event and an Alert that is consistent with the currently approved Surry EAL scheme, the NRC staff finds this change to be acceptable.

The NRC staff has reviewed the proposed removal of the main steam radiation monitors from their respective effluent monitor threshold tables. Considering that the main steam radiation monitors are not effluent monitors and that a steam generator tube leak would be bounded by

the fission product barrier and off-site dose assessment or field monitoring, the NRC staff finds this change to be acceptable.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

6.1.2 EAL Set RU2/RA2/RS2/RG2 [AU2/AA2/AS2/AG2]

The intent of this EAL set is to ensure that an emergency classification level is declared upon site-specific indications of potential or actual damage to an irradiated fuel assembly or multiple assemblies. It addresses a lowering of water level over irradiated fuel or fuel uncover (i.e., level below the top of the fuel), a spectrum of fuel handling accidents that result in mechanical damage to irradiated fuel (e.g., a dropped fuel assembly). Some of these EALs rely on the SFP water level instrumentation required by NRC Order EA-12-051.

The NRC staff has verified that the progression from an Unusual Event to a General Emergency classification level is appropriate and consistent with EAL scheme development guidance.

- RU2 – This EAL addresses a decrease in water level above irradiated fuel that causes elevated radiation levels.
- RA2 – This EAL addresses events that have caused imminent or actual damage to an irradiated fuel assembly or a significant lowering of water level within the SFP.
- RS2 – This EAL addresses a significant loss of SFP water inventory control and makeup capability leading to imminent fuel damage and addresses NRC Order EA-12-051.
- RG2 – This EAL addresses a significant loss of SFP water inventory control and makeup capability leading to a prolonged uncover of irradiated fuel and addresses NRC Order EA-12-051.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, ease of upgrading/downgrading, and instrumentation and setpoints for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in

Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

6.1.3 EAL RA3 [AA3]

The intent of this EAL is to ensure that an emergency classification level is declared when elevated radiation levels in certain plant rooms and areas are enough to preclude or impede personnel from performing actions necessary to maintain normal plant operation or to perform a normal plant cooldown and shutdown. This includes equipment in the control room and the central alarm station. The Alert classification level is intended primarily to ensure that the licensee's ERO is activated to support the control room in removing the impediment to normal access, as well as assisting in quantifying potential damage to the fuel. Indications of increasing radiation levels in the plant are bounded by Recognition Category 'F,' as well as EALs RS1 and RG1.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, and instrumentation and setpoints for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

6.2 Recognition Category 'C' – Cold Shutdown/Refueling System Malfunction

6.2.1 EAL Set CU1/CA1/CS1/CG1 [CU1/CA1/CS1/CG1]

The intent of this EAL set is to ensure an emergency classification level is declared upon a loss of RPV inventory and/or RCS leakage.

The NRC staff verified that the progression from an Unusual Event to a General Emergency classification level is appropriate and consistent with EAL scheme development guidance.

- CU1 – This EAL addresses the inability to restore and maintain water level to a required minimum level (or the lower limit of a level band) or a loss of the ability to monitor RPV/RCS level concurrent with indications of reactor coolant leakage.
- CA1 – This EAL addresses conditions that are precursors to a loss of the ability to adequately cool irradiated fuel in the RPV/RCS (i.e., a precursor to a challenge to the fuel clad barrier).

- CS1 – This EAL addresses a significant and prolonged loss of RPV/RCS inventory control and makeup capability leading to imminent fuel damage.
- CG1 – This EAL addresses the inability to restore and maintain RPV/RCS level above the top of active fuel with containment challenged.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, ease of upgrading/downgrading, and instrumentation and setpoints for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

6.2.2 EAL Set CU2/CA2 [CU2/CA2]

The intent of this EAL set is to ensure that an emergency classification level is declared upon a loss of available AC power to emergency power electrical busses.

The NRC staff verified that the progression from an Unusual Event to an Alert classification level is appropriate and consistent with EAL scheme development guidance. The Site Area Emergency and General Emergency classification levels for this specific accident progression are bounded by EALs RS1 and RG1.

- CU2 – This EAL describes a significant degradation of off-site and on-site AC power sources such that any additional single failure would result in a loss of all AC power to safety systems.
- CA2 – This EAL addresses a loss of all AC power that compromises the performance of all safety systems requiring electric power, including those necessary for emergency core cooling, containment heat removal/pressure control, irradiated fuel heat removal, and the ultimate heat sink.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, and ease of upgrading/downgrading for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an

unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

6.2.3 EAL Set CU3/CA3 [CU3/CA3]

The intent of this EAL set is to ensure that an emergency classification level is declared based on the inability to maintain control of decay heat removal.

