NEI EAL Task Force Responses to
NRC Staff Comments from Public Meeting on 3/15/24

	IC/EAL ID	NRC STAFF COMMENT	RESPONSE AND PROPOSED CHANGES
1.	**IC AU1** EAL #1 EAL #2 EAL #3	Provide additional clarity in the change basis to support removal of the IC.	This IC and the associated EAL were removed because the risk posed to the public from the event is so low as to not reasonably require an emergency declaration. IC AA1 is set at 1% of the lower value of the EPA PAG (the "early phase" range is 1 to 5 rem) and thus establishes an appropriate lower dose limit on releases that should be considered an emergency (which is 10 mrem). The IC and EAL are also not aligned with the definition of an Unusual Event because there has not been a potential degradation of plant safety. Activation of a site emergency plan and ERO mobilization would not be necessary to respond to the event. A site would have sufficient procedures and capabilities to respond without declaring an emergency (e.g., use of Radiation Protection and Chemistry resources for locating and assessing radiological releases). Depending on event-specific conditions, some plant response actions may be required by Technical Specifications or the ODCM, and the site may make a report to the NRC in accordance with the requirements in 10 CFR Part 20.
2.	**IC AA1** EAL #1 **IC AS1** EAL #1 **IC AG1** EAL #1	The staff requests that the precalculated radiation monitor EALs be restored to the scheme.	The NEI EAL task force notes here our comments made during the public meeting on 3/15/24. The NRC has made clear in various documents and public meetings that licensees are expected to assess events and make accurate emergency classifications; over- or under-classifications are not acceptable. Since the precalculated radiation monitor values are determined using assumed source terms and meteorology, it is very likely that a precalculated EAL threshold will be above or below a dose assessment result obtained at the time of the event, which would be based on the actual source term and meteorology. The magnitude of this difference could be sufficient to change an initial emergency classification and/or PAR made on a precalculated radiation monitor EAL. Moreover, since all sites have an on-shift dose assessment capability, a dose assessment result will likely be available not too long after a classification (and possibly an ORO notification) was made based on a precalculated EAL threshold. This means a licensee could make, and transmit to OROs, an emergency declaration (and possibly

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			a PAR) based on a precalculated radiation monitor EAL that is not reflective of actual radiological release conditions (which could be more or less severe). Then, around this same time period, a dose assessment based on actual data will become available. If the assessment results indicate a different ECL and/or PAR, then the licensee would need to communicate that to the OROs. The closely spaced transmittal of two different ECLs and/or PARs could cause confusion on the part of both the ERO and the OROs. This outcome would complicate ORO decision-making and potentially affect the level of trust that an ORO has in licensee capabilities (*particularly if the ECL based on a dose projection is lower than that declared based on a precalculated radiation monitor EAL*). We noted too that this issue was brought up by a previous NEI EAL task force during the development of Revision 6. In that case, the precalculated radiation monitor EALs were also retained based on a request from the NRC staff. Concerning the NRC staff comments on the degree of confidence in the input data and results of an on-shift dose assessment, we agree that some uncertainty could exist on the selection of a source term during an event. However, a source term selected at the time of an event will almost certainly be more accurate than an assumed source term used to derive precalculated EAL thresholds since the choice will be supported by an assessment of contemporaneous plant and radiological indications. Furthermore, real-time meteorological data from the site's instrumentation will also be available from read-outs in the Control Room, and absolutely be more accurate than the assumed data. Finally, the uncertainties inherent in dose assessments are understood (e.g., see the Introduction section of NUREG/CR-5247 Vol. 1, Rev. 2) but those uncertainties would affect the precalculated EAL threshold values and the results of an on-shift dose assessment equally because the same model is used for both. To summarize, it can be expected that in every instance, the results of a dose assessment will be a more accurate basis for an emergency declaration (and PAR) than a precalculated EAL threshold value.

