August 29, 2014

The staff has reviewed the simplified approach to assess the probability of energetic arcing faults breaching a well-sealed MCC electrical cabinet of 440V or greater and has the following comments.

The evaluation leading to the 0.45 severity factor needs to be expanded. It should be possible to understand from the text exactly how this value is determined to the extent that a knowledgeable reader could reproduce the evaluation. This level of detail is requested because one use of the FAQ would be for each licensee to be able to replicate, or confirm the applicability of, the 0.45 estimate. *(NEI, please provide additional discussion for 0.45)*

If the staff accepts the description to estimate the 0.45 severity factor (which based on the phone discussions seems likely), then 0.1 can be used to characterize the likelihood that such a fire can breach a well-sealed MCC cabinet and damage all cables within 6" from the top of the cabinet. Further modeling of fire propagation and damage should be done using the NUREG/CR-6850 models for propagation through cable trays.

The basis for this 0.1 is an acceptable likelihood for cabinet breach of 0.2, and a phenomenological fire modeling evaluation of the MCC buckets causing damage yielding the severity factor of 0.45. The 0.2 probability of cabinet breach is based on the Fire PRA Methods Review Panel determination that a MCC fire has the probability of 0.19 to breach a cabinet. Revision F of the FAQ proposed a cabinet breech factor of 0.087 instead of 0.2. The NRC Staff does not anticipate accepting this value because it is based on re-evaluation of the data that was not performed as part of a formal consensus process. Formal review of the updated database utilized in the RES/EPRI database project would be needed to modify the 0.2 estimate. Furthermore, the NRC staff performed a preliminary assessment of the data from 1990-2009 from the new RES/EPRI database project which supports a 0.2 for the likelihood of an energetic fault (non-HEAF) from a MCC. Quantitatively, the 0.1 is supported by
0.2 * 0.45 ~ 0.1

For the second case where all cables are located higher than 6" above the cabinet, the phenomenological fire modeling evaluation that was used to develop the 0.45 estimate could be applied to different heights. In this case, once the first cable has been damaged, further modeling of fire propagation and damage should be done using the NUREG/6850 models for propagation through cable trays.

Any modification of the phenomenological fire modeling in either case (e.g., using a fire ramp up time prior to peak HRR upon initiation of a fire and crediting suppression due to this growth period) is a method that is not yet accepted by the NRC Staff and would require a detailed submittal and further review by the Staff.