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

November 9, 2012

Vice President, Operations
Arkansas Nuclear One
Entergy Operations, Inc.
1448 S.R. 333
Russellville, AR 72802

SUBJECT: ARKANSAS NUCLEAR ONE, UNITS 1 AND 2 - APPROVAL OF CONVERSION OF THE EMERGENCY ACTION LEVEL SCHEME TO A SCHEME BASED ON NUCLEAR ENERGY INSTITUTE (NEI) 99-01, REVISION 5 (TAC NOS. ME7661 AND ME7662)

Dear Sir or Madam:

By letter dated December 1, 2011, as supplemented by letters dated June 9 and August 17, 2012, Entergy Operations Inc. (Entergy, the licensee), requested prior U.S. Nuclear Regulatory Commission (NRC) approval for proposed changes to the emergency action level (EAL) scheme for the Arkansas Nuclear One (ANO), Units 1 and 2.

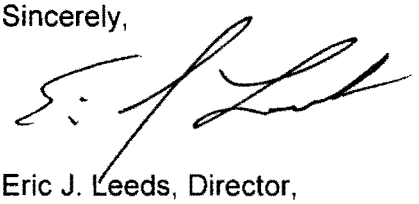
The licensee requested changes pursuant to Section IV.B(1) of Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities," to Part 50 of Title 10 of the *Code of Federal Regulations* (10 CFR), to support a conversion from its current EAL scheme to a scheme based on Nuclear Energy Institute (NEI) 99-01, Revision 5, "Methodology for Development of Emergency Action Levels," dated February 2008.

The NRC staff has completed its review of the proposed changes to the licensee's EAL scheme and supporting documentation in accordance with Section IV.B(1) of Appendix E to 10 CFR Part 50, Section IV.B.(1). Based on the enclosed safety evaluation, the NRC staff concludes that the proposed changes meet the standards in 10 CFR 50.47(b) and the requirements of Appendix E to 10 CFR Part 50, and provides reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency.

Therefore, the NRC staff concludes that the licensee's proposed changes to the EAL scheme for ANO, Units 1 and 2, as outlined in the letters referenced above, are acceptable. NRC expects Entergy to implement the EALs as approved in the enclosed safety evaluation, which includes the implementation of the EAL technical basis document within a period of 180 days from the date on this letter, as stated in your application dated December 1, 2011.

If you have any questions, please contact Mr. Kaly Kalyanam, the NRC Project Manager for ANO, Units 1 and 2, at (301) 415-1480, or by e-mail to kaly.kalyanam@nrc.gov.

Sincerely,



Eric J. Leeds, Director,
Office of Nuclear Reactor Regulation

Docket Nos. 50-313 and 50-368

Enclosure:
Safety Evaluation

cc w/encl: Listserv

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

EMERGENCY ACTION LEVEL SCHEME UPGRADE BASED ON

NUCLEAR ENERGY INSTITUTE 99-01, REVISION 5

ENTERGY OPERATIONS, INC.

ARKANSAS NUCLEAR ONE, UNITS 1 AND 2

DOCKET NOS. 50-313 AND 50-368

1.0 INTRODUCTION

By application dated December 1, 2011 (Reference 1), and supplemented by letters dated July 9 and August 17, 2012 (References 2 and 3, respectively), Entergy Operations, Inc. (the licensee), requested prior U.S. Nuclear Regulatory Commission (NRC) approval for proposed changes to the emergency action level (EAL) scheme for Arkansas Nuclear One (ANO), Units 1 and 2.

The licensee's requested changes support a conversion from its current EAL scheme to a scheme based on Nuclear Energy Institute (NEI) 99-01, Revision 5, "Methodology for Development of Emergency Action Levels," dated February 2008 (Reference 4).

The licensee requested an upgrade of its EAL scheme to incorporate the numerous enhancements and clarification efforts made to the generic EAL development guidance resulting in the most recent document, NEI 99-01, Revision 5, which was found to be acceptable for use as generic EAL development guidance by the NRC (Reference 5).

2.0 REGULATORY EVALUATION

The NRC staff reviewed the proposed revision against the following regulations and guidance described below.

2.1 Regulations

Section 50.47, "Emergency plans," of Title 10 of the *Code of Federal Regulations* (10 CFR), sets forth emergency plan requirements for nuclear power plant facilities. The regulations in 10 CFR 50.47(a)(1)(i) states, in part, that

> [. . .] no initial operating license for a nuclear power reactor will be issued unless a finding is made by the NRC that there is reasonable assurance that adequate

> protective measures can and will be taken in the event of a radiological emergency.

