



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

March 29, 2021

Mr. John Dent, Jr.
Vice President and
Chief Nuclear Officer
Nebraska Public Power District
72676 648A Avenue
P.O. Box 98
Brownville, NE 68321

SUBJECT: COOPER NUCLEAR STATION - ISSUANCE OF AMENDMENT NO. 269
RE: TO REVISE EMERGENCY ACTION LEVELS TO A SCHEME BASED ON
NEI 99-01, REVISION 6, "DEVELOPMENT OF EMERGENCY ACTION LEVELS
FOR NON-PASSIVE REACTORS" (EPID L-2020-LLA-0028)

Dear Mr. Dent:

The U.S. Nuclear Regulatory Commission (NRC, the Commission) has issued the enclosed Amendment No. 269 to Renewed Facility Operating License No. DPR-46 for Cooper Nuclear Station. The amendment consists of changes to the emergency action level scheme in response to your application dated February 18, 2020, as supplemented by letters dated August 6, 2020, and August 25, 2020.

The amendment revises the current emergency action level scheme 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, which was endorsed by the NRC in a letter dated March 28, 2013.

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

Sincerely,

/RA/

Thomas J. Wengert, Senior Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-298

Enclosures:

1. Amendment No. 269 to DPR-46
2. Safety Evaluation

cc: Listserv



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

NEBRASKA PUBLIC POWER DISTRICT

DOCKET NO. 50-298

COOPER NUCLEAR STATION

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 269
Renewed License No. DPR-46

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Nebraska Public Power District (the licensee), dated February 18, 2020, as supplemented by letters dated August 6, 2020, and August 25, 2020, 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. 269, Renewed Facility Operating License No. DPR-46 is hereby amended to authorize revision to the Emergency Action Level Technical Basis Document of the Cooper Nuclear Station Emergency Plan as set forth in the licensee's application dated February 18, 2020, as supplemented by letters dated August 6, 2020, and August 25, 2020, and evaluated in the NRC staff's safety evaluation for this amendment.
3. The license amendment is effective as of its date of issuance and shall be implemented within 365 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Andrea D. Veil, Director
Office of Nuclear Reactor Regulation

Date of Issuance: March 29, 2021



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 269 TO

RENEWED FACILITY OPERATING LICENSE NO. DPR-46

NEBRASKA PUBLIC POWER DISTRICT

COOPER NUCLEAR STATION

DOCKET NO. 50-298

1.0 INTRODUCTION

By application dated February 18, 2020 (Reference 1), as supplemented by letters dated August 6, 2020, and August 25, 2020 (References 2 and 3, respectively), Nebraska Public Power District (NPPD, the licensee) submitted a license amendment request to the U.S. Nuclear Regulatory Commission (NRC, the Commission) for approval of changes to revise the emergency action level (EAL) scheme for Cooper Nuclear Station (Cooper).

The proposed amendment would revise the current EAL scheme 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 21, 2012 (Reference 4). Revision 6 of NEI 99-01 was endorsed by the NRC in a letter dated March 28, 2013 (Reference 5).

The supplemental letters dated August 6, 2020, and August 25, 2020, 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's proposed no significant hazards consideration determination as published in the *Federal Register* on May 19, 2020 (85 FR 29985).

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 onsite and offsite 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.

Planning Standard (4) of 10 CFR 50.47(b) requires that onsite and offsite emergency response plans meet the following standard:

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 requires 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 permit 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 6). This guidance was subsequently revised 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 7), which was endorsed by NRC Regulatory Guide (RG) 1.101, Revision 2, "Emergency Planning and Preparedness for Nuclear Power Reactors," dated October 1981 (Reference 8),¹ 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

¹ Subsequently issued as Revision 3 and Revision 4 in August 1992 and July 2003, respectively.

learned, numerous of which have been provided to the NRC for review and endorsement as generic 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 acceptable generic EAL scheme development guidance.

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.

