

Appendix F, Attachment 4

Fire Ignition Source Mapping Information: Fire Frequency, Counting Instructions, Applicable Fire Severity Characteristics, and Applicable Manual Fire Suppression Curves

Fire Ignition Source Mapping Table:
See additional counting instructions at end of table.

Mapping Fire Ignition Source Scenarios to Fire Frequency, the Fire Severity Characteristics, and the Applicable Manual Fire Suppression Curve				
Ignition Source Bin	Counting Unit	Fire Frequency per Counting Unit (/ry)	Use These Fire Severity Characteristics	Use This Manual Fire Suppression Curve
Cables – Thermoplastic or Non-Qualified:				
Low Loading	per fire area	1.6E-05	Self-Ignited Cable Fire	Cable Fire
Medium Loading		4.8E-04		
High Loading		1.4E-03		
Electrical Cabinets:				
Switchgear Cabinets	per distinct vertical section	5.5E-05	Small Electrical Fire	Electrical Fires
		4.7E-06	Energetic Faults	Energetic Faults
General Electrical Cabinets		6.0E-05	Small Electrical Fire	Electrical Fires
General Control Cabinets		6.0E-05	Large Electrical Fire	Electrical Fires
MCR and MCR Service Cabinets	per unit control room	4.8E-03	Large Electrical Fire	Main Control Room
Electric Motors:				
Electric Motors – (< 100HP)	per motor	6.5E-04	Small Electrical Fire	Electrical Fires
Electric Motors – (≥ 100HP)		6.5E-04	Large Electrical Fire	Electrical Fires
Generators – General:				
Diesel Generators	per generator	5.6E-03	Engine and Heater Fires	All Events
Gas Turbine Generators		3.2E-04		
Reactor Protection System MG Sets		6.7E-04		
Hydrogen Sources:				
H2 Recombiner (BWR)	per recombinder	5.5E-03	Gas Fire	All Events
H2 Storage Tanks	per H2 tanks	6.5E-04	Gas Fire	All Events
H2 - Normally Charged Piping	per fire area with charged piping	9.7E-04	Gas Fire	All Events
Hot Work:				
Hot Work – Low	per fire area	2.3E-05	Self-ignited cable, transient, or other (see text)	Hot Work / Welding
Hot Work – Moderate		6.9E-05		
Hot Work – High		6.9E-04		
Main Turbine-Generator Set:				
TG Exciter Fire	per exciter	1.4E-03	Small Electrical Fire	Turbine Generator
TG Oil Fires	per lube oil system	1.7E-03	Oil Fire	
TG Hydrogen Fires	per H2 system	1.4E-03	Gas Fire	

Mapping Fire Ignition Source Scenarios to Fire Frequency, the Fire Severity Characteristics, and the Applicable Manual Fire Suppression Curve				
Ignition Source Bin	Counting Unit	Fire Frequency per Counting Unit (/ry)	Use These Fire Severity Characteristics	Use This Manual Fire Suppression Curve
Miscellaneous Components:				
Air Compressors (< 100HP)	per compressor	1.6E-04	Small Electrical Fire	Electrical
		1.0E-04	Oil Fire	All Events
Air Compressors (≥ 100HP)	per compressor	1.6E-04	Large Electrical Fire	Electrical
		1.0E-04	Oil Fire	All Events
Battery Banks	per interconnected battery set	1.9E-04	Small Electrical Fire	Electrical Fire
Boiler Heating Units	per boiler	9.7E-04	Engines and Heaters	All Events
Bus Bars	per bus bar	4.7E-06	Energetic Faults	Energetic Faults
Electric Dryers	per dryer	5.4E-04	Small Electrical Fire	Electrical Fire
Ventilation Subsystems	per major ventilation system	6.0E-05	Small Electrical Fire	Electrical Fire
Pumps:				
Reactor Coolant Pump (PWR)	per reactor coolant pump	6.2E-04	Large Electrical Fire	Electrical Fire
		3.1E-04	Oil Fire	All Events
Reactor Feed Pump (BWR)	per reactor feed pump	8.4E-05	Large Electrical Fire	Electrical Fire
		8.4E-04	Oil Fire	All Events
Main Feedwater Pumps	per main feedwater pump	2.7E-04	Large Electrical Fire	Electrical Fire
		2.7E-03	Oil Fire	All Events
Other Pumps (< 100HP)	per pump	5.0E-05	Small Electrical Fire	Electrical Fire
		5.0E-05	Oil Fire	All Events
Other Pumps (≥ 100HP)	per pump	5.0E-05	Large Electrical Fire	Electrical Fire
		5.0E-05	Oil Fire	All Events
Transformers:				
Outdoor/Yard	per transformer	4.2E-03	Yard Transformer Fire	Yard Transformer Fires
Indoor Dry		1.1E-04	Small Electrical Fire	Electrical Fire
Indoor Oil-Filled		1.1E-04	Indoor Oil-Filled Trans.	All Events
Transient Fuels:				
Transients – Low	per fire area	5.5E-05	Transient Fuel Fire	Transients
Transients – Moderate		1.7E-04		
Transients – High		1.7E-03		

Additional Counting Instructions:

Electrical Cabinets - All types:

- Count distinct vertical sections
- Do not individual cubicles for devices such as breakers and MCCs - count vertical sections.
- Do not count fully enclosed wall-mounted electrical panels and junction boxes.

- General electrical cabinets include MCCs, load centers, breakers, electrical distribution cabinets, battery chargers, inverters, and all other similar cabinets generally associated with power distribution and/or power switching.
- General control cabinets include relay cabinets, signal conditioning cabinets, signal multiplexing cabinets, cabinets provided for local control of systems and components such as the diesel generator, remote shutdown panels, and all other similar cabinets generally associated with plant instrumentation and control functions.

Electrical Cabinets - MCR and MCR Service Cabinets:

- “MCR service cabinets” refers to cabinets located in an area immediately adjacent to the main control room that might be located in the main control room at another plant. Such areas are often referred to as an “auxiliary electrical equipment area”, “relay room”, or “relay rack room”. Other names may be applied on a plant-specific basis. Not all plants will have such fire areas, in which case, these cabinets are located in the MCR itself.

Electric Motors:

- Do not count motors that are 5 HP or less.
- Do not count any motor already included as a part of another fire ignition source:
 - Pump motors are counted as part of the pump.
 - Ventilation fan/blower motors are counted as a part of a ventilation subsystem.

Miscellaneous Components - Air Compressors:

- Do not count air compressors if the drive motor is 5 HP or less.

Miscellaneous Components - Batteries:

- Count interconnected banks of batteries.
- Do not count small batteries (e.g., individual battery cells) associated with back-up power to a small component
- Do not count emergency lighting batteries.

Miscellaneous Components - Ventilation Subsystems:

- Do not count wall mounted ventilation fans if the drive motor is 5 HP or less.

Pumps - Other Pumps:

- Do not count small sampling pumps.
- Do not count pumps if the drive motor is 5HP or less.

Transformers - Indoor Dry Transformers:

- Count only transformers that are at least 1 cubic foot in size.
- Count wall-mounted transformers if they do satisfy other counting criteria.
- Do not count lighting transformers.
- Do not count control power transformers.

- Do not count small transformers integrated as an individual component within a larger electrical panel - these are included as a part of the panel.
- Battery chargers and inverters are counted as general electrical cabinets.

END