Section 50.47(b) of 10 CFR establishes the standards that the onsite and offsite emergency response plans must meet for NRC staff to make a positive finding that there is reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency. Planning Standard (4) of this section requires that onsite and offsite emergency response plans contain:

> 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.

Section 50.47(b)(4) of 10 CFR specifies a standard emergency classification and action level scheme, assuring that implementation methods are relatively consistent throughout the industry for a given reactor and containment design while simultaneously providing an opportunity for a licensee to modify its EAL scheme as necessary to address plant-specific design considerations or preferences.

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

> 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.

The licensee's proposed changes were submitted to the NRC for a technical and regulatory review prior to implementation by the licensee. This review is based upon a revision to the ANO EAL scheme provided in the licensee's application letter and supplemented by the licensee's responses to the NRC staff's requests for additional information. Enclosure 3 of the licensee's letter dated August 17, 2012 (Reference 3), contains the final version of the licensee's proposed plant-specific EAL scheme for ANO and is, therefore, the final version reviewed by the NRC staff for acceptability.

2.2 Guidance

EAL development guidance was initially established via NRC Generic Letter (GL) 1979-50 dated October 10, 1979 (Reference 6), and was subsequently established in NUREG-0654/FEMA-REP-1 "Criteria for Preparation and Evaluation of Radiological

Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," November 1980 (Reference 7), which was endorsed as an approach for the development of an EAL scheme via NRC Regulatory Guide (RG) 1.101, Revision 2, "Emergency Planning and Preparedness for Nuclear Power Reactors," October 1981 (Reference 8). As industry and regulatory experience was gained with the implementation and use of EAL schemes, the industry issued revised EAL scheme development guidance documents to reflect lessons learned. To date, NUMARC/NESP-007, Revision 2, "Methodology for Development of Emergency Action Levels," January 1992 (Reference 9), NEI 99-01, Revision 4 (Reference 10), and NEI 99-01, Revision 5 (Reference 4), were provided to the NRC for review and endorsement as generic (non plant-specific) EAL development guidance. Revisions 3 and 4 of RG 1.101 (Reference 11) endorsed NUMARC/NESP-007 and NEI 99-01, Revision 4, as acceptable alternatives for licensees to consider in the development of their plant-specific EAL schemes, as well as allowing licensees to develop plant-specific EALs based upon an alternative approach not endorsed by the NRC. NEI 99-01, Revision 5 was endorsed by the NRC as generic (non plant-specific) EAL development guidance via letter dated February 22, 2008 (Reference 5), and this endorsement is expected to be reflected in the next revision of RG 1.101.

The EAL development guidance contained in GL 1979-50, NUREG-0654/FEMA-REP-1, NUMARC/NESP-007, NEI 99-01, Revision 4, and NEI 99-01, Revision 5 are all considered generic EAL development guidance, as they are not plant-specific and may not be entirely applicable for some reactor designs. However, the guidance contained in these documents bounds the most typical accident/event scenarios for which emergency response is necessary, in a format that allows for industry standardization and consistent regulatory oversight. Most licensees choose to develop their plant-specific EAL schemes using the latest endorsed EAL development guidance with appropriate plant-specific alterations as applicable. Pursuant to 10 CFR Part 50, Appendix E, Section IV.B (2), a revision to an EAL must be approved by the NRC before implementation, if the licensee is changing from one EAL scheme to another EAL scheme.

Based on the above, the NRC staff considers the following methods acceptable for use in developing plant-specific EALs that meet the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4), with the understanding that licensees may want to develop EALs that differ from the applicable guidance document as allowed in RG 1.101 and in the NRC letter dated February 22, 2008 (Reference 5):

- Appendix 1, "Emergency Action Level Guidelines for Nuclear Power Plants," to NUREG-0654/FEMA-REP-1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," November 1980;

- NUMARC/NESP-007, Revision 2, "Methodology for Development of Emergency Action Levels," January 1992;

- NEI 99-01, Revision 4, "Methodology for Development of Emergency Action Levels," January 2003; and

- NEI 99-01, Revision 5, "Methodology for Development of Emergency Action Levels," February 2008.

