

FAQ Number: 09-0056

FAQ Revision: 0

FAQ Title: Radioactive Release Transition

Plant: N/A

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Submitter Contact: NRC (Harold Barrett)

Phone: 301-415-1402

Email: Harold.Barrett@nrc.gov

Purpose of FAQ:

A sufficient level of information is required to demonstrate compliance with NFPA 805 Radioactive Release Criteria.

Interpretation of guidance? Yes / No

Proposed new guidance not in NEI 04-02? Yes / No

Details:

NEI 04-02 guidance needing interpretation (include section, paragraph, and line numbers as applicable):

NEI 04-02, Section 4.3.4 and Appendix G

Evaluation of the potential for radiological release due to fire fighting activities includes the following:

- **Review pre-fire plans.** Ensure for locations that have the potential for contamination that specific steps are included for containment and monitoring of potentially contaminated fire suppression water. Update pre-fire plans as necessary.
- **Review fire brigade training materials.** Ensure that training materials deal specifically with the containment and monitoring of potentially contaminated fire suppression water. Update training materials as necessary.
- **Document results in Transition Table G-1.**

Table G-1 NFPA 805 – Radioactive Release Transition Review Guidance		
NFPA 805 Requirements	Implementing Guidance	Results
Radiation release to any unrestricted area due to the direct effects of fire suppression activities (but not involving fuel damage) shall be as low as reasonably achievable and shall not exceed applicable 10 <i>CFR</i> , Part 20, Limits.	Review pre-fire plans. Ensure for locations that have the potential for contamination that specific steps are included for containment and monitoring of potentially contaminated fire suppression water. Update pre-fire plans as necessary.	Describe how the pre-fire plans do (or will) provide guidelines for the containment and monitoring for potentially contaminated fire suppression water.
	Review fire brigade training materials. Ensure that training materials deal specifically with the containment and monitoring of potentially contaminated fire suppression water. Update training materials as necessary.	Describe how the fire brigade training materials do (or will) provide instruction for the containment and monitoring for potentially contaminated fire suppression water.

Circumstances requiring guidance interpretation or new guidance:

The subject of radioactive release transition review is discussed in NEI 04-02 Section 4.3.4 and Appendix G. However, it is unclear how following the stated guidance will show that the plant's fire protection program (FPP) meets the NFPA 805 radioactive release performance criteria. Clarification is requested regarding the information that must be provided in the transition report to demonstrate compliance with the NFPA 805 criteria.

Detail contentious points if licensee and NRC have not reached consensus on the facts and circumstances:

N/A

Potentially relevant existing FAQ numbers:

None

Background

NFPA 805 Section 1.3.2, Radioactive Release Goal, states "The radioactive release goal is to provide reasonable assurance that a fire will not result in a radiological release that adversely affects the public, plant personnel, or the environment."

NFPA 805 Section 1.4.2, Radioactive Release Objective, states "Either of the following objectives shall be met during all operational modes and plant configurations.

- (1) Containment integrity is capable of being maintained.
- (2) The source term is capable of being limited."

NFPA 805 Section 1.5.2, Radioactive Release Performance Criteria, states “Radiation release to any unrestricted area due to the direct effects of fire suppression activities (but not involving fuel damage) shall be as low as reasonably achievable and shall not exceed applicable 10 CFR, Part 20, limits.”

While not specifically endorsed by 10 CFR 50.48(c), NFPA Section A.4.3, Radiation Release, states “Radioactive releases can take the form of solids, liquids, or gases generated from the combustion of radioactive material, the fire-related rupture of holding vessels, or fire suppression activities.” The model used for determining the plant risk can be a bounding risk analysis, a qualitative risk analysis, or a detailed risk analysis such as a Level III PRA. Effects from radioactive releases can be estimated from comparison of source terms and do not necessarily require detailed determination of health effects.

Release of radioactivity is defined to include releases from all sources such as primary containment buildings, radioactive waste processing, and so forth.”

Information presented in pilot LARs

The information provided in the pilot LARs describes review of the fire pre-plans and fire brigade training to address potential effluent (water run-off and smoke) release during a fire per the NEI 04-02 guidance. However, neither LAR specifically addressed the NFPA 805 radioactive release performance criteria, nor did they provide an assessment of whether and how the FPP will meet the criteria.

Response Section:

Proposed resolution of FAQ and the basis for the proposal:

Revise NEI 04-02 Section 4.3.4 and Appendix G to clearly identify the information needed to demonstrate compliance with the radioactive release performance criteria, including:

- identification of FPP elements, measures / systems / procedural control actions / flow paths, credited to meet the criteria
- description of plant programs, such as fire brigade training that are relied upon to implement the radioactive release performance criteria.