In summary, 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 in 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.

2.3 NRC Staff Review

In its application dated February 18, 2020, as supplemented by letters dated August 6, 2020, and August 25, 2020, the licensee proposed to revise the EAL scheme for Cooper to one 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 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 stated 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 that the proposed EAL scheme is consistent with the guidance provided in NEI 99-01, Revision 6, to ensure that the proposed EAL scheme meets the requirements of Section IV.B of Appendix E to 10 CFR Part 50 and planning standard in 10 CFR 50.47(b)(4). 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 preference.

The NRC staff reviewed the application, as supplemented, and 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.

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

- 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, is worded in a manner that addresses human factors engineering and user friendliness concerns, and 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 scheme is 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 (SE), the following conventions are used (e.g., AU1 or AA1):

- 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 (UE)
 - A = Alert,
 - S = Site Area Emergency (SAE), and
 - G = General Emergency (GE).

- 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 SE 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

3.1 Recognition Category 'A' – Abnormal Radiation Levels/Radiological Effluent

3.1.1 Cooper EAL Set AU1/AA1/AS1/AG1 [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 UE 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 a UE to a GE classification level is appropriate and consistent with EAL scheme development guidance.

- AU1 – 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).

- AA1 – This EAL addresses a release of gaseous or liquid radioactivity that results in projected or actual offsite doses greater than or equal to 1 percent of the U.S. Environmental Protection Agency (EPA) early phase protective action guides (PAGs) (Reference 10).

- AS1 – This EAL addresses a release of gaseous radioactivity that results in projected or actual offsite doses greater than or equal to 10 percent of the EPA early phase PAGs.

- AG1 – This EAL addresses a release of gaseous radioactivity that results in projected or actual offsite doses greater than or equal to the EPA early phase PAGs.

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.

3.1.2 Cooper EAL Set AU2/AA2/AS2/AG2 [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 spent fuel pool 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 a UE to a GE classification level is appropriate and consistent with EAL scheme development guidance.

- AU2 – This EAL addresses a decrease in water level above irradiated fuel that causes elevated radiation levels.
- AA2 – 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 refueling pathway (AA2.1, AA2.2, and AA2.3 basis are not same).
- AS2 – This EAL addresses a significant loss of spent fuel pool water inventory control and makeup capability leading to imminent fuel damage and addresses NRC Order EA-12-051.
- AG2 – This EAL addresses a significant loss of spent fuel pool water inventory control and makeup capability leading to a prolonged uncover of spent fuel and addresses NRC Order EA-12-051.

The licensee modified the threshold value for EAL AA2.1 by replacing uncover of irradiated fuel with imminent uncover of irradiated fuel. The licensee provided that the use of IMMEDIATE was added because irradiated fuel uncover will always be anticipatory as no direct indication is available to determine when the irradiated fuel has become uncovered. In response to a request for additional information (RAI) by letter dated August 6, 2020, the licensee provided that the use of IMMEDIATE is consistent with the cited basis [AA2 of NEI 99-01, Revision 6] as

well as the classification criteria of Section 5.5 of NEI 99-01, Revision 6. Based on a review of NEI 99-01, Revision 6, the NRC staff determined that the basis discussion for AA2 refers to imminent or actual damage of an irradiated fuel assembly, and Section 5.5 of NEI 99-01, Revision 6, refers to making an emergency classification when the Emergency Director determines that “conditions that could lead to meeting or exceeding an EAL within a short amount of time.” The NRC staff finds that the addition of imminent to the threshold value for AA2.1 is acceptable based on consistency with Section 5.5 of NEI 99-01, Revision 6, for which imminent is applicable to all classification levels.

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.

3.1.3 Cooper EAL AA3 [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 primarily intended to ensure that the licensee’s emergency response organization (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. Escalation of an Alert classified under AA3 would be via Recognition Category ‘A,’ ‘C,’ or ‘F’ EALs.

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.