The NRC Regulatory Issue Summary (RIS) 2003-18, "Use of NEI 99-01, 'Methodology for Development of Emergency Action Levels', dated January 2003," dated October 8, 2003, with Supplement 1 dated July 13, 2004, and Supplement 2 dated December 12, 2005 (Reference 12), also provide guidance for developing or changing a standard emergency classification and action level scheme. In addition, RIS 2003-81 and its supplements provide recommendations to assist licensees, consistent with Section IV.B of Appendix E to 10 CFR Part 50, in determining whether to seek prior NRC approval of deviations from the guidance.

Regardless of the generic EAL scheme development guidance document used by a licensee to develop its EAL scheme, or if a licensee choses to develop its EAL scheme using an alternative approach not endorsed by the NRC, or a combination of the two (most typical), the NRC staff will review the EAL scheme to assure it meets the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4).

3.0 TECHNICAL EVALUATION

In its application and supplemental letters, the licensee submitted the proposed EAL scheme for ANO, the technical basis, a comparison matrix, the EAL numbering scheme, and an explanation for any difference or deviation from NEI 99-01, Revision 5. The comparison matrix provided a cross reference relating the proposed EAL scheme to the EAL scheme in NEI 99-01, Revision 5 and the current EAL scheme.

ANO currently utilizes an EAL scheme based on the generic EAL scheme development guidance from Nuclear Management and Resources Council/National Environmental Studies Project (NUMARC/NESP)–007, Revision 2 (Reference 9), with plant-specific modifications due to design issues and/or licensee preference. The licensee is converting to an EAL scheme using the development guidance from NEI 99-01, Revision 5 (Reference 4), with plant-specific modifications due to design issues and/or licensee preference.

The proposed plant-specific EAL scheme is unique to ANO; however, to ensure consistency and regulatory stability, the NRC staff reviewed the proposed plant-specific EAL scheme to ensure the following key characteristics of an effective EAL scheme are in place:

- Consistency (i.e., the EALs would lead to similar decisions under similar circumstances at different plants), up to and including standardization in intent, if not in actual wording;
- Human factors engineering and user friendliness;
- Potential for classification upgrade only when there is an increasing threat to public health and safety;
- Ease of upgrading and downgrading;
- Thoroughness in addressing and disposing of the issues of completeness and accuracy raised regarding Appendix 1 to NUREG-0654;

- Technical completeness for each classification level;
- Logical progression in classification for multiple events; and
- Objective and observable values.

To aid in understanding the nomenclature used in this safety evaluation, for each category of EALs reviewed the following naming/numbering convention is used: the first letter signifies the category; the second letter signifies the classification level (G = General Emergency (GE), S = Site Area Emergency (SAE), A = Alert, U = Notification of Unusual Event (UE)); and the number is the applicable number from the plant-specific EAL scheme. For ease of use, this safety evaluation will use the numbering system from the plant-specific EAL scheme rather than from the generic EAL development guidance.

3.1 Category 'A' – Abnormal Radiological Release/Radiological Effluent

3.1.1 EAL Set AG1/AS1/AA1/AU1

This EAL set is based upon plant-specific indications of a release of radioactivity (gaseous and/or liquid). The progression from UE to GE is appropriate and consistent with EAL scheme development guidance.

The numbering, sequencing, and format of this EAL set are consistent with the overall EAL scheme development guidance and with the site-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The instrumentation and set points derived for this EAL set are consistent with the overall EAL scheme development guidance, address the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The plant-specific implementation method for this EAL set is in alignment with the key characteristics of an effective EAL scheme, meets the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4) and, therefore, is acceptable.

3.1.2 EAL Set AA2/AU2

This EAL set is based upon plant-specific indications of fuel uncovery. The progression from UE to Alert is appropriate and consistent with EAL scheme development guidance. The SAE and GE classification levels for this specific accident progression are bounded by indications available in the fission barrier matrix, as well as in EALs AS1 and AG1.

The numbering, sequencing, and format of this EAL set are consistent with the overall EAL scheme development guidance and with the site-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The instrumentation and set points derived for this EAL set are consistent with the overall EAL scheme development guidance, address the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The plant-specific implementation method for this EAL set is in alignment with the key characteristics of an effective EAL scheme, meets the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4) and, therefore, is acceptable for implementation.

3.1.3 EAL AA3

This EAL is based upon indications of a rise in plant radiation levels that impedes normal access to the Control Room (CR) and Central Alarm Station (CAS). The Alert EAL is primarily intended to ensure the plant emergency response organization is activated to support the CR in removing the impediment to normal access to the CR and CAS. Indications of increasing radiation levels in the plant are bounded by indication of fission barrier loss or potential loss, as well as in AS1 and AG1.

