

Initial NRC staff comments on NEI 24-11 “Fire Brigade Staffing Analysis for Advanced Reactor Technology” for public meeting on May 22, 2025

Discussion topics

- Although it is described as risk-informed throughout, it is unclear how the process described in the document is risk-informed in the way that it is currently understood.
- When is it envisioned that the determination on fire brigade staffing would be made? Construction Permit Application? Operating License Application?

Figure 6-2 flowchart

- There does not appear to be a way to get to a Structural Fire Brigade result except through some insufficiency in offsite response.
- It is unclear whether you can get to “Offsite Response Only” result using the flowchart.
- The “Circle A” transfer should go to the “response time” box, rather than the “specialized training” box.
- What is the asterisk in the box labeled “For Fire Areas containing Equipment Important to Safety Identify the expected types of fires*” intended to indicate?
- Section 6.2.4 includes: “Will a memorandum of understanding (MOU)/contract need to be entered into to guarantee response and service level?”

Whereas Figure 6-2, spot 13 includes: “Will offsite response org accept MOU or contract for site response?”

Why the difference?

Method range of applicability

- Section 3.3 concludes with a statement on the suitability of using guidance for non-power reactors for micro reactors. It would be useful to have a definition of micro reactors, at least its intended use in this document.
- Section 6.2.2, “Determine the Need for Onsite Fire Response,” includes: “In the event of very small reactors approved to operate for specific applications (e.g., micro-reactors), the safety features of the design could allow for sole reliance on offsite fire response.” This statement and further discussion on micro-reactors in this section imply a size limitation on the determination of acceptability of offsite only fire response that is not borne out in the rest of the document.

Key comments

- It seems that if there is a special fire hazard at the plant (such as sodium or other combustible/toxic coolant or moderator) that it would be difficult to justify the “incipient fire brigade” or “offsite response only” results.
- This document would benefit from a more explicit definition of “incipient fire brigade,” in particular on the appropriate size.

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- Section 6.2.2 includes the sentence: “If the ability to achieve and maintain safe shutdown is ensured, given a fire in any fire area without operator intervention, and alternative onsite operations staffing has been approved by the NRC, then offsite fire response could be utilized and is presented in Figure 6-2.” [emphasis added]

This indicates that this alternate staffing approval is a prerequisite for the “offsite only” determination, but it is unclear to the NRC when, and through what process, this approval would be granted, or in what document.

- Section 6.2.4 includes: “If the capability and reliability of the offsite fire response organization is not acceptable, then an onsite structural fire brigade is recommended”

Does this mean without an offsite response there must be a structural fire brigade? Is there an option of just an incipient fire brigade?

- Section 6.1 states the FSSA, Fire PRA, and FHA need to be in a “stable state”. What does this mean and who determines what “stable state” is?
- For the fire modeling in the FHA (i.e., for ZOI calculations) what will the source of the fire characteristics (like HRR) be? Standard PRA methods?
- Section 6.1 states that there can be offsite response only, where section 6.2.4 states that offsite response would be a supplement to the incipient fire brigade. Can there be offsite only or is it in addition to an incipient fire brigade?
- Suggest a section describing level of detail to be included in various types of submittals (CP, OL, COL, etc.).
- The discussion of the information needed from the FHA seems to indicate that the fires under consideration involve fixed combustibles/ignition sources (i.e., electrical cabinets), and might be difficult to determine for other types, such as transients or pool fires.
- Would the individual with the “necessary level of understanding of the plant” described in Section 6.4 be present at all times?
- It is unclear how applicable the data on fire detection and suppression is to the proposed staffing levels because this data is from the current operating fleet which has staffing levels far above those in the current proposal.

Other comments

- In the enumeration of the potential outcomes of the process, the “Onsite Incipient Fire Brigade” result should also indicate that offsite response is required.
- The document uses the term “important to safety” throughout. The advanced reactor community does not use this term. Consider changing.

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- Footnote 2 [page 4] states: “Note, the other sections of 10 CFR 50.48 *[i.e., other than 50.48(a) -ed.]* do not apply to the advanced reactor fleet.” It is the position of the NRC that 50.48(f) would apply to advanced reactors undergoing decommissioning that are subject to 50.48.
- In Section 3.2.1 concerning guidance in Regulatory Guide 1.189, consider including discussion of RG sections 5.3.1 and 5.3.2.
- In section 3.4.4, the guidance in Safety Standards Series documents “NS-G-1.7, 2004” and “NS-G-2.1, 2000” are mentioned, and it is noted that these two documents have been superseded by SSG-64 and SSG-77. Did the guidance change when these documents were superseded?
- Reason for including NFPA 806, which does not address fire brigade size?
- Section 5.2 includes the following:

Specific attention should also be given to high hazard fire sources (turbine fires, transformer fires, switchgear, etc.) and separating these hazards from equipment important to safety. These fires would not be expected to require a fire response greater than that provided by an incipient fire brigade, and therefore additional echelons of defense-in-depth should be provided. [emphasis added]

It is unclear why the underlined is correct.

- Section 5.3 includes the following:

The advanced reactor fleet should design passive fire barriers (including penetration seals, doors, and dampers) in accordance with guidance provided in RG 1.189 and should be or commensurate with the hazard in the fire area. [emphasis added]

Is the highlighted “or” extraneous?

- Section 6.2.3 in the second bullet on the content of the incipient stage evaluation:

Based on the information contained in the FHA and the Fire PRA (if performed), and the plant design (factored in ZOIs), an assessment can be made of the fires that are expected to propagate beyond the ignition source (e.g., fires propagating outside of an electrical cabinet such that it could potentially damage adjacent cabinets/cable trays).” [emphasis added]

Should “factored” be “factoring”?

- Section 6.2.4 “Offsite Fire Response Organization Adequacy” would be a good place to point to the guidelines from the NEIL Loss Control Manual identified earlier.
- Suggest adding SSG-64 and SSG-77 to the references, since they are the documents currently in effect.

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- The color of the font in Figures 6-1 and 6-2 are difficult to read.