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

3.2.1 Cooper 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 a UE to a GE 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 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 provided that, due to location and structural components, the containment high range radiation monitors could not be utilized to determine reactor vessel level with respect to the top of active fuel, and no other radiation monitors exist that could be utilized to determine reactor vessel level. This is consistent with the guidance provided by NEI 99-01, Revision 6, that for boiling water reactors that do not have installed radiation monitors capable of monitoring core uncover, alternate site-specific indications of core uncover should be used if available. As such, the NRC staff finds the proposed threshold values for CS1 and CG1 acceptable.

The licensee provided that it will update its emergency procedure guidelines/severe accident guidelines (EPGs/SAGs) concurrent with the implementation of this EAL scheme change. This revised EPG/SAG guidance provides an additional method to provide adequate core cooling using core spray flow with RPV level above the jet pump suction. This method was not available when NEI 99-01, Revision 6, was developed. Cooper proposed the addition of a site-specific threshold value for CS1 and CG1 that reflects adequate core spray flow when RPV level is above the jet pump suction to the existing core submergence threshold value. Based on the capability of core spray to provide adequate core cooling for an RPV level below the top of active fuel but above the jet pump suction, the NRC staff finds the addition of this condition to the threshold values for CS1 and CG1 acceptable.

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.

3.2.2 Cooper 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 alternating current (AC) power to emergency power electrical busses.

The NRC staff verified that the progression from a UE to an Alert classification level is appropriate and consistent with EAL scheme development guidance. Escalation of an Alert classified under CA2 would be via EALs CS1 or AS1.

- CU2 – This EAL describes a significant degradation of offsite and onsite 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 total 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 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.

3.2.3 Cooper EAL Set CU3/CA3 [CU3/CA3]

The intent of this proposed 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 a UE to an Alert classification level is appropriate and consistent with EAL scheme development guidance. Escalation of an Alert classified under CA3 would be via EALs CS1 or AS1.

- CU3 – This EAL addresses an unplanned increase in RCS temperature greater than or equal to 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 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.

3.2.4 Cooper 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 when the plant is in the cold shutdown or refueling mode. This EAL is primarily intended to ensure that key licensee ERO members and offsite response organizations (OROs) are aware of the event, resources necessary to respond to the event are mobilized, and any necessary compensatory measures are promptly implemented. Escalation of an Alert classified under CU4 would be via EALs CA1 or CA3, or in Recognition Category 'A' of the proposed EAL scheme.

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.

3.2.5 Cooper 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 onsite

and offsite personnel, or with State and local agencies, including the NRC, are lost. This EAL is primarily intended to ensure that key licensee ERO members and State and local agencies 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 provided by NEI 99-01, Revision 6.

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.

3.2.6 Cooper 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 primarily intended 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. Escalation of an Alert classified under CA6 would be via EALs CS1 or AS1.

As described in NEI 99-01, Revision 6, an Alert classification level exists when “[e]vents 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 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.

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

3.3.1 Cooper 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 primarily intended 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 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.

3.4 Recognition Category 'F' – Fission Product Barrier Matrix

3.4.1 Cooper EAL Set FA1/FS1/FG1 [FA1/FS1/FG1]

The intent of this proposed 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.

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 GE classification level is appropriate and consistent with EAL scheme development guidance in NEI 99-01, Revision 6.

- 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 provided that it will update the Cooper EPGs/SAGs concurrent with the implementation of the proposed EAL scheme change. The updated EPG/SAG guidance includes a substantially different methodology to provide cooling of core debris within the RPV and extends the time available to put an alternative method of containment heat removal in place. This strategy significantly delays, or even eliminates, the need for containment flooding. As such, the NEI 99-01, Revision 6, threshold value of primary containment flooding would not be appropriate as a potential loss of containment barrier for the proposed Cooper EAL scheme. In the licensee's response to an RAI, dated August 6, 2020, the proposed threshold value for a potential loss of containment was modified from, "PC [primary containment] Flooding is required," to, "It cannot be determined that core debris will be retained in the RPV." Considering that the proposed threshold value is tied to an operationally significant decision within the SAGs that is a precursor to a potential loss of containment and reflects the site-specific operating characteristics, the NRC staff finds the proposed containment barrier potential loss threshold barrier acceptable.