The numbering, sequencing, and format of this EAL set are consistent with the overall EAL scheme development guidance and with the site-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The plant-specific implementation method for this EAL is in alignment with the key characteristics of an effective EAL scheme, meets the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4) and, therefore, is acceptable for implementation.

3.2 Category 'C' – Cold Shutdown/Refueling System Malfunction

3.2.1 EAL Set CA5/CU5

This EAL set is based upon a loss of available alternating current (AC) power sources to the emergency busses. The progression from UE to Alert is appropriate and consistent with EAL scheme development guidance. The SAE and GE classification levels for this specific accident progression are bounded by indications available in EALs AS1 and AG1.

The licensee chose to modify this EAL set by using a plant-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. However, the numbering, sequencing, and format of this EAL set are consistent with the overall EAL scheme development guidance and with the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The instrumentation, values, and listing of applicable power sources derived for this EAL set are consistent with the overall EAL scheme development guidance, address the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The plant-specific implementation method for this EAL set is in alignment with the key characteristics of an effective EAL scheme and, while different than that provided in the generic EAL development guidance, continues to meet the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4) and, therefore, is acceptable for implementation.

3.2.2 EAL CU6

This EAL is not part of an EAL set within the overall EAL scheme. The EAL's intent is to ensure an EAL is declared when a loss of direct current (DC) power event occurs, as this condition compromises the ability of the licensee to monitor and control the removal of decay heat during Cold Shutdown or Refueling modes of operation.

The licensee chose to modify this EAL by using a plant-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. However, the numbering, sequencing, and format of this EAL are consistent with the overall EAL scheme development guidance and with the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The plant-specific implementation method for this EAL is in alignment with the key characteristics of an effective EAL scheme and, while different than that provided in the generic EAL development guidance, continues to meet the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4) and, therefore, is acceptable.

3.2.3 EAL CU7

This EAL is not part of an EAL set within the overall EAL scheme. The EAL's intent is to highlight the significance of inadvertent criticality events by ensuring an EAL is declared if an unplanned positive and sustained start-up rate is observed on nuclear instrumentation.

The licensee chose to modify this EAL by using a plant-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. However, the numbering, sequencing, and format of this EAL are consistent with the overall EAL scheme development guidance and with the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The plant-specific implementation method for this EAL is in alignment with the key characteristics of an effective EAL scheme and, while different than that provided in the generic EAL development guidance, continues to meet the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4) and, therefore, is acceptable.

3.2.4 EAL CU8

This EAL is not part of an EAL set within the overall EAL scheme. The EAL's intent is to highlight the importance of emergency communications by ensuring an EAL is declared if normal communication methods for onsite and offsite personnel, or for offsite response organizations including the NRC, are lost.

The licensee chose to modify this EAL by using a plant-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. However, the numbering, sequencing, and format of this EAL are consistent with the overall EAL scheme development guidance and with the

plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The communication methods derived for this EAL are consistent with the overall EAL scheme development guidance, address the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The plant-specific implementation method for this EAL is in alignment with the key characteristics of an effective EAL scheme and, while different than that provided in the generic EAL development guidance, continues to meet the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4) and, therefore, is acceptable.

3.2.5 EAL Set CG1/CS1/CA1/CU1/CU2

This EAL set is based upon a loss of reactor pressure vessel inventory and/or reactor coolant system (RCS) leakage. The progression from UE to GE is appropriate and consistent with EAL scheme development guidance.

The numbering, sequencing, and format of this EAL set are consistent with the overall EAL scheme development guidance and with the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The instrumentation and set points derived for this EAL set are consistent with the overall EAL scheme development guidance, address the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The plant-specific implementation method for this EAL set is in alignment with the key characteristics of an effective EAL scheme, meets the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4) and, therefore, is acceptable for implementation.

3.2.6 EAL Set CA3/CU3

This EAL set is based upon an inability to maintain control of decay heat removal. The progression from UE to Alert is appropriate and consistent with EAL scheme development guidance. The SAE and GE classification levels for this specific accident progression are bounded by indications available in EALs AS1 and AG1.

The licensee chose to modify this EAL set by using a plant-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. However, the numbering, sequencing, and format of this EAL set are consistent with the overall EAL scheme development guidance and with the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The instrumentation and set points derived for this EAL set are consistent with the overall EAL scheme development guidance, address the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The plant-specific implementation method for this EAL set is in alignment with the key characteristics of an effective EAL scheme and, while different than that provided in the generic EAL development guidance, continues to meet the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4) and, therefore, is acceptable for implementation.