The NRC staff verified that the progression from an Unusual Event to an Alert classification level is appropriate and consistent with EAL scheme development guidance. The progression to a Site Area Emergency and/or a General Emergency classification level is bounded by EALs RS1 and RG1.

- CU3 – This EAL addresses an unplanned increase in RCS temperature above the technical specification cold shutdown temperature limit or the inability to determine RCS temperature and level.
- CA3 – This EAL addresses conditions involving a loss of decay heat removal capability or an addition of heat to the RCS in excess of that which can currently be removed.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, and ease of upgrading/downgrading for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

6.2.4 EAL CU4 [CU4]

The intent of this EAL is to ensure that an emergency classification level is declared upon a loss of vital DC power that compromises the ability to monitor and control operable safety systems. This EAL is intended primarily to ensure that key licensee ERO members and OROs are aware of the event, resources necessary to respond to the event are mobilized, and any necessary

compensatory measures are promptly implemented. The Alert, Site Area Emergency, and General Emergency classification levels for a protracted loss of vital DC power are bounded by EALs CA1, CA3, CS1, CG1, RA1, RS1, and RG1.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, formatting, logical progression, and instrumentation and setpoints for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

6.2.5 EAL CU5 [CU5]

The intent of this EAL is to highlight the importance of emergency communications by ensuring that an emergency classification level is declared if normal communication methods for on-site and off-site personnel, or with OROs, including the NRC, are lost. This EAL is intended primarily to ensure that key licensee ERO members and OROs are aware of the loss of communications capabilities, the resources necessary to restore communications are mobilized, and compensatory measures are promptly implemented. Considering that a loss of emergency communications capability would not involve an actual or potential substantial degradation to the level of safety of the plant, no escalation path is necessary for this EAL.

The communication methods derived for this EAL are consistent with the overall EAL scheme development guidance.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, and logical progression for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

6.2.6 EAL CA6 [CA6]

The intent of this EAL is to ensure that an emergency classification level is declared when hazardous events lead to potential damage to safety systems. The hazardous events of interest include, but are not limited to, an earthquake, flooding, high winds, tornado strike, explosion, fire, or any other hazard applicable for the site. This EAL is intended primarily to ensure that the licensee's ERO is activated to support the control room in understanding the event impacts and restoring affected safety system equipment to service. Indications of hazard-induced damage to components containing radioactive materials are bounded by EALs CS1, CG1, RS1, and RG1.

As described in NEI 99-01, Revision 6, an Alert classification level exists when events are in process or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant. Any releases are expected to be limited to small fractions of the EPA early phase PAG exposure levels. The guidance in NEI 99-01, Revision 6, is intended to ensure that an Alert classification level should be declared only when an actual or potential substantial degradation of the level of safety of the plant has occurred because of a hazardous event. However, there may be cases where a hazardous event only causes damage to a single safety system component or a single safety system train. Additionally, an Alert classification level should not be declared if the damage from the hazardous event is limited to a safety system component or a safety system train that was inoperable or out of service prior to the event occurring.

The licensee proposed that an Alert classification level will be declared when a hazardous event results in indications of degraded performance to one train of a safety system with either indications of degraded performance on a second safety system train or visible damage to a second safety system train, such that the operability or reliability of the second safety system train is a concern. Although different from the guidance in NEI 99-01, Revision 6, this change is acceptable, considering that the guidance in NEI 99-01, Revision 6, is intended to ensure that an Alert classification level should be declared only when an actual or potential substantial degradation of the level of safety of the plant has occurred because of a hazardous event.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, and logical progression for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

6.3 Recognition Category 'E' – Independent Spent Fuel Storage Installation

6.3.1 EAL EU1 [E-HU1]

This EAL applies to an event that results in damage to the confinement boundary of a storage cask containing irradiated fuel. This EAL is intended primarily to ensure that key licensee ERO members and OROs are aware of the cask damage, resources necessary to respond to the event are mobilized, and protective measures, if warranted, are promptly implemented.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, and logical progression for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

6.4 Recognition Category 'F' – Fission Product Barrier Matrix

6.4.1 EAL Set FA1/FS1/FG1 [FA1/FS1/FG1]

The intent of this EAL set is to ensure that an emergency classification level is declared upon a loss or potential loss of one or more fission product barriers.

This EAL set uses plant condition-based thresholds as triggers within a particular logic configuration needed to reflect a loss or potential loss of a fission product barrier. Non-passive, large light-water reactors in the United States have three fission product barriers: fuel cladding, the RCS, and primary containment. Licensees are to develop thresholds that provide EAL decision-makers input into making an event declaration based upon degradation of one or more of these fission product barriers.