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.

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

3.5.1 Cooper 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. 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 licensee proposed to not develop EAL HG1, as provided in NEI 99-01, Revision 6.

The NRC staff verified that the progression from a UE to an SAE 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 within 30 minutes of the site.
- HS1 – This EAL addresses the occurrence of a hostile action within the Protected Area.

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 AG1 or AG2 in NEI 99-01, Revision 6. The NRC staff verified that the Cooper EALs AG1, AG2, and HG7 bound the events addressed by EAL HG1 in NEI 99-01, Revision 6.

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.

3.5.2 Cooper 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 primarily intended 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. Depending on the operating mode applicable at the time of the event, escalation of a UE classified under HU2 would be via EALs CA6.1 or SA8.1 for seismic events that affect more than one safety system.

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.

3.5.3 Cooper 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 onsite conditions that are sufficient to prohibit the plant staff from accessing the site via personal vehicles, and
- Other site-specific events.

This EAL is primarily intended 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.

Depending on the operating mode applicable at the time of the event, escalation of a UE classified under HU3 would be via EALs CA6.1 or SA8.1 for natural or technological hazard events that affect more than one safety system.

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.

3.5.4 Cooper 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 primarily intended to ensure that key licensee's ERO members and OROs are aware of the fire, and post-event damage assessments are promptly implemented.

Depending on the operating mode applicable at the time of the event, escalation of a UE classified under HU4 would be via EALs CA6.1 or SA8.1 for fires that affect more than one safety system.

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.

3.5.5 Cooper 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 primarily intended 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. Escalation of an Alert classified under HA5 would be via Recognition Category 'A,' 'C,' or 'F' EALs.

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.

3.5.6 Cooper 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 an SAE classification level is appropriate and consistent with EAL scheme development guidance. Escalation of an SAE classified under HS6 would be via EALs FG1 or CG1.

- 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 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.

3.5.7 Cooper 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 ERO and ORO is warranted.

The NRC staff verified that the progression from a UE to a GE 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 a UE.
- 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 an SAE.
- 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 GE.

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.

3.6 Recognition Category 'S' – System Malfunction

3.6.1 Cooper EAL Set SU1/SA1/SS1/SG1 [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 a UE to a GE classification level is appropriate and consistent with EAL scheme development guidance.

- SU1 – This EAL addresses a prolonged loss of offsite AC power.

- SA1 – This EAL describes a significant degradation of offsite and onsite AC power sources such that any additional single failure would result in a loss of all AC power to safety systems.
- SS1 – 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.
- SG1 – This EAL addresses a prolonged loss of all power sources to AC emergency busses.

Concerning EAL SG1, the licensee proposed an alternate threshold value that was based on the capability to establish long-term RCS heat removal rather than basing a threshold value solely on a coping time that may no longer lead to the loss of one or more fission product barriers. Considering that the licensee currently has procedures and equipment to “restore core cooling, containment, and spent fuel pool cooling capabilities indefinitely,” the NRC staff concludes that the proposed threshold values for EAL SG1 are acceptable.

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.

3.6.2 Cooper EAL Set SU3/SA3 [SU2/SA2]

The intent of this proposed 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 a UE to an Alert classification level is appropriate and consistent with EAL scheme development guidance. Escalation of an Alert classified under SA3 would be via EALs FS1 or AS1.

- SU3 – This EAL addresses the difficulty associated with monitoring normal plant conditions without the ability to obtain safety system parameters from within the control room.

- SA3 – 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 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.

