

NRC Position on industry's FAQ 14-0007 on Transient Fire Frequency

Issue #1: Requirements for Identifying a TISR in the plant for frequency reduction in the PRA

One type of TISR which is proposed as having a lower frequency is a transient free zone. Transient free zones for frequency reduction may currently only be marked on the floor. To credit a reduced frequency within a PAU through the TISR approach, a stronger visual cue more than a marked floor is necessary. Similar to the treatment for a protected train, a visual cue, e.g. a pylon/rope or pylon/chain, or a temporary barrier such as a gated, cross-link fence, must supplement the marked floor to qualify the TISR for a reduced frequency in the PRA. Appropriate signage indicating a transient free zone should be displayed also.

Issue #2: Dividing PAUs into TISRs.

The staff agrees that different plant conditions within certain PAUs support the division of PAUs into TISRs. A TISR should be limited by definition to a subset of a PAU, rather than the entire PAU. Although not in question, a fire ignition frequency should be applied to a PAU or TISR unless prohibited by operation or design as directed in NUREG/CR-6850.

Issue #3: Use of weighting factors from FAQ 64 for this FAQ

The description of weighting factors in FAQ 64, which is the latest description, regularly refers to compartments, aka PAUs. The staff questions whether the description of these influence factors need to be adjusted for this FAQ. For example, should the reference be made to TISRs in any of these cases where compartment is used in the description? Or is "compartment" still the correct reference? Also, it should be noted in this FAQ that the constraints on the use of influence factor ratings from violations as described in FAQ 64 applies to this FAQ as well.

Issue #4: Weighting influence factors by floor area

The staff disagrees with industry's proposal to apply floor area to the calculation of influence factors.

From a review of transient influence factors from NUREG/CR-6850, guidance for influence factors are not meant to be scaled by floor area. For example, maintenance is based on low, medium, high, or very high number of work orders for the typical PAU, and are not scaled by floor size. That is, according to the guidance, a low number of work orders for a small room does not receive the same influence factor as a high number of work orders for a large room.

Also, according to the guidance, should a room have both open and closed containers of combustible/flammable materials, the high for open containers is used regardless of the closed containers being present. Furthermore, if no combustible/flammable materials are stored in one section of a PAU, but in another part are stored in closed containers, then the worst category,

medium, is used for the PAU. Thus, no averaging is to be applied in either one of these transient fire influence categories. Applying a scaled influence factor introduces a new level of subjectivism beyond the existing guidance.

Should the influence factor be significantly different over different parts of a PAU, then the PAU should be divided into different TISRs. Averaging the presence of transients over the TISR or PAU is not the way towards more realism. Averaging would underestimate the risk from transients in that portion of the PAU containing frequent transients.

Issue #5: Adjusting frequency to a PAU through a TISR addition

The staff agrees in part with industry's approach in this area.

In particular, an assigned PAU fire frequency could be changed if the licensee makes a change to the plant that would affect the frequency. For instance, if a transient free zone is assigned to the plant after the PAU analysis which assumed no transient free zone was done, then the PAU frequency could change. Should the PAU frequency change, then the remainder of the PAU frequencies for the remainder of the location would be affected.

However, if no plant change is made after the assignment of the PAU frequencies, then the PAU frequency must be preserved. That is, the PAU frequency after the breakup into TISRs must be forced to maintain the original frequency. In other words, each TISR will have its own frequency, but scaled as the PAU frequency will be forced to be the same as originally.

Issue #6: This question was not considered by the FAQ.

What if there are cables in the overhead within the ZOI from fires on each side of the TISR? Compartments don't have this problem as the PAU essentially constrains the effect of the fire. However, for the TISR approach, the analyst would have to develop scenarios from both TISRs and assign both scenarios to the overall CDF/LERF. Each scenario would have different fire frequencies based on the particular TISR.

Comment: Impact of use of scenario ZOI in substantiating insights

It's worth noting that assuming 0.5 for the ZOI over the TFZ area in industry's Table 6 (Scenario Data, TISR Ratio) makes the results of the partitioned PAU D seem out of line in the Table 7B on TISR Based Scenario Frequencies without floor area. However, if the 0.5 which represents the ZOI over the TISR area is changed to 0.25 or 0.1 (comparable to the other ZOI to TISR area ratios), then the TFZ scenario frequency experiences a much larger decrease from the partitioning of PAU D (10% decrease in TFZ scenario frequency for 0.5 in industry's example, 55% decrease when using 0.25 instead of 0.5, 82% decrease when using 0.1 instead of 0.5) and is in line with what is expected. The lesson here is that the ZOI is a key variable in

determining the scenario frequency. Thus the approach without integrating floor area into the weighting factors provides frequencies consistent with expectations.

Conclusion:

The staff agrees with the resolution of PAUs into TISRs as warranted. Several concerns/questions remain in its implementation as described above.

First of all, for those TISRs warranting a frequency reduction, more than a marked floor is necessary. Precautions such as those taken for the protected train are necessary for the PRA to use a reduced frequency for the TISR representing a transient free zone.

Secondly, given the existing guidance for influence factors, floor areas should not be integrated into the influence factors. Such a change is unwarranted.

Next, the staff agrees that the frequency of an existing PAU can be changed to reflect a plant change. However, absent a plant change, the PAU frequency should remain the same.

Finally, the staff has identified other concerns and comments above.