There are numerous triggers used as logic inputs to decide on the appropriate emergency classification level based upon the number of loss and/or potential loss indicators that are met for each barrier. These indicators are redundant with other similar indicators in Recognition Categories 'R' and 'M.'

The NRC staff verified that the logic used to determine the appropriate emergency classification level is consistent with the generic EAL scheme development guidance in NEI 99-01, Revision 6. The progression from an Alert to a General Emergency classification level is appropriate and consistent with EAL scheme development guidance.

- FA1 – This EAL addresses any loss or any potential loss of either the fuel clad or RCS barrier.
- FS1 – This EAL addresses loss or potential loss of any two barriers.
- FG1 – This EAL addresses loss of any two barriers and loss or potential loss of the third barrier.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, ease of upgrading/downgrading, and instrumentation and setpoints for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

6.5 Recognition Category 'H' – Hazards and Other Conditions Affecting Plant Safety

6.5.1 EAL Set HU1/HA1/HS1 [HU1/HA1/HS1/HG1]

The intent of this EAL set is to ensure that an emergency classification level is declared based upon a security-related event.

This EAL set was developed in accordance with the guidance from NRC Bulletin 2005-02 and RIS 2006-12 for licensees to implement, regardless of the specific version of the generic EAL scheme development guidance used, or if the licensee developed its EAL scheme using an alternative approach. Based upon lessons learned from the implementation and use of this EAL set, particularly the insights gained from combined security and emergency preparedness drills, Dominion proposed to not develop EAL HG1, as provided in NEI 99-01, Revision 6.

EAL HG1 of NEI 99-01, Revision 6, addresses a hostile action that results in the loss of physical control of the facility. Such an action can reasonably be expected to exceed EPA early phase PAG exposure levels off-site for more than the immediate site area, which is the criteria for EAL HG7 in NEI 99-01, Revision 6. Therefore, in NEI 99-01, Revision 6, EAL HG1 is bounded by EAL HG7. Additionally, any event that could result in a radiological release in excess of EPA early phase PAGs would be bounded by EALs RG1 [AG1] or RG2 [AG2] in NEI 99-01, Revision 6. The NRC staff verified that the Dominion EALs RG1, RG2, and HG7 bound the events addressed by EAL HG1 in NEI 99-01, Revision 6.

The NRC staff also verified that the progression from an Unusual Event to a Site Area Emergency classification level is appropriate and consistent with EAL scheme development guidance.

- HU1 – This EAL addresses events that pose a threat to plant personnel or safety system equipment.
- HA1 – This EAL addresses the occurrence of a hostile action within the Owner Controlled Area or notification of an aircraft attack threat.
- HS1 – This EAL addresses the occurrence of a hostile action within the Protected Area.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, and ease of upgrading/downgrading for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

6.5.2 EAL HU2 [HU2]

The intent of this EAL is to ensure that an emergency classification level is declared based upon a seismic event that results in accelerations at the site greater than specified for an operating basis earthquake. This EAL is intended primarily to ensure that key licensee ERO members and OROs are aware of the earthquake magnitude at the site and that post-event damage assessments are promptly implemented. This EAL is considered part of an EAL set containing EALs CA6 and MA9, depending on the operating mode applicable at the time of the event. Indications of earthquake-induced damage to components containing radioactive materials are bounded by Recognition Category 'F,' as well as EALs RA1, RS1, or RG1.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, and instrumentation and setpoints for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues

regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

6.5.3 EAL HU3 [HU3]

The intent of this EAL is to ensure that an emergency classification level is declared based upon the effects that natural or technological hazard events may have on the facility that are precursors to a more significant event or condition or have potential impacts that warrant emergency notification to local, State, and Federal authorities. Specific hazards addressed include:

- Tornado striking within the protected area;
- Internal room or area flooding requiring the electrical isolation of a safety system component;
- Movement of personnel within the protected area that is impeded due to an off-site event involving hazardous materials;
- A hazardous event that results in on-site conditions that are sufficient to prohibit the plant staff from accessing the site via personal vehicles; and
- Other site-specific events.

This EAL is intended primarily to ensure that key licensee ERO members and OROs are aware of the hazardous event affecting the site, and post-event damage assessments are promptly implemented. In addition, other site-specific events that may impact the effective implementation of the site emergency plan are considered.

