

## EMERGENCY PREPAREDNESS FREQUENTLY ASKED QUESTION (EPFAQ)

**EPFAQ Number:** 2015-009

**DATE INITIATED** 25-Sep-15

**STATUS:**

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DRAFT PROPOSED

**ORGANIZATION** Illinois Emergency Management Ag **PHONE #**

**RELEVANT GUIDANCE:** NEI 99-01 R6

**APPLICABLE SECTION(S)** EALS AG1 AND AS1

### QUESTION OR COMMENT

The implementation guidance provided in NEI 99-01, Revision 6, for EALs AG1 and AS1 is vague in reference to the selection of the source term. The developer notes provided on pages 42 and 46 (for AS1 and AG1, respectively) do not specify an actual source term. The only guidance provided is the fourth bullet, which states, "Acceptable sources of this information include, but are not limited to, the RETS/ODCM, and values used in the site's emergency dose assessment methodology." While developers are cautioned to ensure that the method used results in a logical escalation in the ECL, they are not provided guidance for the selection of an appropriate source term. As a result, some licensees have used an ODCM source term that contains only noble gases. This is not considered to be a realistic source term for a General Emergency or Site Area Emergency Classification, in that at this accident level severity, the source term would be expected to include non-noble components. For example, the EALs for AS1 and AG1 include dose set points of 500 and 5000 mrem thyroid CDE, respectively. Because it is recognized that the iodine fraction of the source term could be limiting in these EALs, the thyroid CDE PAG was also included in AS1 and AG1. Excluding non-noble components in calculations of effluent set points for these two EALs results in values that are extremely large and non-conservative. Based on the above, is it acceptable to use a noble gas only source term for the threshold calculation of effluent monitor readings for EALs AG1 and AS1?

### PROPOSED SOLUTION

Add guidance for the selection of an appropriate source term in set point calculation, such as the gap or clad source term as referenced in NUREG-1465.

### NRC RESPONSE:

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## EMERGENCY PREPAREDNESS FREQUENTLY ASKED QUESTION (EPFAQ)

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RELEVANT GUIDANCE: NEI 99-01 R6

APPLICABLE SECTION(S) FISSION BARRIER MATRIX

### QUESTION OR COMMENT

The guidance provided for determination of loss or potential loss of the three fission product barriers in NEI 99-01, Revision 6, is based on several plant variables. The plant high-range containment radiation monitor is one of the variables used in the calculation. Initiating conditions are shown for BWRs on page 83 (example 4) and PWRs on page 98 (example 3.A). These conditions reference the determination of a site-specific value that is calculated based on a percentage of fuel clad damage. Many licensees have referenced the graphs in RTM-96, as listed in Figures A.5- A.12. In an attempt to clarify the values, these figures were reproduced in RTM-2002 with percent fuel melt/clad damage values added to relate with the dose rates on the ordinate axis. Despite this clarification, some licensees continued to use a logarithmic relationship between percent clad damage and containment radiation reading in their core damage procedure. This was contrary to the fact that the percentage of fuel clad failure is understood to be directly proportional to containment radiation reading. This relationship is demonstrated by the equations in the following guidance documents:

1. Westinghouse Owners Group Core Damage Assessment Guidance (WCAP-14696-A, Revision 1, 1999), p. 3

$$\% \text{ Clad Damage (CRM)} = \frac{\text{Current Containment Radiation Level}}{\text{Predicted Containment Radiation Level at 100\% Power}}$$

2. BWR Owners' Group Guidance Methods of Estimating Core Damage in BWRs (NEDC-33045P, Revision 0, July 2001), p. B-11

$$\% \text{ Cladding Damage} = \text{Indicated Radiation Level} / \text{Clad Damage Radiation Level} \times 100$$

Does the NRC agree that there is a direct proportionality in the amount of fuel clad damage and the containment radiation monitor reading? Does the NRC also agree that the figures for clad damage in the RTM should be read that way?

### PROPOSED SOLUTION

Issue an Information Notice to all licensees, alerting them of the possible confusion in the use of the RTM graphs in determining clad failure based on containment radiation monitors, and clarify how the graphs are to be used.

### NRC RESPONSE:

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## EMERGENCY PREPAREDNESS FREQUENTLY ASKED QUESTION (EPFAQ)

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RELEVANT GUIDANCE: NEI 10-05

### APPLICABLE SECTION(S)

### QUESTION OR COMMENT

How is the guidance in Regulatory Guide (RG) 1.219 "Guidance on Making Changes to Emergency Response Plans for Nuclear Power Reactors," dated November 2011 (ADAMS Accession No. ML102510626) specifically used to perform an evaluation to support license amendment requests (LARs) asking for NRC approval for changes to assignments and/or delays in the license's emergency response organization (ERO) augmentation?