3.3 Category 'E' – Independent Spent Fuel Storage Installation (ISFSI)

3.3.1 EAL E-HU1

This EAL is not part of an EAL set within the overall EAL scheme. The EAL's intent is limited to radiological events at the ISFSI. While security-related events at the ISFSI are also of concern, they are bounded by the licensee's EAL HA1.

The numbering, sequencing, and format of this EAL are consistent with the overall EAL scheme development guidance and with the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The plant-specific implementation method for this EAL is in alignment with the key characteristics of an effective EAL scheme, meets the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4) and, therefore, is acceptable for implementation.

3.4 Category 'F' – Fission Product Barrier Matrix

This category is unique in the overall EAL scheme, as the thresholds are not intended to be stand-alone indicators of a particular event occurring at the plant. Rather, they are to be used as triggers within the particular logic configuration needed to reflect a loss or potential loss of a fission product barrier. U.S. nuclear power plants have three fission product barriers: fuel cladding, the RCS, and the 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 classification based upon the number of loss and/or potential loss indicators that are triggered for each barrier. By design, these indicators are redundant with other similar indicators in the Category 'A' and Category 'S' EAL sets, due to the importance for licensees to be able to recognize reactor and/or fission product barrier events as timely as possible using the best available indicators from several different perspectives.

The NRC staff verified that the logic used to determine the appropriate emergency classification is consistent with the generic EAL scheme development guidance.

The instrumentation and set points derived for this EAL category are consistent with the overall EAL scheme development guidance, address the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The licensee chose to modify this EAL category by using a plant-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. However, the numbering, sequencing, and format of this EAL are consistent with the overall EAL scheme development guidance, are

consistent with the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The plant-specific implementation method for this EAL category is in alignment with the key characteristics of an effective EAL scheme and, while different than that provided in the generic EAL development guidance, continues to meet the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4) and, therefore, is acceptable for implementation.

3.5 Category 'H' – Hazards

3.5.1 EAL Set HG1/HS1/HA1/HU1

This EAL set is based upon security-related events originally 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 13), or NRC Regulatory Issue Summary RIS 2006-12, "Endorsement of Nuclear Energy Institute Guidance 'Enhancements to Emergency Preparedness Programs for Hostile Action'," dated July 19, 2006 (Reference 14), 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, the NRC staff and the industry worked to enhance the language of these EALs so as to eliminate any confusion without changing the intent of the EAL set as set forth in NRC Bulletin 2005-02 and RIS 2006-12. The NRC staff generated EAL Frequently Asked Question (EALFAQ) 2009-48 (Reference 15) to address the changes made to the generic EAL scheme development guidance document.

The licensee chose to modify this EAL set by using a plant-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. However, the numbering, sequencing, and format of this EAL set are consistent with the overall EAL scheme development guidance and with the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

This EAL set is consistent with the guidance provided in NRC Bulletin 2005-02 and RIS 2006-12, as further enhanced by the lessons learned from implementation and drills, and revised in NEI 99-01, Revision 5, and evaluated in EALFAQ 2009-48.

The plant-specific implementation method for this EAL set is in alignment with the key characteristics of an effective EAL scheme and, while different than that provided in the generic EAL development guidance, continues to meet the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4) and, therefore, is acceptable for implementation.

3.5.2 EAL Set HS3/HA3

This EAL set is based upon CR evacuation. The progression from Alert to SAE is appropriate and consistent with EAL scheme development guidance. The GE classification level for this specific accident progression is bounded by indications available in the fission barrier matrix or EAL AG1.

The licensee chose to modify this EAL set by using a plant-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The numbering, sequencing, and format of this EAL set are consistent with the overall EAL scheme development guidance, are consistent with the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The plant-specific implementation method for this EAL set is in alignment with the key characteristics of an effective EAL scheme and, while different than that provided in the generic EAL development guidance, continues to meet the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4) and, therefore, is acceptable for implementation.

3.5.3 EAL Set HA6/HU6

This EAL set is based upon the effect that natural and destructive hazards may have on the licensee. The progression from UE to Alert is appropriate and consistent with EAL scheme development guidance. The SAE and GE classification levels for this specific accident progression are bounded by indications available in the fission barrier matrix and EALs AS1 and AG1.

The licensee chose to modify this EAL set by using a plant-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. However, the numbering, sequencing, and format of this EAL set are consistent with the overall EAL scheme development guidance and with the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The instrumentation and set points derived for this EAL set are consistent with the overall EAL scheme development guidance, address the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The licensee's seismic event classification thresholds, for both the UE and Alert classification levels, are appropriate, consistent with a standard EAL scheme, and meet the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4) and are, therefore, acceptable for implementation.