This EAL is considered part of an EAL set containing EALs CA6 and MA9, depending on the operating mode applicable at the time of the event. Indications of hazard-induced damage to components containing radioactive materials are bounded by Recognition Category 'F,' as well as EALs RA1, RS1, or RG1.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, and logical progression for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in

Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

6.5.4 EAL HU4 [HU4]

The intent of this EAL is to ensure that an emergency classification level is declared based upon the effect that a fire may have on the facility, which would be indicative of a potential degradation of the level of safety of the plant. This EAL is intended primarily to ensure that key licensee ERO members and OROs are aware of the fire, and post-event damage assessments are promptly implemented. This EAL is considered part of an EAL set containing EALs CA6 and MA9, depending on the operating mode applicable at the time of the event. Indications of a protracted fire involving radioactive materials are bounded by Recognition Category 'F,' as well as EALs RS1 and RG1.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, and logical progression for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

6.5.5 EAL HA5 [HA5]

The intent of this EAL is to ensure that an emergency classification level is declared based upon the effect that toxic, corrosive, asphyxiating, or flammable gases may have on the facility, which precludes or impedes access to equipment necessary to maintain normal plant operation or is required for a normal plant cooldown and shutdown. This EAL is intended primarily to ensure that the licensee ERO is activated to support the control room in removing the impediment to normal access to the affected area or room. Indications of a protracted loss of access to equipment necessary for normal plant operations, cooldown, or shutdown are bounded by Recognition Category 'F,' as well as EALs RS1 and RG1.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, and formatting for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level,

addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

6.5.6 EAL Set HA6/HS6 [HA6/HS6]

The intent of this EAL set is to ensure that an emergency classification level is declared based upon a control room evacuation with the inability to control critical plant systems remotely.

The NRC staff verified that the progression from an Alert to a Site Area Emergency classification level is appropriate and consistent with EAL scheme development guidance. A General Emergency classification level for this specific accident progression is bounded by Recognition Category 'F,' as well as EAL RG1.

- HA6 – This EAL addresses an evacuation of the control room that results in transfer of plant control to alternate locations outside the control room.
- HS6 – This EAL addresses an evacuation of the control room that results in transfer of plant control to alternate locations, and the control of a key safety function cannot be reestablished in a timely manner.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, and ease of upgrading/downgrading for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

6.5.7 EAL Set HU7/HA7/HS7/HG7 [HU7/HA7/HS7/HG7]

The intent of this EAL set is to provide decision-makers with an escalating emergency classification level path to consider when, in their judgment, entry into the site's emergency plan and mobilization of the ERO and ORO is warranted.

The NRC staff verified that the progression from an Unusual Event to a General Emergency classification level is appropriate and consistent with EAL scheme development guidance.

- HU7 – This EAL addresses unanticipated conditions not addressed explicitly elsewhere but, in the judgement of the Emergency Director, warrant declaration of an emergency due to conditions existing that are believed to fall under the emergency classification level description for an Unusual Event.
- HA7 – This EAL addresses unanticipated conditions not addressed explicitly elsewhere but, in the judgement of the Emergency Director, warrant declaration of an emergency due to conditions existing that are believed to fall under the emergency classification level description for an Alert.
- HS7 – This EAL addresses unanticipated conditions not addressed explicitly elsewhere but, in the judgement of the Emergency Director, warrant declaration of an emergency due to conditions existing that are believed to fall under the emergency classification level description for a Site Area Emergency.
- HG7 – This EAL addresses unanticipated conditions not addressed explicitly elsewhere but, in the judgement of the Emergency Director, warrant declaration of an emergency due to conditions existing that are believed to fall under the emergency classification level description for a General Emergency.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, and ease of upgrading/downgrading for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

6.6 Recognition Category 'M' – System Malfunction

6.6.1 EAL Set MU1/MA1/MS1/MG1 [SU1/SA1/SS1/SG1]

The intent of this EAL set is to ensure that an emergency classification level is declared based upon a loss of available AC power sources to the emergency busses.

The NRC staff reviewed the licensee's evaluation and justification for site-specific changes associated with this EAL set and verified that the progression from an Unusual Event to a General Emergency classification level is appropriate and consistent with EAL scheme development guidance.

- MU1 – This EAL addresses a prolonged loss of off-site AC power.

- MA1 – This EAL describes a significant degradation of off-site and on-site AC power sources such that any additional single failure would result in a loss of all AC power to safety systems.
- MS1 – This EAL addresses a loss of all AC power that compromises the performance of all safety systems requiring electric power, including those necessary for emergency core cooling, containment heat removal/pressure control, irradiated fuel heat removal, and the ultimate heat sink.
- MG1 – This EAL addresses a prolonged loss of all power sources to AC emergency busses.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, ease of upgrading/downgrading, and instrumentation and setpoints for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Dominion proposed to deviate from the guidance provided in NEI 99-01, Revision 6, by replacing the MG1 generic threshold condition of “restoration of at least one AC emergency bus in less than (site-specific hours) is not likely,” with “long-term heat removal capability is not likely to be established and maintained per procedure.” Dominion provides that current plant emergency operating procedures (EOPs) and associated support guidelines will restore or maintain core cooling and heat removal, containment, and spent fuel pool cooling capabilities even if AC power cannot be restored.