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			We also point out that, per NRC requirements and the guidance in NUREG-0654/FEMA-REP-1, licensees have a designated on-shift position(s) that performs dose assessments and provides input to the Shift Manager/Emergency Director, until relieved. As required by 10 CFR 50, Appendix E, section IV.A.9, licensees have performed a detailed analysis demonstrating that this position is not assigned responsibilities that would prevent the timely performance of their assigned functions. In addition, the on-shift dose assessment capability is supported by the necessary procedures, equipment, and training, all of which are periodically demonstrated in drills and exercises. To address the current NRC staff comment but also minimize the potential impacts of having a precalculated EAL threshold be different than the result of a dose assessment performed at the time of the event, the following changes are proposed: 1. The precalculated radiation monitor threshold under IC AU1 would be removed when the IC is removed, per change description #1 above. 2. Maintain the removal of R6 EAL #1 from IC AA1 since these values and the resultant Alert declaration are not used by OROs to direct precautionary or prompt protective actions for the public. 3. Add back R6 EAL #1 to IC AS1 and AG1 since these values and the resultant declarations are used by OROs to direct precautionary and prompt protective actions for the public (*which we understand is the basis for why the NRC staff wants them restored*). 4. Add the following note to the "Example Emergency Action Levels" for IC AS1 and AG1: • Assess the threshold values in EAL #1 if a dose assessment result is not or cannot be obtained within 15 minutes of indications that a release is exceeding an ODCM limit. The monitoring of EAL #1 should stop when a dose assessment capability is established. This note is intended to give up to 15 minutes for completion of an on-shift dose assessment before declaring an emergency based on a precalculated radiation monitor reading. This would help

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			mitigate the potential classification and PAR impacts discussed above. 5. Add this statement to the Basis section of IC AS1 and AG1: • The precalculated radiation monitor thresholds in EAL #1 are determined using the dose value specified in the IC, and an assumed source term and meteorology. For this reason, the doses projected at the time of an event, which will be based on a source term determined from plant indications and actual metrological data, can reasonably be expected to be above or below the dose specified in the IC. Due to these expected differences, the assessment of EAL #1 should occur if a dose assessment result is not or cannot be obtained within 15 minutes of indications that a release is exceeding an ODCM and stop when a dose assessment capability is established.
3.	**IC AA1** EAL #3	Provide additional clarity in the change basis to support removal of the EAL.	This EAL was removed because of challenges associated with making a timely assessment (*a legacy issue from insufficient vetting during the development of R6*) and bounding by other EALs. An accurate assessment of this EAL will likely require that samples be taken in the field, returned to a lab, and analyzed. This evolution cannot be completed within the 15-minute assessment period required by regulations and may take up to several hours to complete. Moreover, a liquid release will be diluted and dispersed as it moves from its source (e.g., a holding tank) to the site boundary and the environs beyond. It is extremely unlikely that downstream liquid concentrations could reach the levels needed to result in the specified EAL threshold doses without a starting point source term much greater than that available during normal operations (e.g., need some level of fuel cladding failure). If a sufficiently high source term were present, then another EAL would already be met. Focusing on just the site response to the event, the necessary actions could be taken without activating the emergency plan (similar to that discussed above for AU1) and implementation of the security plan would not be affected. It is also noted that State and local public safety and environmental officials, upon being notified of the release, would mobilize

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			and take actions to address the event without the necessity of an emergency declaration.
4.	**FPB Tables 9-F-2 & 3** RCS Barrier Loss **FPB Tables 9-F-2 & 3** CNMT Barrier Potential Loss	The NEI EAL task force understands that the NRC would like the CNMT radiation monitor thresholds retained in the BWR and PWR FPB Tables. The resolution to the right collectively addresses comments 4, 5, 6 and 8.	The following changes are proposed: 1. The R6 CNMT radiation monitor thresholds will be restored for the Fuel Clad Barrier Loss and the CNMT Barrier Potential Loss. 2. Add this paragraph to the Basis sections: • The containment radiation monitor reading is calculated using an assumed source term and instantaneous dispersal of the RCS inventory into the containment atmosphere. These assumptions may not be aligned with conditions during an actual event. In addition, the containment monitors could "see" radioactive shine from piping sources or be influenced by in-containment conditions such as the use of sprays, natural deposition/plateout, containment leakage, natural and forced convection, filters, and connection to a suppression pool [*BWRs*], any of which could also affect a reading value. For this reason, the percentage of fuel clad damage during an actual event could be higher or lower than that used to calculate the monitor reading. 3. Per a previous agreement with the staff before the CNMT radiation monitor thresholds were removed, the developer note for the Fuel Clad Barrier Loss threshold will specify that it should be based on 2% cladding failure, with 300 uCi/cc DEI as an alternative basis. The revised basis will promote a more standardized approach to the calculation of a monitor reading (because most licensee core damage assessment tools deal in percents of fuel cladding damage, not dose equivalent iodine concentrations). 4. The thresholds that were proposed to replace the R6 CNMT radiation monitor thresholds in the Fuel Clad and CNMT Barrier columns will be removed. These are the thresholds that reference a core damage assessment and an offsite dose of 750 mrem, respectively. 5. The NEI EAL Task Force believes that a CNMT radiation monitor threshold is not necessary for the RCS Barrier and continues to support its removal as a barrier Loss threshold. This threshold has