3.6.3 Cooper EAL SU4 [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 primarily intended 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 of a UE classified under SU4 would be via EAL FA1 or Recognition Category 'A' EALs.

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.

3.6.4 Cooper EAL SU5 [SU4]

The intent of this EAL is to ensure that an emergency classification level is declared when the plant has indications of RCS leakage for 15 minutes or longer. 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 primarily intended 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 of a UE classified under EAL SU5 would be via Recognition Category 'A' or 'F' EALs.

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.

3.6.5 Cooper EAL Set SU6/SA6/SS6 [SU5/SA5/SS5]

The intent of this proposed 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 a UE to an SAE classification level is appropriate and consistent with EAL scheme development guidance. Escalation of an SAE classified under EAL SS6 would be via EALs AG1 or FG1.

- SU6 – 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.
- SA6 – 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.
- SS6 – 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.

For the Cooper EAL scheme, the licensee chose to add “as indicated by reactor power > 3%” to the threshold values for SU6, SA6, and SS6. In response to an RAI, the licensee provided a justification that was based, in part, on the capacity of decay heat removal systems and the mode of applicability for EAL declarations. Based on a review of NEI 99-01, Revision 6, the NRC staff determined that the discussion related to mode applicability applies only to the applicability of this proposed EAL set and is not an indication of a shutdown reactor. The NRC staff does agree with the licensee’s RAI response that core heat generation will fall to a level

within the capabilities of the plant's decay heat removal capabilities following a successful reactor shutdown. However, as noted above, the intent of this proposed EAL set is to make an appropriate event declaration following a failure of the RPS. Considering that the RPS is designed to place the reactor in a subcritical condition when certain setpoints are exceeded, a failure of the RPS would be indicated by reactor power rising subsequent to reaching or exceeding an RPS setpoint or condition. As such, the NRC staff concludes that the threshold values for this proposed EAL set should be consistent with a subcritical reactor. This would be indicated by reactor power going below 3 percent, for Cooper, and continuing to lower. Although the NRC staff does not agree with the licensee's justification for including "as indicated by reactor power > 3%," the NRC staff finds that the licensee is not relying on using a reactor power of 3 percent or below as the only indication of a shutdown reactor. The licensee continues to use the subcategory of "RPS Failure" and the Initiating Condition of "Automatic or manual scram fails to shut down the reactor," either of which would clearly indicate that a reactor shutdown (subcritical reactor) is required. Therefore, the NRC staff finds that adding the condition of reactor power being less than 3 percent to the condition of the reactor being shutdown acceptable.

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.

3.6.6 Cooper EAL SU7 [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 onsite and offsite personnel, or with OROs, including the NRC, are lost. This EAL is primarily intended 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 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.

3.6.7 Cooper EAL N/A [SU7]

This EAL, as provided in NEI 99-01, Revision 6, is only applicable to pressurized-water reactors. Since Cooper is a boiling-water reactor, this EAL does not apply to Cooper.

3.6.8 Cooper EAL Set SS2/SG1 [SS8/SG8]

The intent of this proposed 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 an SAE to a GE classification level is appropriate and consistent with EAL scheme development guidance.

- SS2 – This EAL addresses a loss of vital DC power that compromises the ability to monitor and control safety systems.
- SG1 – This EAL addresses a concurrent and prolonged loss of both AC and vital DC power.

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.

3.6.9 Cooper EAL SA8 [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 Cooper. This EAL is primarily intended 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. Escalation of an Alert classified under SA8 would be via EALs FS1 or AS1.

As described in the guidance in NEI 99-01, Revision 6, an Alert classification level exists when “[e]vents 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 NRC-endorsed 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 NRC-endorsed guidance in NEI 99-01, Revision 6, this change is acceptable considering that the NRC-endorsed 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 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.