The EAL coping times were developed based on 10 CFR 50.63 “Loss of all alternating current power.” Specifically, 10 CFR 50.63(a) “Requirements,” states, in part, that station blackout duration shall be based on the following factors:

- i. The redundancy of the onsite emergency AC power sources;
- ii. The reliability of the onsite emergency AC power sources;
- iii. The expected frequency of loss of offsite power; and
- iv. The probable time needed to restore offsite power.

Considering that the above Requirements for determining station blackout duration (i.e., coping time) do not take credit for current plant capabilities and procedures, making a declaration based on the guidance provided by NEI 99-01, Revision 6, could result in the declaration of a general emergency based on exceeding coping times when long-term heat removal capability is likely to be established and maintained per procedure. This declaration would not be consistent with the NEI 99-01, Revision 6, definition of a general emergency which states, in part, that “events are in progress or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity.” Additionally, the NRC

staff finds that the proposed condition of “long-term heat removal capability is not likely to be established and maintained per procedure,” is consistent with NEI 99-01, Revision 6, which provides that a general emergency should be declared pursuant to MG1 prior to meeting the thresholds for EAL FG1. As such, the NRC staff finds Dominion’s proposed deviation for MG1 acceptable.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

6.6.2 EAL Set MU3/MA3 [SU2/SA2]

The intent of this EAL set is to ensure that an emergency classification level is declared based upon the effect that a loss of available indicators in the control room has on the facility.

The NRC staff verified that the progression from an Unusual Event to an Alert classification level is appropriate and consistent with EAL scheme development guidance. The Site Area Emergency and General Emergency classification levels for this specific accident progression are bounded by Recognition Category ‘F,’ as well as EALs RS1 and RG1.

- MU3 – This EAL addresses the difficulty associated with monitoring normal plant conditions without the ability to obtain safety system parameters from within the control room.
- MA3 – This EAL addresses the difficulty associated with monitoring rapidly changing plant conditions during a transient without the ability to obtain safety system parameters from within the control room.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, ease of upgrading/downgrading, and instrumentation and setpoints for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

6.6.3 EAL MU4 [SU3]

The intent of this EAL is to ensure that an emergency classification level is declared when RCS activity is greater than technical specification allowable limits. This EAL is intended primarily to

ensure that key licensee ERO members are aware of the elevated reactor coolant activity and support the control room in implementation of appropriate response measures. Escalation from this emergency classification level is bounded by Recognition Category 'F,' as well as EALs RA1, RS1, and RG1.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, and instrumentation and setpoints for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

6.6.4 EAL MU5 [SU4]

The intent of this EAL is to ensure that an emergency classification level is declared when the plant has indications of RCS leakage. By design, the indications for this EAL are redundant to corresponding indicators for a loss or potential loss of fission product barriers, as well as radiation monitoring, to ensure reactor and/or fission product barrier events are recognized. This EAL is intended primarily to ensure that key licensee ERO members are aware of the RCS leakage and support the control room in implementation of appropriate response measures. Escalation from this emergency classification level is bounded by Recognition Category 'F,' as well as EALs RA1, RS1, and RG1.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, and instrumentation and setpoints for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

6.6.5 EAL Set MU6/MA6/MS6 [SU5/SA5/SS5]

The intent of this EAL set is to ensure that an emergency classification level is declared based upon the effect that a failure of RPS may have on the plant.

The NRC staff verified that the progression from an Unusual Event to a Site Area Emergency classification level is appropriate and consistent with EAL scheme development guidance. A General Emergency classification level for this event is bounded by Recognition Category 'F,' as well as EAL RG1.

