

The discussion of this issue found that this issue affects only general electrical cabinets and panels. In the case of switchgears, load centers, unit substations, and motor control centers the term 'segment' was uniformly interpreted to be equal to the individual vertical sections that define these types of components. As applied to general electrical cabinets and panels, the term 'segments' could be interpreted to mean different metrics.

- A segment could be defined as an enclosed element that is generally independent of size or volume (also referred to as a vertical section).
- A segment could be defined as an individual section of an enclosure regardless of whether it was fully enclosed.
- A segment could be defined based on a 'standard' or reference sample panel size.

Depending on the metric being used, the counting of electrical cabinets would result in varying results and consequently, different fire ignition frequency values. While NUREG/CR-6850 allows the establishment of plant specific criteria for counting of electrical cabinets, additional guidance is required to achieve a consistent basis for determining the ignition frequencies.

Detail contentious points if licensee and NRC have not reached agreement

This topic has impact on the NFPA-805 pilots, non-pilots and other users of NUREG/CR-6850.

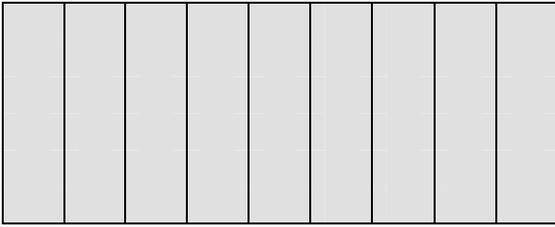
Potentially relevant existing FAQ numbers:

This guidance is specific to the characterization of electrical cabinets for Bin 15 ignition frequency determination. The characterization of switchgear and load center segments for the purposes of high energy arcing faults is addressed by FAQ 06-0017.

Response Section

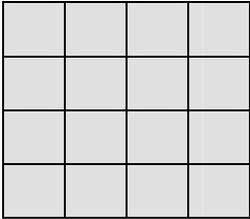
A generalized counting criterion for general electrical cabinets and panels is proposed. This proposed criterion would involve two elements.

For switchgears, load centers, unit substations, and motor control centers the counting for the purposes of NUREG/CR-6850, Task 6, Bin 15 would be based on vertical section. This counting is illustrated in the following examples.



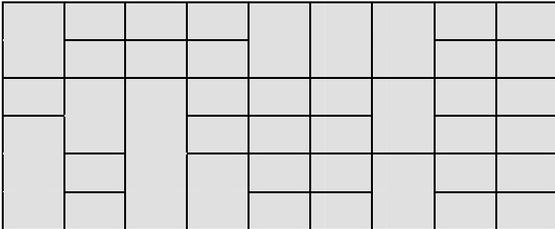
Medium Voltage Switchgear

9 Breakers and Sections
Count = 9 for Bin 15



Load Center or Unit Substation

16 Breakers in 4 Sections
Count = 4 for Bin 15



Motor Control Center

41 Breakers/Starters in 9 Sections
Count = 9 for Bin 15

For general electrical cabinets and panels, it is proposed that the counting be based on a physically enclosed element. A physically enclosed element means that the cabinet or panel is fully enclosed by 6 solid elements with the provision that a non-combustible floor or ceiling may represent the bottom or top. The term ‘solid’ element is not intended to mean that the element is substantially continuous. Consequently, breeches or unsealed penetrations could still be treated as ‘solid’. The term ‘solid’ is intended to prevent a panel that is divided by an element that is substantially open from being treated as two separate panels.

This proposed counting for electrical cabinets and panels is to be applied for a wide range of panel sizes. However, recognizing that the ignition frequency is more a function of the cabinet contents than the cabinet size, a basis is needed to address outlier conditions. It is proposed that each user be required to establish criteria for identifying the outliers and the basis for counting them. As an example, they can be counted by establishing a nominal ‘standard’ or reference cabinet size. The count could also be based on evaluating the cabinet internals relative to a defined ‘standard’ or reference configuration.

For example, a particular user may define a cabinet with any horizontal dimension more than 8 feet as an outlier, and a ‘standard’ cabinet as being nominally 4 feet in length x 3 feet deep. (cabinet height is not generally an issue based on the use of vertical sections). Using this example, the following cabinet and panel examples would be counted as follows:

6 ft



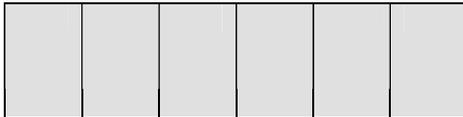
Cabinet is not an outlier –
Count = 1



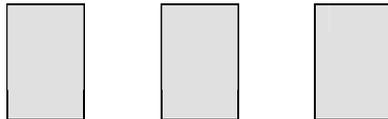
Cabinet is same as standard
Count = 1



Internal dividers are not solid
Count = 1



Internal dividers are solid
Count = 6



Three independent cabinets
Count = 3

12 feet, 3 ft deep



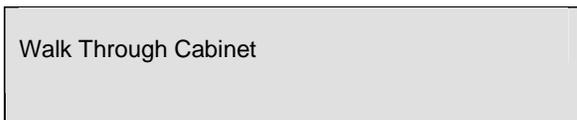
Panel is an outlier,
using a 4' standard
cabinet -
Count = 3

9 ft long , 6 ft deep



Cabinet is an outlier, no evaluation of
contents, based on reference cabinet
Count = 3 – due to both variation
from the standard length and width..

9 ft long , 6 ft deep



Cabinet is an outlier, evaluation of
contents shows low cable loading
typical of the standard cabinet -
Count = 1

The intent is that a basis for the counting of outliers is required. A volumetric comparison is not required. Also, to prevent any appearance that this treatment is intended to be based on physical measurements, the proposed approach allows only integer counting. The assignment of fractional values would not be allowed. In addition, the proposed methodology retains the option for screening small cabinets resulting in a count of zero for them (as discussed in NUREG/CR-6850). As applied in this case, the user would be allowed to screen cabinets or panels based on defined criteria and exclude them from the overall population count. When performing detailed fire modeling, the fire should be applied to the actual cabinet footprint by vertical section, including outliers.

Basis:

The existing guidance in NUREG/CR-6850 is based on industry data which has only been provided with fidelity adequate to support plant level ignition frequencies for electrical cabinets. Although the guidance does address the broad applicability of the data, it leaves room for variability that can create issues with PRA quality. It is important that the ignition frequency results be of sufficient quality to support not only NFPA-805 transition but also the more broad scope of regulatory inspection and enforcement issues.

The guidance proposed will provide more consistency when determining plant specific electrical cabinet ignition frequencies while working within the bounds of the exiting data provided by the NUREG. This should facilitate the review and acceptability of the results.