3.7 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, in order 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 its review, 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 February 18, 2020, as supplemented by letters dated August 6, 2020, and August 25, 2020, are acceptable for implementation.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Nebraska State official was notified of the proposed issuance of the amendment on January 26, 2021. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes requirements with respect to installation or use of facility components located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves 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 amendment involves no significant hazards consideration published in the *Federal Register* on May 19, 2020 (85 FR 29985), and there has been no public comment on such finding. Accordingly, the amendment meets 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 amendment.

6.0 CONCLUSION

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

7.0 REFERENCES

1. Dent, Jr., J., Nebraska Public Power District, letter to U.S. Nuclear Regulatory Commission, "Request to Adopt Emergency Action Level Scheme Pursuant to NEI 99-01, Revision 6, 'Development of Emergency Action Levels for Non-Passive Reactors,'" dated February 18, 2020 (Agencywide Documents Access and Management System (ADAMS) Package Accession No. ML20055D877).
2. Dia, K., Nebraska Public Power District, letter to U.S. Nuclear Regulatory Commission "Response to Nuclear Regulatory Commission Request for Additional Information (RAI) for License Amendment Request to Adopt Emergency Action Level Scheme, Pursuant to NEI 99-01, Revision 6," dated August 6, 2020 (ADAMS Package Accession No. ML20227A062 [Package]).
3. Dent, Jr., J., Nebraska Public Power District, letter to U.S. Nuclear Regulatory Commission, "Response to Nuclear Regulatory Commission's Supplemental Request for Additional Information (RAI) for License Amendment Request to Adopt Emergency Action Level Scheme, Pursuant to NEI 99-01, Revision 6," dated August 25, 2020 (ADAMS Accession No. ML20248H493).
4. Nuclear Energy Institute, "Development of Emergency Action Levels for Non-Passive Reactors," NEI 99 01, Revision 6, dated November 2012 (ADAMS Accession No. ML12326A805).
5. 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 Package Accession No. ML13091A209).
6. U.S. Nuclear Regulatory Commission, Generic Letter 79-50, "Emergency Plans Submittal Dates," dated October 10, 1979 (ADAMS Accession No. ML031320278).
7. U.S. Nuclear Regulatory Commission and Federal Emergency Management Agency (FEMA), "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, dated November 1980 (ADAMS Accession No. ML040420012).
8. U.S. Nuclear Regulatory Commission, "Emergency Planning and Preparedness for Nuclear Power Reactors," Regulatory Guide 1.101, Revision 2, dated October 1981 (ADAMS Accession No. ML090440294); Revision 3, dated August 1992 (ADAMS Accession No. ML003740302); and Revision 4, dated July 2003 (ADAMS Accession No. ML032020276).
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).
11. U.S. Nuclear Regulatory Commission, "Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Effective Immediately), EA-12-051," dated March 12, 2012 (ADAMS Accession No. ML12056A044).

Principal Contributor: R.J. Hoffman

Date: March 29, 2021

SUBJECT: COOPER NUCLEAR STATION - ISSUANCE OF AMENDMENT NO. 269
 RE: TO REVISE EMERGENCY ACTION LEVELS TO A SCHEME BASED ON
 NEI 99-01, REVISION 6, "DEVELOPMENT OF EMERGENCY ACTION LEVELS
 FOR NON-PASSIVE REACTORS" (EPID L-2020-LLA-0028) DATED
 MARCH 29, 2021

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NRR-106

OFFICE	NRR/DORL/LPL4/PM	NRR/DORL/LPL4/LA	NSIR/DPR/RLB/BC	OGC - NLO
NAME	TWengert (concur)	PBlechman	JQuichocho	AGhosh
DATE	2/08/2021	2/22/2021	12/04/2020	3/10/2021
OFFICE	NRR/DORL/LPL4/BC	NRR/DORL/D	NRR/D	NRR/DORL/LPL4/PM
NAME	JDixon-Herrity	CErlanger	AVeil (MKing for)	TWengert (sign)
DATE	3/11/2021	3/16/2021	3/25/2021	3/29/2021

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