- MU6 – This EAL addresses a failure of the RPS to initiate or complete an automatic or manual reactor trip that results in a reactor shutdown, and either a subsequent operator manual action taken at the reactor control consoles or a subsequent automatic trip is successful in shutting down the reactor.
- MA6 – This EAL addresses a failure of the RPS to initiate or complete an automatic or manual reactor trip that results in a reactor shutdown, and subsequent operator manual actions taken at the reactor control consoles to shut down the reactor are also unsuccessful.
- MS6 – This EAL addresses a failure of the RPS to initiate or complete an automatic or manual reactor trip that results in a reactor shutdown, all subsequent operator actions to manually shut down the reactor are unsuccessful, and continued power generation is challenging the capability to adequately remove heat from the core and/or the RCS.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, ease of upgrading/downgrading, and instrumentation and setpoints for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

For the SPS1/SPS2 EAL schemes, the licensee chose to add the condition “as indicated by reactor power > 5%.” Considering that Dominion continues to use the Subcategory of “RPS Failure” and the Initiating condition of “Automatic or manual trip fails to shut down the reactor,” the NRC staff finds that adding the condition of reactor power being less than 5% to the condition of the reactor being shutdown is acceptable.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

6.6.6 EAL MU7 [SU6]

The intent of this EAL is to highlight the importance of emergency communications by ensuring that an emergency classification level is declared if normal communication methods for on-site and off-site personnel, or with OROs, including the NRC, are lost. This EAL is intended primarily to ensure that key licensee ERO members, OROs, and the NRC are aware of the loss of communication capabilities, the resources necessary to restore communications are mobilized, and compensatory measures are promptly implemented. Considering that a loss of emergency communications capability would not involve an actual or potential substantial degradation to the level of safety of the plant, no escalation path is necessary for this EAL.

The communication methods derived for this EAL are consistent with the overall EAL scheme development guidance.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, and logical progression for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

6.6.7 EAL MU8 [SU7]

The intent of this EAL is to ensure that an emergency classification level is declared when the plant has indications of containment barrier degradation. It also addresses an event that results in high containment pressure with a concurrent failure of containment pressure control systems. The indications for this EAL are redundant to corresponding indicators from a loss or potential loss of fission product barriers, as well as radiation monitoring, to ensure reactor and/or fission product barrier events are recognized.

This EAL is intended primarily to ensure that key licensee ERO members, OROs, and the NRC are aware of significant challenges to containment integrity, and compensatory measures are promptly implemented. Escalation is bounded by Recognition Category 'F', as well as EALs RA1, RS1, and RG1.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, and instrumentation and setpoints for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are therefore consistent with a standard EAL scheme,

as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns; is technically complete for this emergency classification level; addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

6.6.8 EAL Set MS2/MG1 [SS8/SG8]

The intent of this EAL set is to ensure that an emergency classification level is declared when a loss of DC power occurs, as this condition compromises the ability of the licensee to monitor and control safety systems.

The NRC staff verified that the progression from a Site Area Emergency to a General Emergency classification level is appropriate and consistent with EAL scheme development guidance.

- MS2 – This EAL addresses a loss of vital DC power that compromises the ability to monitor and control safety systems.
- MG1 – This EAL addresses a concurrent and prolonged loss of both AC and vital DC power.

The licensee chose to modify this EAL set by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, ease of upgrading/downgrading, and instrumentation and setpoints for this EAL set are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL set is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for each emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG-0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL set is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL set acceptable.

6.6.9 EAL MA9 [SA9]

The intent of this EAL is to ensure that an emergency classification level is declared when hazardous events lead to potential damage to safety systems needed for the current operating mode. The hazardous events of interest include, but are not limited to, an earthquake, flooding, high winds, tornado strike, explosion, fire, or any other hazard applicable for Surry. This EAL is

intended primarily to ensure that the licensee ERO is activated to support the control room in understanding the event impacts and restoring affected safety system equipment to service. Indications of hazard-induced damage to components containing radioactive materials are bounded by Recognition Category 'F,' as well as EALs RS1 and RG1.

As described in NEI 99-01, Revision 6, an Alert classification level exists when events are in process or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant. Any releases are expected to be limited to small fractions of the EPA early phase PAG exposure levels. The guidance in NEI 99-01, Revision 6, is intended to ensure that an Alert classification level should be declared only when an actual or potential substantial degradation of the level of safety of the plant has occurred because of a hazardous event. However, there may be cases where a hazardous event only causes damage to a single safety system component or a single safety system train. Additionally, an Alert classification level should not be declared if the damage from the hazardous event is limited to a safety system component or a safety system train that was inoperable or out of service prior to the event occurring.

The licensee proposed that an Alert classification level be declared when a hazardous event results in indications of degraded performance to one train of a safety system with either indications of degraded performance on a second safety system train or visible damage to a second safety system train, such that the operability or reliability of the second safety system train is a concern. Although different from the guidance in NEI 99-01, Revision 6, this change is acceptable, considering that the guidance in NEI 99-01, Revision 6, is intended to ensure that an Alert classification level should be declared only when an actual or potential substantial degradation of the level of safety of the plant has occurred because of a hazardous event.