Severe weather or high wind events, as well as the development of plant-specific areas considered in these EALs, are consistent with the development strategies stated in the generic EAL development guidance. These EALs are consistent with a standard EAL scheme and meet the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4), and are, therefore, acceptable for implementation.

Main turbine rotating equipment failures are appropriately developed using the generic EAL development guidance with plant-specific terminology and plant-specific areas of consideration determined for these EALs. These EALs are consistent with a standard EAL scheme and meet the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4) and are, therefore, acceptable.

Internal flooding events are appropriately developed using the generic EAL development guidance with plant-specific terminology and plant-specific areas of consideration determined for these EALs. While consistent with the development strategies stated in the generic EAL development guidance, the actual wording used is different. However, these EALs are consistent with a standard EAL scheme and meet the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4) and are, therefore, acceptable.

Events based upon vehicle crashes within the protected area or vital area has typically been difficult to differentiate for EAL purposes, between the UE and Alert classification levels. GL 1979-50, NUREG-0654/FEMA-REP-1, and NUMARC/NESP-007 used language equating vehicles to aircraft, trains, and barges. NEI 99-01, Revision 4, addresses vehicles that are large enough to cause damage. With the issuance of NRC Bulletin 2005-02, the need for EALs related to airborne, waterborne, or land-based security events has been resolved with the development of security-specific EALs. In addition, the intended basis for a UE EAL considers, among other factors, the resultant degradation in the level of safety of the plant. Eliminating the UE EAL for vehicle crashes is consistent with the intent of the UE classification and removes any misunderstanding regarding the remaining Alert classification. The Alert classification is based upon indications of degraded performance or visible damage to a specific list of areas considered applicable to this EAL. Removing the UE EAL based upon vehicle crashes, and revising the wording of the remaining Alert EAL, is consistent with a standard EAL scheme and meets the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4) and are, therefore, acceptable.

The plant-specific implementation method for this EAL set is in alignment with the key characteristics of an effective EAL scheme and, while different than that provided in the generic EAL development guidance, continues to meet the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4) and, therefore, is acceptable.

3.5.4 EAL Set HA4/HU4

This EAL set is based upon the effect fire and explosions may have on the licensee's facility. The progression from UE to Alert is appropriate and consistent with EAL scheme development guidance. The SAE and GE classification levels for this specific accident progression are bounded by indications available in the fission product barrier matrix, EALs AS1 and AG1, or applicable EALs from the Systems Malfunction Category.

The licensee chose to modify this EAL set by using a plant-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. However, the numbering, sequencing, and format of this EAL set are consistent with the overall EAL scheme development guidance and with the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The development of plant-specific areas considered in these EALs is consistent with the development strategies stated in the generic EAL development guidance even though the actual wording used is different. Therefore, the approach is consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The plant-specific implementation method for this EAL set is in alignment with the key characteristics of an effective EAL scheme and, while different than that provided in the generic EAL development guidance, continues to meet the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4) and, therefore, is acceptable for implementation.

3.5.5 EAL HA5/HU5

This EAL set is based upon the effect toxic, corrosive, asphyxiant or flammable gases may have on the licensee. The progression from UE to Alert is appropriate and consistent with EAL scheme development guidance. The SAE and GE classification levels for this specific accident progression are bounded by indications available in the fission barrier matrix, EALs AS1 and AG1, or applicable EALs from the Systems Malfunction category.

The licensee chose to modify this EAL set by using a plant-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. However, the numbering, sequencing, and format of this EAL set is consistent with the overall EAL scheme development guidance and with the plant-specific implementation strategies provided, and is considered part of a standard EAL scheme.

The development of plant-specific areas considered in these EALs, is consistent with the development strategies stated in the generic EAL development guidance even though the actual wording used is different, and is considered part of a standard EAL scheme.

The plant-specific implementation method for this EAL set is in alignment with the key characteristics of an effective EAL scheme, and while different than that provided in the generic EAL development guidance, it continues to meet the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4) and, therefore, is acceptable.

3.5.6 EAL Set HG2/HS2/HA2/HU2

This EAL set is based upon providing the decision-makers with EALs to consider when, in their judgment, an emergency classification is warranted.