Emergency Preparedness Frequently Asked Questions (EPFAQ) 2014-002 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15076A259) provided the following, in part:

LARs submitted for NRC prior approval must identify and evaluate every change. Changes to on-shift staffing assignments, functional responsibilities, and/or staffing numbers, must be evaluated. NEI 10-05 is one method licensees can consider to support this evaluation. However, this does not satisfy the requirement to identify and evaluate changes to ERO augmentation timing or any other change to the ERO. LARs that seek approval for changes to on-shift staff **AND** the ERO (timing, etc.) must identify each change and evaluate them individually following the guidance from RG 1.219].

RG 1.219, Section 5.2, "Evaluation Process," provides further guidance for evaluating proposed changes to the emergency plan. Step c(1) provides the following (emphasis added):

Identify the individual proposed changes to be evaluated. Each proposed change should be evaluated separately. The treatment of changes collectively should be reserved for (1) repetitive identical changes, (2) editorial or typographical changes such as formatting, paragraph numbering, spelling, or punctuation that does not change intent, (3) conforming changes, or (4) two or more elements that are interdependent (e.g., a change to one element compensates for a change in another element).

### PROPOSED SOLUTION

Nuclear Energy Institute (NEI) document NEI 10-05, "Assessment of On-Shift Emergency Response Organization Staffing and Capabilities," dated June 23, 2011 (ADAMS Accession No. ML111751698), which provides one method of performing the on-shift staffing analysis required by Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Appendix E, Section IV.A.9, states, in part:

The on-shift staff must be able to cope with the spectrum of events described in NSIR/DPR-ISG-01, Interim Staff Guidance – Emergency Planning for Nuclear Power Plants [ADAMS Accession No. ML113010523], until augmenting Emergency Response Organization (ERO) staff arrives in accordance with the site's emergency plan commitments. The augmented ERO responders assume many managerial, engineering, and administrative duties from the on-shift personnel, allowing them to focus more fully on plant operations. NUREG-0654 guidance recommends that there be 30-minute and 60-minute responders; however, many sites have different augmentation time commitments.

The use of the guidance in NEI 10-05 is intended to focus on the capabilities of the on-shift staff, specifically to identify collateral duties that could potentially interfere with the performance of on-shift EP functions/capabilities. NEI 10-05 was not intended to consider the capabilities provided by the augmenting ERO to relieve and support on-shift staffing for the purposes of providing justification for extension of ERO response times. Rather the intent is to ensure there is sufficient on-shift staff to perform all necessary EP

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functions/capabilities. The guidance in NEI 10-05, Section 2.14, "Changes to ERO Response Times," could be used to identify if there is an additional on-shift position, not currently being taken credit for or having to perform EP functions/capabilities, which may have the training and capabilities necessary to perform a major task assigned to an augmenting responder.

The evaluation of the on-shift staffing using NEI 10-05 is based on a series of specific accident scenarios identified in NSIR/DPR-ISG-01, which states, in part:

Therefore, on-shift responders must be able to cope with expected DBAs [design-basis accidents], the DBT [design-basis threat], and the response actions for a potential aircraft threat in accordance with 10 CFR 50.54(hh)(1) for the first 30 minutes of an emergency event. For those licensees that do not use 30-minute responders, on-shift staff must cope with these events until augmenting responders arrive.

However, NUREG-0654/FEMA REP-1, Revision 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," dated November 30, 1980 (ADAMS Accession No. ML040420012), Section I.D, "Planning Basis," states, in part:

No single specific accident sequence should be isolated as the one for which to plan because each accident could difference consequences, both in nature and degree.

The purpose of ERO augmentation is to relieve the on-shift personnel of emergency response functions (e.g., notifications) to allow on-shift staff to focus on plant operations and event mitigation, as well as support the control room by enhancing the capabilities in radiation protection, notifications, corrective actions, engineering support, accident mitigation and assessment.

A LAR submitted for NRC prior approval must identify and evaluate each proposed change. The guidance in NEI 10-05 is one method licensees can consider to provide input to this evaluation. For example, as discussed above, it could be used to identify if there is an on-shift position that may have the training and capabilities necessary to perform a major task assigned to an augmenting responder. This would allow the assignment of an augmented major task to that position, thereby maintaining the capability to perform the major task of the Emergency Plan. However, this by itself does not satisfy the requirement to identify and evaluate changes to ERO augmentation timing or any other change to ERO augmentation staffing. LARs that seek approval for changes to the on-shift and the augmenting ERO (e.g., staffing levels, response timing, etc.) must identify each change and evaluate them individually following the guidance from RG 1.219.