The licensee chose to modify this EAL by using a site-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The NRC staff verified that the numbering, sequencing, formatting, logical progression, and instrumentation and setpoints for this EAL are consistent with the overall EAL scheme development guidance and address the site-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4). The NRC staff also verified that the EAL is worded in an unambiguous manner that addresses human factors engineering and user-friendliness concerns, is technically complete for this emergency classification level, addresses issues regarding completeness and accuracy raised in Appendix 1 to NUREG 0654, and uses objective and observable values based on site-specific indications.

Based on the above, the NRC staff concludes that the site-specific implementation method for this EAL is consistent with the key characteristics of an effective EAL scheme (identified in Section 2.3 above) and meets the requirements of 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

6.7 Review Summary

The NRC staff has reviewed the technical bases for the proposed EAL scheme; the modifications from NEI 99-01, Revision 6, and the licensee's evaluation of the proposed changes. The licensee chose to modify its proposed EAL scheme from the generic EAL scheme development guidance provided in NEI 99-01, Revision 6, to adopt a format that is better aligned with how it currently implements its EALs, as well as with site-specific writer's guides and preferences. The NRC staff verified that these modifications do not alter the intent

of any specific EAL within a set, recognition category, or within the entire EAL scheme described in NEI 99-01, Revision 6. Thus, the proposed changes meet the requirements in Appendix E to 10 CFR Part 50 and planning standard 10 CFR 50.47(b)(4).

The NRC staff determined that the proposed EAL scheme uses objective and observable values, is worded in a manner that addresses human factors engineering and user-friendliness concerns, follows logical progressions for escalating events, and allows for event downgrading and upgrading based upon the potential risk to the public health and safety. Risk assessments were appropriately used to set the boundaries of the emergency classification levels and ensure that all EALs that trigger an emergency classification are in the same range of relative risk. In addition, the NRC staff determined that the proposed EAL scheme is technically complete and consistent with EAL schemes implemented at similarly designed plants.

The NRC staff verified that the instrumentation and setpoints derived for this proposed EAL scheme are consistent with the overall EAL scheme development guidance, address the site-specific implementation strategies provided, and are consistent with a standard EAL scheme.

Based on the above, the NRC staff finds that the licensee's proposed EAL scheme is acceptable and provides reasonable assurance that the licensee can and will take adequate protective measures in the event of a radiological emergency. Specifically, the staff concludes that the licensee's proposed EAL scheme and site-specific EAL technical basis document provided by letter dated January 4, 2019, as supplemented by letters dated August 29 and October 30, 2019, meets 10 CFR 50.47 and Section IV.B.2 of Appendix E to 10 CFR Part 50, and is acceptable for implementation.

7.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Commonwealth of Virginia official was notified of the proposed issuance of the amendments on November 5, 2019. The state official confirmed that the Commonwealth had no comments.

In accordance with the Commission's regulations, the Connecticut State official was notified of the proposed issuance of the amendments on November 12, 2019. The official provided the following comment (ADAMS Accession No. ML19346B389):

DEEP notes that the proposed thresholds for EAL MPS2 MU 4.2 reflect primary and secondary coolant activity values from TS 3.4.8 which Dominion has identified are non-conservative due to errors in their analyses. Specifically, Dominion has identified that based on their analysis of the radiological consequences following a postulated Main Steam Line Break and Steam Generator Tube Rupture accident, a reduction in the TS primary and secondary coolant specific activity limits are required to meet control room dose regulatory limits. Dominion has implemented administrative limits and has requested a license amendment from the NRC (Serial 19-243 dated July 30, 2019). Since the proposed uses the existing non-conservative values, it appears that Dominion would not classify the UE when they have exceeded their compensatory administrative limits for 48 hours even though this condition is a precursor to a more significant event and represents a potential degradation of the level of safety of the plant. DEEP believes that the EAL should reflect the proper values or other compensatory action be taken to ensure proper classification and ORO notification for this condition.

The activity values listed in EAL MPS2 MU4.2 are included referentially from the TSs. As indicated in the comment, the currently listed value accurately reflect the current TS values, which are known to be non-conservative. Also, as indicated in the comment, the licensee has placed administrative limits on the reactor coolant specific activity and submitted a license amendment request to correct the TS values. In consideration of the comment, the NRC staff confirmed with the licensee that the currently in-place administrative limits are also applied to the EALs while the values are being corrected. Once the TS values have been corrected, the licensee would be able to propagate the more limiting values to the EALs and eliminate the administrative limits. The need for prior NRC approval of this change would be governed by 10 CFR 50.54(q).

8.0 ENVIRONMENTAL CONSIDERATION

The amendments change requirements with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 because the amendment approves an acceptable EAL scheme which is required for operation of the facility. 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 May 21, 2019 (84 FR 23079). 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.