The licensee chose to modify this EAL set by using a plant-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The numbering, sequencing and format of this EAL set are consistent with the overall EAL scheme development guidance, are consistent with the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The plant-specific implementation method for this EAL set is in alignment with the key characteristics of an effective EAL scheme and, while different than that provided in the generic EAL development guidance, continues to meet the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4) and, therefore, is acceptable for implementation.

3.6 Category 'S' – System Malfunction

3.6.1 EAL Set SG1/SS1/SA1/SU1

This EAL set is based upon a loss of available AC power sources to the emergency busses. The progression from UE to GE is appropriate and consistent with EAL scheme development guidance.

The licensee chose to modify this EAL set by using a plant-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. However, the numbering, sequencing, and format of this EAL set are consistent with the overall EAL scheme development guidance and with the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The instrumentation, values, and listing of applicable power sources derived for this EAL set are consistent with the overall EAL scheme development guidance, address the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The plant-specific implementation method for this EAL set is in alignment with the key characteristics of an effective EAL scheme and, while different than that provided in the generic EAL development guidance, continues to meet the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4) and, therefore, is acceptable.

3.6.2 EAL SS4

This EAL is not part of an EAL set within the overall EAL scheme. The EAL's intent is to ensure an EAL is declared when a loss of DC power event occurs, as this condition compromises the ability of the licensee to monitor and control the removal of decay heat. The GE classification level for this event is bounded by fission barrier matrix indicators and EAL AG1.

The licensee chose to modify this EAL by using a plant-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. However, the numbering, sequencing, and format of this EAL are consistent with the overall EAL scheme development guidance, are consistent with the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The plant-specific implementation method for this EAL is in alignment with the key characteristics of an effective EAL scheme and, while different than that provided in the generic EAL development guidance, continues to meet the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4) and, therefore, is acceptable.

3.6.3 EAL Set SG3/SS3/SA3/SU10

This EAL set is based upon the effect that a failure of the reactor protection system may have on the plant, as well as inadvertent criticality for SU10. The progression from UE to GE is appropriate and consistent with EAL scheme development guidance.

The licensee chose to modify this EAL set by using a plant-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. The numbering, sequencing, and format of this EAL set are consistent with the overall EAL scheme development guidance and with the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The instrumentation and set points derived for this EAL set are consistent with the overall EAL scheme development guidance, address the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The plant-specific implementation method for this EAL set is in alignment with the key characteristics of an effective EAL scheme and, while different than that provided in the generic EAL development guidance, continues to meet the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4) and, therefore, is acceptable.

3.6.4 EAL Set SS6/SA6/SU6

This EAL set is based upon the effect that a loss of indication, control and annunciation capabilities has on the plant. The progression from UE to SAE is appropriate and consistent with EAL scheme development guidance. The GE classification level for this specific accident progression is bounded by indications available in the fission product barrier matrix or EAL AG1.

The numbering, sequencing, and format of this EAL set are consistent with the overall EAL scheme development guidance and with the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The instrumentation and set points derived for this EAL set are consistent with the overall EAL scheme development guidance, address the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The plant-specific implementation method for this EAL is in alignment with the key characteristics of an effective EAL scheme and, while different than that provided in the generic EAL development guidance, continues to meet the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4) and, therefore, is acceptable.

3.6.5 EAL SU11

This EAL is not part of an EAL set within the overall EAL scheme. The EAL's intent is to ensure an EAL is declared when the plant is not brought into the required operating mode within the time allowed in accordance with the plant's Technical Specifications (TS) Limiting Condition of Operation (LCO) Action Statement completion time.

The numbering and format of this EAL are consistent with the overall EAL scheme development guidance and with the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The plant-specific implementation method for this EAL is in alignment with the key characteristics of an effective EAL scheme and, while different than that provided in the generic EAL development guidance, it continues to meet the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4) and, therefore, is acceptable.

3.6.6 EAL SU7

This EAL is not part of an EAL set within the overall EAL scheme. The EAL's intent is to ensure an EAL is declared when the plant has indications of RCS leakage. By design, this EAL is redundant with 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 regardless of the particular EAL table a licensee may be referring to. EAL escalation is bounded by fission product barrier indicators and EALs AA1, AS1, and AG1.

The licensee chose to modify this EAL by using a plant-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. However, the numbering, sequencing, and format of this EAL are consistent with the overall EAL scheme development guidance, are consistent with the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The plant-specific implementation method for this EAL is in alignment with the key characteristics of an effective EAL scheme and, while different than that provided in the generic EAL development guidance, continues to meet the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4) and, therefore, is acceptable.