Furthermore, methods for achieving radioactive release performance criteria must be addressed on a fire area-by-fire area basis (NFPA 805 Section 2.2.4), however, nothing would prevent examining this criterion on a finer level such as fire zone or grouping fire areas together if the same measures, systems, procedural control applies. The review for radioactive release must cover all plant operational modes.

NFPA 805 is structured with goals, objectives and performance criteria. The guidance in NEI 04-02 is structured to meet the performance criteria. As with other goals of NFPA 805 satisfying the performance criteria meets the goals and objectives.

If appropriate, provide proposed rewording of guidance for inclusion in the next Revision:

NEI 04-02 Section 4.3.4, Radioactive Release Transition Review

Independent of whether the deterministic (NFPA 805 Section 4.3.1) or performance-based (NFPA 805 Section 4.3.2) approach is chosen, a licensee must also show that the fire protection goals, objectives and criteria are met as they relate to potential radioactive release scenarios. Therefore, licensees must now evaluate fire risks and fire protection for various scenarios (not involving fuel damage) that could lead to radioactive release to an unrestricted area.

The treatment of radiological release to any unrestricted area due to fire is focused on potential radioactive release due to potential fuel damage and fire fighting activities.

Fuel Damage

- The Nuclear Safety Performance Criteria (NSPC) already requires the prevention of fuel cladding damage. As such, radiological release due to fuel damage should not require a separate examination since no such damage is assumed to occur without violating the basic requirements of NFPA 805. This effectively limits the source of radiation (release source term). Containment integrity should not require specific examination. This means the scope of the fire protection analyses need not be expanded to include all containment isolation valves.
- The use of NFPA 805 Section 4.2.3 explicitly meets the radioactive release objective by limiting the source term (no fuel damage). The use of NFPA 805 Section 4.2.4 and Section 4.2.4.1 also explicitly meets the radioactive release objective by limiting the source term (no fuel damage and success path free of fire damage with margin between MEFS and LFS). The use of NFPA 805 Section 4.2.4 and Section 4.2.4.2 meets the radioactive release goal by providing “reasonable assurance that a fire will not result in a radiological release that adversely affects the public, plant personnel, or the environment” via a measure of CDF and LERF along with defense in depth and safety margin considerations.
- The Radioactive Release Performance Criteria (NFPA 805 Section 1.5.2) requires that radiation release to unrestricted areas due to direct affects of fire suppression activities shall be low as reasonably achievable and shall not exceed applicable 10 CFR, Part 20, Limits. This limits the review to fire fighting activities and the control of combustion products (smoke and particulates) and the control of fire fighting agents (primarily water).
- The potential for radiological release due to fire fighting activities should be addressed via fire pre-plans. The objective is to address the potential for the loss of boundary control for contaminated spaces.

Comment [VFR1]: While I do not think anyone is using this I wanted to make sure all bases are covered.

Refer to Appendix G for examples of this process and the documentation requirements anticipated.

G. Considerations for Radioactive Release

To demonstrate compliance with the radioactive release performance criteria, the following tasks should be performed:

- **Review pre-fire plans.** Ensure for locations that have the potential for contamination that specific steps are included for containment and monitoring of potentially contaminated smoke and fire suppression water. This review shall cover all plant operating modes. Update pre-fire plans as necessary. Summarize how the radioactive release performance criteria are met for each area, compartment, or groups of areas/compartments. For fire pre-plans that are not revised at the time of the LAR provide a summary of planned changes and provide a schedule for implementation as part of the overall NFPA 805 implementation schedule.
- **Review fire brigade training materials.** Ensure that training materials deal specifically with the containment and monitoring of potentially contaminated smoke and fire suppression water. Update training materials as required. For materials not completed by the time of the LAR provide a summary of the proposed changes and provide a schedule for implementation as part of the overall NFPA 805 implementation schedule..
- **Document results in Transition Table G-1.**

Comment [VFR2]: This matches NFPA 805 1.5.2

Table G-1 Radioactive Release Transition Report

Table G-1 NFPA 805 – Radioactive Release Transition Review Guidance
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Fire Zone/Area/Compartment	Screened In/Out	Engineering Controls		Conclusions
		Water	Smoke	
<p>Identification/name of the compartment being considered. This could be on a compartment/zone/area or groups of area level. Consider second column if required to define the exact compartment under consideration</p>	<p>Provide information that this compartment is screened in (affects radioactive release) or screened out (can not affect radioactive release). This can be a yes/no column provide the process to determine this is listed elsewhere</p>	<p>Describe how the pre-fire plans do (or will) provide guidelines for the containment and monitoring for potentially contaminated smoke and fire suppression water Describe how fire brigade training materials do (or will) provide instruction for containment and monitoring for potentially contaminated smoke and fire suppression water.</p>		