

EPFAQ Number: 2015-013

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Organization: NUCLEAR REGULATORY COMMISSION

Relevant Guidance: NEI 99-01 REV. 6

Applicable Section(s): EAL HG1

Status: Public Comment Period

QUESTION OR COMMENT:

This EAL [Emergency Action Level] has two components, each predicated upon Hostile Action occurring at the facility. Should consideration be given to split this EAL into two parts: one for a Hostile Action resulting in a loss of the ability to cool the reactor, such that fuel damage is likely within 4-hours; and one for a Hostile Action resulting in a loss of physical control of spent fuel?

PROPOSED SOLUTION:

The premise of the question is not quite clear – there is one HOSTILE ACTION General Emergency Initiating Condition (IC), which is HG1. In NEI [Nuclear Energy institute] 99-01, Revision 5 [Methodology for Development of Emergency Action Levels], IC HG1 has 2 EALs and 1 EAL in NEI 99-01, Revision 6 [Development of Emergency Action Levels for Non-Passive Reactors]. In both cases, the EALs deal with threats to reactor key safety functions and spent fuel cooling. It is assumed that what is being proposed here is to retain the one IC, HG1, and under it would be the 2 EALs described in the question.

The industry desires EALs that are as objective and measurable as reasonably achievable. These attributes help to drive correct, timely and consistent emergency declarations. Evaluating the proposed 4-hour criterion would be somewhat subjective in that a decision-maker would need to consider several factors, some of which may be imperfectly known or require estimates, including the overall probability of successful and timely implementation of mitigating actions. This subjectivity may lead to inconsistent emergency declarations (i.e., presented with a given set of conditions, one Emergency Director may believe that fuel damage is likely within 4 hours while another may not).

With respect to spent fuel, the industry suggests using a different term/phrase than “loss of physical control.” The primary threat of a HOSTILE ACTION directed at spent fuel is a loss of cooling resulting from a reduction in spent fuel pool water inventory. Although water inventory could be reduced through a loss of spent fuel pool cooling (i.e., loss of cooling systems leading to pool heat up and boil off), an immediate threat to the spent fuel under such circumstances would not materialize for many hours (typically greater than 24 hours). The event presenting the greater risk is a HOSTILE ACTION during which adversaries’ actions are successful in penetrating the spent fuel pool liner to a degree sufficient to allow a rapid drain-down of the spent fuel pool. Neither of these loss-of-cooling scenarios involves a “loss of physical control of spent fuel.”

Given the above points, the industry proposes the following IC and EALs for staff consideration.

Revise IC HG1 to read: “HOSTILE ACTION affecting the capability to cool irradiated fuel EAL for fuel in the reactor:”

The industry believes that the symptom-based thresholds found in the BWR [boiling water reactor] and PWR [pressurized water reactor] fission product barrier tables would also be useful in identifying plant conditions warranting a General Emergency declaration in response to a hostile action. These thresholds are both objective and measurable, and well understood by emergency classification decision-makers. The following EAL is provided for consideration:

A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the (site-specific security shift supervision).

AND

A Potential Loss of the Fuel Clad Barrier as determined by the Fission Product Barrier Table.

EAL for water-cooled spent fuel (i.e., in the pool):

A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the (site-specific security shift supervision).

AND

With spent fuel present, water level in the spent fuel pool CANNOT be:

- Maintained above (site-specific Level 3 value), **OR**
- Monitored for 2-hours or longer **AND** Emergency Director judgment that the HOSTILE ACTION has resulted in leakage from the spent fuel pool.

Another solution to consider is deleting:

- The reactor fuel aspect of IC HG1 and rely upon the bounding aspects of other ICs and EALs to drive the General Emergency declaration (e.g., AG1, FG1, SG1 or SG 8), and/or
- The spent fuel pool aspect of IC HG1 and rely upon the bounding aspects of other ICs and EALs to drive the General Emergency declaration (e.g., AG1, AG2, SG1 or SG 8).

Following the selection of a solution by the staff, the industry would like to have an opportunity to provide input on recommended Basis and Developer Note information to be included in the final EPFAQ as these are important for consistent implementation. We anticipate providing this input during the public comment period.

Consistent with the guidance in Regulatory Issue Summary (RIS) 2003-18, Supplement 2, *Use of Nuclear Energy Institute (NEI) 99-01, "Methodology for Development of Emergency Action Levels," Revision 4*, dated January 2003, it is reasonable to conclude that the change proposed above would be considered as a "deviation."