NUREG-0654/FEMA REP-1, Revision 1, Section II.B.5 states, in part:

Each licensee shall specify the positions or title and major tasks to be performed by the persons to be assigned to the functional areas of emergency activity. For emergency situations, specific assignments shall be made for all shifts and for plant staff members, both onsite and away from the site. These assignments shall cover the emergency functions in Table B-1 entitled, "Minimum Staffing Requirements for Nuclear Power Plant Emergencies." The minimum on-shift staffing levels shall be as indicated in Table B-1. The licensee must be able to augment on-shift capabilities within a short period after declaration of an emergency. This capability shall be as indicated in Table B-1.

Table B-1 provides an acceptable approach to meeting the staffing requirements of 10 CFR 50.47(b)(2). Current licensee emergency plans are NRC-approved with a site-specific on-shift staffing and augmentation. In addition to a site-specific evaluation, the NRC uses the minimum staffing guidance in Table B-1 to evaluate LARs dealing with proposed changes to on-shift and/or augmented ERO staffing; however, it is recognized that an alternate staffing approach may be acceptable provided that initial facility accident response in key functional areas is maintained at all times and there is timely augmentation of response capabilities. In support of its LAR, a licensee should provide sufficient information to allow the NRC to independently conclude that a proposed alternate staffing approach supports timely and effective performance of the "Major Functional Areas" and "Major Tasks" listed in Table B- 1.

The NRC has extensive experience with the review of proposed changes to on-shift and augmented ERO staffing. This experience has allowed identification of several common alternate approaches which have been

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found to be acceptable and that a licensee may wish to consider when developing a staffing-related LAR. The following are examples of approaches described in previously approved LARs related to ERO staffing changes.

## **Technical Justification for Extension of 30-minute Responders to 60-minutes**

### **Notification/Communication**

To support the elimination/extension of the one 30-minute responder, an additional on-shift position should be identified to fill the 30-minute responder's role of "Notify licensee, State, local and Federal personnel, and maintain communication." These positions should not be assigned additional tasks that may prevent the timely performance of their assigned notification/communication functions as specified in the emergency plan. Alternately, a licensee may be able to demonstrate that installed communications technologies obviate the need for an additional on-shift responder. The change basis would need to discuss how communication technologies employed by the proposed on-shift staff will support timely, effective and reliable notifications. Additionally, the communications technologies would need to be referenced in the emergency plan to ensure that future changes to the communications technologies are reviewed using the RG 1.219 change process as they were used as the basis for the proposed change.

### **Offsite Dose Assessment**

To support the elimination/extension of the one 30-minute responder, an additional on-shift position should be identified to fill the 30-minute responder's role of "offsite dose assessment." This position should not be assigned additional tasks that may prevent the timely performance of its assigned offsite dose assessment functions as specified in the emergency plan. Alternately, a licensee may be able to demonstrate that installed automated systems and/or information technologies obviate the need for an additional on-shift responder. The change basis would need to discuss how automated systems and/or information technologies employed by the proposed on-shift staff will support timely, effective and reliable dose assessment. Additionally, the automated systems and/or information technologies would need to be referenced in the emergency plan to ensure that future changes to the automated systems and/or information technologies are reviewed using the RG 1.219 change process as they were used as the basis for the proposed change.

### **Offsite Surveys / Onsite (out-of-plant) / In-plant Surveys**

Table B-1 assigns these major tasks to "Health Physics (HP) Technicians" with one technician on-shift and four available within 30 minutes. To support an extension in response timing of the two 30-minute responders for on-site (out-of-plant) and in-plant surveys to 60 minutes, the on-shift HP staffing should include one HP technician per unit with a minimum of two HP Technicians on-shift. If applicable, a licensee may also describe other on-shift positions with the training and qualifications needed to perform onsite surveys and how the survey results provided by these positions are sufficient to support initial emergency response actions until relieved by augmented HP technicians. To support an extension in response timing of the two 30-minute responders for off-site surveys to 60 minutes, a justification basis should discuss the on-shift methods for generating offsite dose projections, highlighting those features that promote timely and effective performance (e.g., a user-friendly computer program), and reliance upon installed and calibrated plant effluent monitors.