<table>
<tr><th></th><th>IC/EAL ID</th><th>NRC STAFF COMMENT</th><th colspan="2">RESPONSE AND PROPOSED CHANGES</th></tr>
<tr><td></td><td></td><td></td><td colspan="2">led to confusion in drills and exercises in cases where an appreciable level of fuel cladding degradation/damage has occurred and the RCS is intact (i.e., no leakage). Because the containment monitors “see” radioactive shine from RCS piping sources and therefore displayed elevated readings, operators were faced with the dilemma that the RCS Barrier Loss threshold based on a containment radiation monitor reading was met, but every operational indication confirmed there was no RCS leakage. The identification of a challenge to the RCS barrier should be made using the safety-related indications available in the Control Room and intended for that purpose. These indications are diverse and highly reliable (e.g., subject to the requirements in 10 CFR 50.65), and used to support diagnostic and mitigation actions in AOPs and EOPs (so operators are well versed in their use). This approach supports timely and accurate emergency classifications by removing a source of potential confusion affecting assessments of the RCS Barrier status. The primary indications available to assess the status of the barrier are already captured in the FPB Table. If in the highly unlikely event that those indications were not available, there are alternative indications that could be used to support an “Emergency Director Judgment” determination that the RCS Barrier has been lost. The primary and alternative indications of RCS Barrier status are listed below. Of course, an elevated containment radiation monitor reading could serve to corroborate these indications.</td></tr>
<tr><td></td><td></td><td></td><td>BWR</td><td>PWR</td></tr>
<tr><td></td><td></td><td></td><td>Primary indications: RPV water level, primary containment pressure, and indicators of high energy line breaks.

Alternative indications: Containment (drywell) sump and humidity levels.</td><td>Primary indications: Subcooling and indications that provide input to the ECCS (SI) actuation logic (principally PZR pressure and containment pressure).</td></tr>
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				Alternative indications: PZR level, RCS pressure, and containment sump level.
5.	**FPB Table 9-F-2** Fuel Clad Barrier Loss 4.A **FPB Table 9-F-3** Fuel Clad Barrier Loss 3.A	See comment #4	See comment #4	
6.	N/A	See comment #4	See comment #4	
7.	**FPB Table 9-F-3** Fuel Clad Barrier Potential Loss 2.B	Provide additional clarity in the change basis to support removal of the threshold.	This threshold was removed so that an "Inadequate Heat Removal" (IHR) condition would not automatically lead to a Site Area Emergency (SAE) declaration. [*The SAE results because the same threshold is shown in R7 RCS Barrier Potential Loss 2.A.*] The change was made because an IHR condition does not mean that a Fuel Clad Barrier challenge is imminent, and hence that an SAE is warranted. This change makes the PWR FPB Table better risk-informed by precluding an unwarranted SAE declaration that may lead some OROs to take precautionary protective actions when they are unnecessary (which creates risk to the public). During this condition, operators would follow plant EOPs that implement a "feed and bleed" cooldown strategy. Each plant's strategy and method for implementation are informed by guidance from the PWROG. Implementation of a "feed and bleed" strategy is expected to maintain the core cooling safety function, thus preventing a challenge to the Fuel Clad Barrier. It should be noted that during the period of strategy implementation, the plant would appropriately be in an Alert due to meeting R7 RCS Barrier Potential Loss 2.A (and possibly other RCS Barrier thresholds as well). Should additional failures occur that lead to meeting a Fuel Clad Barrier threshold (e.g., a failure that causes an ineffective feed and bleed), then the emergency would be appropriately escalated to the SAE level.	

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8.	**FPB Table 9-F-3** CNMT Barrier Potential Loss 4.C	See comment #4	See comment #4
9.	**IC CS1** EAL #1	Provide additional clarity on the change to EAL #1.b.	For the PWR portion of EAL #1.b, replaced "Reactor vessel/RCS level less than (site-specific level)" with "RHR flow is lost and not restored within 30 minutes." [*Note – improved EAL wording was subsequently identified based on operator feedback from EAL validation sessions conducted by sites preparing an LAR submittal for implementation of Revision 7. See change description #15 below.*] EAL 1.b is concerned with a loss of RHR flow due to reduced water inventory. The R6 EAL used a loss of level in a loop leg as the threshold indication since the water in a loop is the pump suction source when RHR is in recirculation mode. The R6 EAL has been problematic for many sites because the temporary instrumentation used to measure loop level, installed to support an outage, either does not have the necessary range to indicate the level called-out in the R6 developer note or becomes unreliable in the lower end of the range. In addition, the IC is applicable in Modes 5 and 6, but the level instrumentation may be available only in certain plant configurations during these Modes. Recognizing these challenges, the R6 developer notes instructs sites encountering one or more of the problems to "not include EAL #1 (classification will be accomplished in accordance with EAL #3)." Since the time between losing pump suction due to low loop level and a loss of RHR flow is very short, a decision was made to focus the EAL on the loss of RHR flow instead of the precursor indication (i.e., replaced the cause [*low loop level leading to RHR suction loss*] with the effect [*lost RHR flow]).* Indications of a loss of RHR flow are available in the Control Room and would be readily recognized by operators. As noted in the IC basis, 30 minutes was selected as a reasonable amount of time for plant operators to recognize the problem, verify that the affected train cannot be restored (i.e., not a transient condition) and secure it, and place another train into service, if available. In summary, this change replaces an EAL that some plants cannot assess with one that all plants can use, thus enhancing the effectiveness of a classification scheme.