NRC RESPONSE:

This particular IC, HG1 (from NEI 99-01 Revision 6), was developed as a result of the direction provided in NRC Bulletin 2005-02, "Emergency Preparedness and Response for Security-Based Events," (ADAMS Accession No. ML051740058). This IC was part of a set of recommended EALs to highlight security-related events and the recommended the appropriate emergency classification level (i.e., Unusual Event, Alert, Site Area Emergency, or General Emergency). Since the publication of this Bulletin (July 2005) there has been a significant number of drills and exercises observed and evaluated by the staff, and many of them have had NRC participation (Headquarters and Regions). Many of these were hostile action-based. The overlap and redundancy of EALs, while typically not an issue, and in fact somewhat expected, has led to some confusion for security-based events, particularly when evaluating the impact on public health and safety.

EMERGENCY PREPAREDNESS FREQUENTLY ASKED QUESTION (EPFAQ)

The intent of the Bulletin, for this IC, was to declare a General Emergency when a Hostile Action led to a loss of control of plant equipment needed to maintain safety functions:

- reactivity control,
- core cooling (PWR) / reactor pressure vessel water level (BWR), and
- Reactor Coolant System (RCS) heat removal.

The basis section also stated that this IC should address a loss of physical control of spent fuel pool cooling systems if imminent fuel damage is likely. There are several ICs that are redundant with this IC, and are better suited to ensure timely and effective emergency declarations. In addition, the development of new spent fuel pool level EALs, as a result of NRC Order EA-12-051, clarified the intended emergency classification level for spent fuel pool level events.

Since the current IC HG1 has two distinct parts, they will be addressed separately as follows:

1. Hostile Action in the Protected Area is bounded by ICs HS1 and HS7. Hostile Action resulting in a loss of physical control is bound by EAL HG7, as well as any event that may lead to radiological releases to the public in excess of Environmental Protection Agency (EPA) Protective Action Guides (PAGs).
 - a. If, for whatever reason, the Control Room must be evacuated, and control of safety functions (e.g., reactivity control, core cooling (PWR) / reactor pressure vessel water level (BWR), and RCS heat removal) cannot be reestablished, then IC HS6 would apply, as well as IC HS7 if desired by the EAL decision-maker.
 - b. Also, as stated above, any event (including Hostile Action) that could reasonably be expected to have a release exceeding EPA PAGs would be bound by IC HG7.
 - c. From a Hostile Action perspective, ICs HS1, HS7 and HG7 are appropriate, and therefore, make this part of HG1 redundant and unnecessary.
 - d. From a loss of physical control perspective, ICs HS6, HS7 and HG7 are appropriate, and therefore, make this part of HG1 redundant and unnecessary.
2. Any event which causes a loss of spent fuel pool level will be bounded by ICs AA2, AS2 and AG2, regardless of whether it was based upon a Hostile Action or not, thus making this part of HG1 redundant and unnecessary.
 - a. An event that leads to a radiological release will be bounded by ICs AU1, AA1, AS1 and AG1. Events that lead to radiological releases in excess of EPA PAGs will be bounded by EALs AG1 and HG7, thus making this part of HG1 redundant and unnecessary.

Based on these considerations, and given the confusion these redundant EALs had on EAL decision-making at the General Emergency level, consideration can be given to not include HG1 in a site-specific EAL scheme. However, ICs AA2, AS2, AG2, AS1, AG1, HS1, HS6, HS7 and HG7 shall be as provided in NEI 99-01, Revision 6 to ensure the intended event is appropriately bound at the correct ECL. For licensees considering a change to their EAL scheme, 10 CFR 50 Appendix E requires prior approval by the NRC staff. For licensees considering a change to individual EALs, 10 CFR 50.54(q) would apply. This EPFAQ does not relieve the responsibility of licensees to control their emergency plans in accordance with the regulations. This EPFAQ is only to capture this position for future revisions of NEI 99-01, and to allow for consistent

consideration for those licensees seeking to obtain NRC prior approval for an EAL scheme change.

This is considered a “deviation” in accordance with Regulatory Issue Summary (RIS) 2003-18, Supplement 2, *“Use of Nuclear Energy Institute (NEI) 99-01, Methodology for Development of Emergency Action Levels, Revision 4,”* dated January 2003.