### **Technical Support**

To support the elimination/extension of the one 30-minute responder, an on-shift position should be identified as capable of filling the 30-minute responder's role of "Core/Thermal Hydraulics." Typically this position will be the shift technical advisor (STA). The justification should indicate that this position has the necessary expertise with "Core/Thermal Hydraulics" and the ability to provide adequate functional oversight to assure that core thermal hydraulic limits are not exceeded and that a coolable core geometry is maintained. Additional support for Core/Thermal Hydraulics expertise should then be available at 60 minutes to provide more detailed core/thermal hydraulic support. The justification basis should also identify the procedure and information technology improvements, made since the implementation of NUREG-0654, which will facilitate the assessment of core conditions. These improvements may include the use of a symptom-based emergency operating procedure network and computerized/automated systems for the acquisition and display of parameters necessary to evaluate core conditions (e.g., a Safety Parameter Display System).

### **Repair and Corrective Actions**

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NUREG-0654 Table B-1 specifies that the major tasks of “Repair and Corrective Actions,” are performed by two on-shift personnel and “may be provided by shift personnel assigned other functions.” The “position title or expertise” for the “repair and corrective actions” for these on-shift positions are Mechanical Maintenance and Electrical Maintenance. In addition, Table B-1 guidance specifies the addition of one Electrical Maintenance and one I&C Technician within 30 minutes.

To support the elimination/extension of the two 30-minute responders, appropriate on-shift positions should be identified as capable of filling these roles. The justification for this staffing change should indicate that the scope of repair and corrective actions performed by on-shift personnel would typically be limited to actions that promptly restore a nonfunctional component or system to functional status (e.g., resetting a relay or logic manipulation), or place a component or system in a desired configuration (e.g., opening a valve or closing a breaker). The justification basis should describe the training and qualifications provided to the assigned positions which allow them to perform these actions. The licensee should also identify any site-specific tasks that these personnel need to perform in order to assure expected execution of emergency operating procedures or operation of plant safety equipment (e.g., support for operation of emergency core cooling system (ECCS) equipment). The basis should make clear that expected repair and corrective actions would not include activities requiring work planning or implementation of lockout/tagout controls to complete. The evaluation should also identify that these added collateral duties do not interfere with other assigned emergency response functions.

### Radiation Protection

- a. Access control
- b. HP coverage for repair corrective actions, search and rescue first-aid and firefighting
- c. Personnel monitoring
- d. Dosimetry

As noted above, on-shift HP staffing should include one HP technician per unit with a minimum of two HP technicians on-shift. The justification for changing the augmentation time from 30 minutes to 60 minutes would need to demonstrate that on-shift HP technicians are relieved of the need to perform access control, personnel monitoring and dosimetry-related tasks, thereby freeing these personnel to cover vital response activities (e.g., HP coverage for repair, corrective actions, search and rescue, first aid and firefighting). The basis for the justification could include the availability of installed area, process, airborne and effluent radiation monitors; automated systems and information technology solutions; and enhanced work processes. Examples of supporting tools and processes may include portal monitors, self-alarmed dosimeters, or an automated access control system for the radiologically controlled area (RCA) that maintains active radiation work permits which are readily available if an emergency is declared (e.g., the system should verify qualifications, dose margins, and access requirements).

### **Technical Justification for Extension of 60-minute Responders to 90-minutes**

### Communication

To support the elimination/extension of the two 60-minute responders, two additional on-shift positions should be identified to fill the 60-minute responder’s role of “Notify licensee, State, local and Federal personnel, and maintain communication.” These positions should not be assigned additional tasks that may prevent the timely performance of their assigned notification/communication functions as specified in the emergency plan. The change basis would need to discuss how communication technologies employed by the proposed on-shift staff will support timely, effective and reliable notifications. Additionally, the communications technologies would need to be referenced in the emergency plan to ensure that future changes to the communications technologies are reviewed using the RG 1.219 change process as they were used as the basis for the proposed change.

### Emergency Operations Facility (EOF) Director

If a licensee is requesting a change in staff augmentation requirements that would have the lead EOF manager being unavailable to assume command and control within 60 minutes of the initial emergency declaration, then the on-shift staff should include enough qualified supervision to allow one supervisor to assume the emergency

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director role with no other duties, i.e., each unit under the direction of a unit supervisor, a shift manager providing oversight of the plant response, and a designated emergency director responsible for emergency plan implementation.