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10.	**IC SU2** EAL #1	Provide additional clarity in the change basis to support removal of the IC.	This IC and the associated EAL were removed because the risk posed to the public from the event is so low as to not reasonably require an emergency declaration. An appropriate lower bound for this condition is set by IC SA2, which requires an Alert declaration should it occur coincident with a reactor trip or ECCS (SI) actuation, events that require immediate and ongoing monitoring of many safety-related indications. And depending on concurrent events or resulting impacts, an emergency may be declared under another IC/EAL (e.g., a loss of DC power that led to the loss of the indications). Activation of a site emergency plan and ERO mobilization would not be necessary to respond to the event. A site would have sufficient protocols and capabilities to respond without declaring an emergency (e.g., use of procedures and resources for responding to a loss of operationally significant equipment and indications). For example, a site would be able to assess the equipment failure(s) and implement the necessary corrective/compensatory measures through use of a Fix-It-Now Team or activation of an outage control center. The condition would be addressed promptly since plant response and restoration actions will be governed by the facility's Technical Specifications.
11.	**IC HU3** EALs #1, EAL #3, EAL #4, EAL #5	Restore this IC and retain R6 EALs #4 and #5.	EALs #4 and #5 will be restored. • #4 - "A hazardous event that results in on-site conditions sufficient to prohibit the plant staff from accessing the site via personal vehicles." • #5 - "(Site-specific list of natural or technological hazard events)" EAL #4 will become EAL #1. With this change, the R6 EAL #2 that was moved to the C and S recognition categories (as CU6 and SU7) will be moved back to IC HU3 as EAL #2. EAL #5 will become EAL #3. The R6 EALs #1 and #3 were removed because the risk posed to the public from these events is so low as to not reasonably require an emergency declaration. Should either event result in significant consequences, then the appropriate ECL will be declared based on another IC/EAL (e.g., if a tornado strike caused a loss of offsite power, then an Unusual Event would be declared per IC SU1). Absent a consequence, neither event represents a potential degradation of plant

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<tr><td></td><td></td><td></td><td colspan="2">safety. Activation of a site emergency plan and ERO mobilization would not be necessary to respond to an event. A site would have sufficient protocols and capabilities to respond without declaring an emergency (e.g., use of procedures and resources for responding to severe weather or a hazardous material release). This includes performance of post-event assessments and implementation of corrective/compensatory measures (e.g., by staffing an outage control center). Depending on the circumstances of the event, some plant response actions may also be required by Technical Specifications.