9.0 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.

10.0 References

1. Dominion Energy Nuclear Connecticut, Inc. and Virginia Electric and Power Company (Dominion) letter to U.S. Nuclear Regulatory Commission, "Millstone Units 1, 2, and 3; North Anna Units 1 and 2; and Surry Power Units 1 and 2 and ISFSIs - License Amendment Request to Adopt Emergency Action Level (EAL) Schemes Pursuant to NEI 99-01, Rev. 6.," dated January 4, 2019 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19011A237).
2. Dominion letter to U.S. Nuclear Regulatory Commission, "Millstone Units 1, 2, and 3; North Anna Units 1 and 2; and Surry Power Units 1 and 2 and ISFSIs - License Amendment Request to Adopt Emergency Action Level (EAL) Schemes Pursuant to NEI 99-01, Rev. 6 [RAI response]," dated August 29, 2019 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19249B779).
3. Dominion letter to U.S. Nuclear Regulatory Commission, "Millstone Units 1, 2, and 3; North Anna Units 1 and 2; and Surry Power Units 1 and 2 and ISFSIs - License Amendment Request to Adopt Emergency Action Level (EAL) Schemes Pursuant to NEI 99-01, Rev. 6 [RAI response]," dated October 30, 2019 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19309E523).
4. Thaggard, M., U.S. Nuclear Regulatory Commission, letter to Ms. Susan Perkins-Grew, Nuclear Energy Institute, "U.S. Nuclear Regulatory Commission Review and Endorsement of NEI 99-01, Revision 6, dated November 2012 (TAC No. D92368)," dated March 28, 2013 (ADAMS Accession No. ML12346A463).
5. U.S. Nuclear Regulatory Commission, Generic Letter 79-50, dated October 10, 1979 (ADAMS Accession No. ML031320278).
6. U.S. Nuclear Regulatory Commission and Federal Emergency Management Agency, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," NUREG-0654/FEMA-REP-1, Revision 1, November 1980 (ADAMS Accession No. ML040420012).
7. U.S. Nuclear Regulatory Commission, "Emergency Planning and Preparedness for Nuclear Power Reactors," Regulatory Guide 1.101, Revision 2, October 1981 (ADAMS Accession No. ML090440294); Revision 3, August 1992 (ADAMS Accession No. ML003740302); and Revision 4, July 2003 (ADAMS Accession No. ML032020276).
8. NEI 99-01, Revision 6, "Development of Emergency Action Levels for Non-Passive Reactors," dated November 2012 (ADAMS Package Accession No. ML13091A209).
9. U.S. Nuclear Regulatory Commission, Regulatory Issue Summary 2003-18, "Use of NEI 99-01, 'Methodology for Development of Emergency Action Levels,' Revision 4, dated January 2003," dated October 8, 2003, including Supplement 1, dated July 13, 2004, and Supplement 2, dated December 12, 2005 (ADAMS Accession Nos. ML032580518, ML041550395, and ML051450482, respectively).
10. U.S. Environmental Protection Agency, "PAG Manual: Protective Action Guides and Planning Guidance for Radiological Incidents," dated January 2017 (ADAMS Accession No. ML17044A073).

10. U.S. Environmental Protection Agency, "PAG Manual: Protective Action Guides and Planning Guidance for Radiological Incidents," dated January 2017 (ADAMS Accession No. ML17044A073).
11. U.S. Nuclear Regulatory Commission, "Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Effective Immediately)," dated March 12, 2012 (ADAMS Accession No. ML12056A044).
12. U.S. Nuclear Regulatory Commission, Bulletin 2005-02, "Emergency Preparedness and Response Actions for Security-Based Events," dated July 18, 2005 (ADAMS Accession No. ML051740058).
13. U.S. Nuclear Regulatory Commission, Regulatory Issue Summary 2006-12, "Endorsement of Nuclear Energy Institute Guidance, 'Enhancements to Emergency Preparedness Programs for Hostile Action,'" dated July 19, 2006 (ADAMS Accession No. ML061530290).

Principal Contributor: Raymond Hoffman

Date: December 31, 2019

**SUBJECT: MILLSTONE POWER STATION UNITS 1, 2, AND 3; NORTH ANNA POWER STATION, UNITS 1 AND 2; SURRY POWER STATION UNITS 1 AND 2
ISSUANCE OF AMENDMENTS RE: ADOPTION OF EMERGENCY ACTION LEVEL SCHEMES PURSUANT TO NEI 99-01, REV. 6 (EPID L-2019-LLA-0003)
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