### Offsite Surveys / Onsite (out-of-plant) / In-plant Surveys

Table B-1 guidance suggests four augmented responders at 60 minutes - two for offsite surveys, one for onsite surveys and one for in-plant surveys. The on-shift HP staffing should include four HP technicians. The additional two HP technicians, in excess of the number evaluated previously for extending the 30-minute responders, are needed to perform in-plant protective actions for the additional maintenance personnel that need to be added to the on-shift staffing to compensate for the extension in augmentation time for the major task of repair and corrective actions, and to perform surveys to assess any offsite site releases of radioactive materials.

### Chemistry/Radio-chemistry

The justification should demonstrate that there are no chemistry-related tasks that must be performed within 90-minutes of emergency declaration (e.g., no tasks necessary to support implementation emergency operating procedures or operation of safety-related equipment).

### Technical Support

NUREG-0654 Table B-1 specifies that the major tasks of "Technical Support," are performed by a 30-minute responder in the role of "Core/Thermal Hydraulics," and two 60-minute responders with "Electrical and Mechanical engineering expertise." The justification for extension in response time for the position of "Core/Thermal Hydraulics" should include an evaluation similar to the one provided for the elimination/extension of the one 30-minute responder. The justification for extension in response time for the positions of "Electrical and Mechanical engineering expertise" should include a review of procedures to evaluate the requirement for engineering support for the extension in augmentation time. Additionally, the evaluation should include a review of the on-shift positions that may be able to support troubleshooting activities for the extension in augmentation time (e.g., electrical or maintenance personnel on-shift with supervisory personnel to provide oversight), without interfering with their primary emergency response duties.

### Repair and Corrective Actions

Table B-1 guidance outlines the addition of one electrical staff member and one I&C technician within 30 minutes with the addition of one mechanical maintenance, one rad waste operator and an additional electrical maintenance person within 60 minutes. A justification for elimination/extension of these responders may be that these positions have been added to the on-shift staff. As part of this change, a licensee may be able to provide a basis for the contention that a rad waste operator is not needed for a period of time substantially longer than 60 minutes (e.g., from a review of procedures).

### Radiation Protection

- a. Access control
- b. HP coverage for repair corrective actions, search and rescue first-aid and firefighting
- c. Personnel monitoring
- d. Dosimetry

Table B-1 guidance suggests two augmented responders at 60 minutes for the major task of "Radiation Protection." The on-shift HP staffing should include four HP technicians. The additional HP technicians in excess of the number evaluated previously for extending the 30-minute responders are needed for in-plant protective actions for the additional personnel added to the on-shift staffing to compensate for the extension in augmentation time and to assess any offsite site releases of radioactive materials. The justification for changing the augmentation time from 60 minutes to 90 minutes would need to demonstrate that on-shift HP technicians are relieved of the need to perform access control, personnel monitoring and dosimetry-related tasks, thereby freeing these personnel to cover vital response activities (e.g., HP coverage for repair, corrective actions, search and rescue, first aid, and firefighting). The basis for the justification could include the



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availability of installed area, process, airborne and effluent radiation monitors; automated systems and information technology solutions; and enhanced work processes. Examples of supporting tools and processes may include portal monitors, self-alarming dosimeters, or an automated access control system for the RCA that maintains active radiation work permits which are readily available if an emergency is declared (e.g., the system should verify qualifications, dose margins, and access requirements).

### NRC RESPONSE:

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**RELEVANT GUIDANCE:** NEI 99-01 R6

**APPLICABLE SECTION(S)** HG1

### QUESTION OR COMMENT

This EAL 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

### NRC RESPONSE:

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**EMERGENCY PREPAREDNESS FREQUENTLY ASKED QUESTION (EPFAQ)**

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**RELEVANT GUIDANCE:** NEI 99-01 R6

**APPLICABLE SECTION(S)** HS6

**QUESTION OR COMMENT**

Should consideration be given to allow for specifying relevant operating modes for the key safety functions listed in this EAL (reactivity control, core cooling, or reactor coolant system (RCS) heat removal)?

**PROPOSED SOLUTION**

**NRC RESPONSE:**

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**EMERGENCY PREPAREDNESS FREQUENTLY ASKED QUESTION (EPFAQ)**

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**RELEVANT GUIDANCE:** NEI 99-01 R6

**APPLICABLE SECTION(S)** SA1, SS1, SG1, CU2, CA2

**QUESTION OR COMMENT**

Should EALs SA1 and CU2 contain a list of power sources applicable for consideration and describe the criteria for what sources may be credited? In addition, should guidance be included to explain why a list of sources is not necessary for EALs SS1 (CA2) and SG1 as these EALs a loss of ALL sources?

**PROPOSED SOLUTION**

**NRC RESPONSE:**

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