It is proposed that the following Note be added to the example EALs – "For EAL #1, should the ERO members needed to staff emergency response facilities be prepositioned onsite prior to the event, then a declaration is not warranted." This note would preclude a declaration during events anticipated in advance and for which the site has prepositioned ERO responders (e.g., prior to the arrival of a hurricane, significant rain event or winter storm, wildfire, etc.).</td></tr>
<tr><td rowspan="2">12.</td><td rowspan="2">IC SS5
Inability to shutdown the reactor causing a challenge to (core cooling [PWR] / RPV water level [BWR]) or RCS heat removal.</td><td rowspan="2">Provide additional clarity in the change basis to support removal of the IC.</td><td colspan="2">This IC and the associated EALs were removed because the condition is adequately addressed by thresholds in the Fission Product Barrier (FPB) Tables. Removing SS5 simplifies the scheme, eliminating the requirement for operators to simultaneously assess ICs SS5 and those in a FPB Table. The portion of the R6 EAL dealing with just an ATWS event (1.a and 1.b) is retained in R7 IC SU8. If subsequent operator actions and equipment responses are unsuccessful in mitigating the ATWS, then challenges to the core cooling and/or heat removal safety functions may occur. These challenges are recognized in R6 IC SS5, EAL 1.c, and the associated indications are defined in the developer notes. The indications in the R6 developer notes map to the R7 FPB thresholds as shown below:</td></tr>
<tr><td>R6 indications for loss of core cooling:
[BWR] – Reactor vessel water level cannot be restored and maintained above Minimum Steam</td><td>R7 equivalent indications:
During an ATWS and in accordance with EOPs, operators will intentionally lower RPV water level below the top of active fuel. The</td></tr>
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			Cooling RPV Water Level (as described in the EOP bases).	MSCRWL specified in R6 is below the top of active fuel indication specified in R7 Fuel Clad Barrier Potential Loss 2.A and RCS Barrier Loss 2.A. As noted in the Basis section for these two thresholds, if RPV water level is being controlled and maintained within the procedurally specified band during an ATWS response, these thresholds are not met. Therefore, a Site Area Emergency would be declared based on IC FS1 when RPV water level is below the top of active fuel and operators cannot maintain RPV water level as required by EOPs, and without the need for IC SS5.
			R6 indications for loss of core cooling: [*PWR*] – Insert site-specific values for an incore/core exit thermocouple temperature and/or reactor vessel water level that drives entry into a core cooling restoration procedure (or otherwise requires implementation of prompt restoration actions).	*R7 equivalent indications*: The indications in the R6 developer notes correspond to R7 Fuel Clad Barrier Loss or Potential Loss 1.A (on level) and/or 2.A (on CET temperature), depending on how the event progresses. As the reactor continues to add heat to the RCS, subcooling will be lost, which meets RCS Barrier Loss 1.A. Therefore, a Site Area Emergency would be declared based on IC FS1 and without the need for IC SS5.
			R6 indications for loss of RCS heat removal:	*R7 equivalent indications*: As noted above, with RPV water level below the top of active fuel and

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			[*BWR*] - Use the Heat Capacity Temperature Limit. This addresses the inability to remove heat via the main condenser and the suppression pool due to high pool water temperature.	operators unable to maintain level as required by EOPs, a Site Area Emergency would be declared based on IC FS1 and without the need for IC SS5; this also makes the HCTL criterion unnecessary. Should the HCTL be exceeded, then R7 CNMT Barrier Potential Loss threshold 1.C would be met and a General Emergency would be declared.
			R6 indications for loss of RCS heat removal: [*PWR*] - Insert site-specific parameters associated with inadequate RCS heat removal via the steam generators. These parameters should be identical to those used for the Inadequate Heat Removal threshold Fuel Clad Barrier Potential Loss 2.B and threshold RCS Barrier Potential Loss 2.A in the PWR EAL Fission Product Barrier Table.	*R7 equivalent indications*: If conditions associated with inadequate RCS heat removal via the steam generators are present, then RCS Barrier Potential Loss 2.A would be met. That combined with the R7 Fuel Clad Barrier Loss or Potential Loss 1.A (on level) and/or 2.A (on CET temperature), depending on how the event progressed, would also require the declaration of a Site Area Emergency without the need for IC SS5.
13.	N/A	Generic comment – remove references to 10 CFR 50.72 from the change bases.	References to 10 CFR 50.72 will be removed from the change bases.	
Additional Changes Proposed by NEI				
14.	**IC AU3** Radiation levels that impede access to equipment necessary	N/A	Correct an error in the second paragraph of the Basis: For EAL #2, an ~~Alert~~ Unusual Event declaration is warranted if entry into the affected room/area is, or may be, procedurally required	

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	for normal plant operations, cooldown or shutdown.		during the plant operating mode in effect at the time of the elevated radiation levels.
15.	**IC CS1** Loss of (reactor vessel/RCS [*PWR*] or RPV [*BWR*]) inventory affecting core decay heat removal capability. (1) a. CONTAINMENT CLOSURE not established. AND b. (RHR flow is lost and not restored within 30 minutes [*PWR*] or RPV level less than (site-specific level) [*BWR*]).	N/A	Incorporate improved EAL wording based on operator feedback from EAL validation sessions conducted by sites preparing an LAR submittal for implementation of Revision 7: (1) a. CONTAINMENT CLOSURE not established. AND b. (A decrease in reactor vessel/RCS inventory has caused a loss of RHR flow for greater than 30 minutes [*PWR*] or RPV level less than (site-specific level) [*BWR*]). Added wording to maintain consistency with the R7 IC wording (and intent of the previous R6 IC/EAL), i.e., the events of interest for this IC and EAL involve a loss of reactor vessel/RCS inventory. Also changed the time-related portion of the statement to be consistent with wording found in other PWR EALs. Neither change affects the EAL intent.