

FAQ Number 16-0010 FAQ Revision A

FAQ Title Alternative Methodology to NUREG/CR-6850 for Maintaining FPRA Ignition Frequencies Weighting Factors

Plant: \_\_\_\_\_ Date: June 9, 2016  
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FPRA TF  BWROG  PWROG

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**Purpose of FAQ:**

This FAQ proposes an alternative method to NUREG/CR-6850 for maintaining Fire PRA ignition source fire frequencies and establish a framework for maintenance of cable loading weighting factors.

In the event of a change in the number of ignition sources in a plant, current guidance provided by NUREG/CR-6850 requires the recalculation of ignition source frequencies. The formula yielding the ignition frequency for a given ignition source includes a weighting factor,  $W_{IS,J,L}$ . This weighting factor is the ratio of the count of the ignition source in question, divided by the total count of ignition sources of the same type in the same generic plant location. See NUREG/CR-6850, section 6.3.1 for more details.

The guidance in this FAQ would eliminate the need to recalculate the NUREG/CR-6850 Task 6 results and the individual fire scenario frequencies for Task 11 if the count of ignition sources changes. This change provides a more pragmatic approach for evaluating the addition or removal of ignition sources.

Application of the proposed method would address the following adverse effects that may be encountered when updating a Fire PRA:

1. The reduction of calculated risk in relatively high-risk fire scenarios resulting from the addition of ignition sources in low-risk locations.
2. The increase of calculated risk in relatively high-risk fire scenarios resulting from the elimination of ignition sources.

As risk models mature and are utilized in evaluating risk informed plant change evaluations (e.g. the use of NFPA-805 self-approval models), consideration for the risk implications of adding or removing of equipment will increase. Therefore, it is expected that the location chosen for the addition of new ignition sources be separated from risk sensitive targets. In these cases, were the guidance in NUREG/CR-6850 to be used, the increase in the number of countable ignition sources (i.e. all ignition source types other than transients and large system ignition sources) would decrease the frequency applied to other, potentially higher risk scenarios, with the same ignition source types. Therefore, the inclusion of a new ignition source would produce the undesired effect of artificially reducing calculated plant risk elsewhere in the model. Conversely, the removal of an ignition source from the analysis would redistribute ignition frequency to the remaining scenarios resulting in an increase of the plant fire risk in those scenarios.

Furthermore, the current method from NUREG/CR-6850 imposes a burdensome process for maintaining cable loading weighting factors when implementing modifications that add or remove cables. With regard to changes in combustible cable loading, risk insights from the Fire PRA models are generally only impacted by large-scale modifications that include a significant change in combustible cable loading. Therefore, this FAQ establishes a framework to treat a change in cable loading as resulting in a negligible change in ignition frequency, thereby eliminating the burden of maintaining cable loading information.

In summary, the process proposed by this FAQ would maintain constant ignition source and cable loading weighting factors. However, it is recognized that during specific PRA model updates, a rebaseline of the weighting factors might be desirable. Therefore, the intent of this FAQ is to provide an alternative approach to NUREG/CR-6850 to pragmatically enhance the application of the Fire PRA models and reduce unnecessary model updates.

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**Relevant NRC document(s):**

NUREG/CR-6850, Section 6.5.7

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**Details:****NRC document needing interpretation (include document number and title, section, paragraph, and line numbers as applicable):**

NUREG/CR-6850, Section 6.5.7

**Circumstances requiring interpretation or new guidance:**

Adding and removing ignition sources produces an undesired effect when redistributing the ignition frequencies for evaluating the effect on plant risk increases and decreases in risk informed change evaluations.

Adding or removing cables within a plant location is generally immaterial to the existing transient fire ignition frequencies. This FAQ would establish a basis for not updating the cable loading factors when evaluating modifications that add or remove cables within a compartment.

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