3.6.7 EAL SU9

This EAL is not part of an EAL set within the overall EAL scheme. The EAL's intent is to ensure an EAL is declared when the plant has indications of fuel clad degradation. By design, this EAL is redundant with 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 regardless of the particular EAL table a licensee may be referring to. EAL escalation is bounded by fission product barrier indicators and EALs AA1, AS1, and AG1.

The licensee chose to modify this EAL by using a plant-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. However, the numbering, sequencing, and format of this EAL are consistent with the overall EAL scheme development guidance, are consistent with the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The plant-specific implementation method for this EAL is in alignment with the key characteristics of an effective EAL scheme and, while different than that provided in the generic EAL development guidance, continues to meet the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4) and, therefore, is acceptable.

3.6.8 EAL SU8

This EAL is not part of an EAL set within the overall EAL scheme. The EAL's intent is to highlight the importance of emergency communications by ensuring an EAL is declared if normal communication methods for onsite and offsite personnel, or for offsite response organizations including the NRC, are lost. No escalation path is necessary for this event progression.

The licensee chose to modify this EAL by using a plant-specific implementation method that uses a modified numbering format and EAL sequence other than that provided in the generic EAL scheme development guidance. However, the numbering, sequencing, and format of this EAL are consistent with the overall EAL scheme development guidance, are consistent with the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The communication methods derived for this EAL are consistent with the overall EAL scheme development guidance, address the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

The plant-specific implementation method for this EAL is in alignment with the key characteristics of an effective EAL scheme and, while different than that provided in the generic EAL development guidance, continues to meet the requirements of Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4) and, therefore, is acceptable for implementation.

3.7 Summary

The NRC staff has reviewed the technical bases for the proposed EAL scheme, the modifications from NEI 99-01, Revision 5, and the licensee's evaluation of the proposed changes. The licensee chose to modify its EAL scheme from the generic EAL scheme development guidance provided in NEI 99-01, Revision 5 in order to adopt a format that is better aligned with how it currently implements its EALs, as well as with plant-specific writer's guides and preferences. The NRC staff determined that these modifications do not alter the intent of any specific EAL within an EAL set, EAL category, or within the entire EAL scheme as stated in NEI 99-01, Revision 5.

Based on its review, the NRC staff has 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 found that the proposed EAL scheme was technically complete and consistent with EAL schemes implemented at similarly designed plants.

4.0 CONCLUSION

Based on the above, the NRC staff has determined that the proposed changes meet the guidance in NEI 99-01, Revision 5, requirements in Appendix E to 10 CFR Part 50 and the

planning standards of 10 CFR 50.47(b). Therefore, the NRC staff concludes that the proposed EAL scheme, as stated in Enclosure 3 of the licensee's letter dated August 17, 2012, provides reasonable assurance that the licensee can and will take adequate protective measures in the event of a radiological emergency.

5.0 REFERENCES

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2. Pyle, S. L., Entergy Operations, Inc., letter to U.S. Nuclear Regulatory Commission – "Response to Request for Additional Information (RAI) Related to Proposed Emergency Action Levels Using NEI 99-01, Revision 5 Scheme," dated July 9, 2012 (ADAMS Accession No. ML12192A090).

3. Pyle, S. L., Entergy Operations, Inc., letter to U.S. Nuclear Regulatory Commission, "Response to Request for Additional Information (RAI) Related to Proposed Emergency Action Levels Using NEI 99-01, Revision 5 Scheme," dated August 17, 2012 (ADAMS Accession No. ML12230A171).

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12. U.S. Nuclear Regulatory Commission, Regulatory Issue Summary 2003-18, "Use of NEI-99-01, 'Methodology for Development of Emergency Action Levels,' dated January 2003," dated October 8, 2003 (ADAMS Accession Nos. ML032580518); Supplement 1 dated July 13, 2004 (ADAMS Accession No. ML041550395); and Supplement 2 dated December 12, 2005 (ADAMS Accession No. ML051450482).

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14. U.S. Nuclear Regulatory Commission, NRC 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. ML072670421).

15. Emergency Action Level Frequently Asked Question 2009-48, dated October 15, 2009 (ADAMS Accession No. ML100710728).

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Date: November 9, 2012

If you have any questions, please contact Mr. Kaly Kalyanam, the NRC Project Manager for ANO, Units 1 and 2, at (301) 415-1480, or by e-mail to kaly.kalyanam@nrc.gov.

Sincerely,

/RA/

Eric J. Leeds, Director,
Office of Nuclear Reactor Regulation

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