

NRC INSPECTION MANUAL

APOB

INSPECTION MANUAL CHAPTER 0609 APPENDIX F ATTACHMENT 5

CHARACTERIZING FIRE IGNITION SOURCES

Effective Date: January 1, 2025

0609F.5-01 PURPOSE

This attachment provides supporting information describing the heat release rate (HRR) profile (HRR versus time curve) parameters and HRR gamma distribution parameters for various fixed and transient ignition sources. The profiles and distribution parameters were used to develop the tables and plots in sets A, D, and E of Attachment 8 to the Fire Protection Significance Determination Process (SDP), IMC 0609 Appendix F. These tables and plots allow the analyst to look up the vertical and radial zone of influence (ZOI) (used in Step 2.3.2), severity factor (SF) (used in Step 2.6.1), and damage time (used in Step 2.7.1) for a specified fixed or transient ignition source, target type, and target location for fire damage state 1 (FDS1) scenarios. Guidance is also provided for determining the HRR of confined and unconfined oil fires, cable tray fires, and hot work fires.

0609F.5-02 HEAT RELEASE RATE PROFILE OF FIXED AND TRANSIENT IGNITION SOURCES

02.01 Heat Release Rate Profile of Fixed Ignition Sources

The HRR profile for all fixed ignition sources is given by the following equation:

$$\dot{Q}(t) = \begin{cases} \dot{Q}_{\text{peak}} \left(\frac{t}{t_g} \right)^{n_g} & t \leq t_g \\ \dot{Q}_{\text{peak}} & t_g < t \leq t_g + t_p \\ \dot{Q}_{\text{peak}} \left(1 - \left(\frac{t - t_g - t_p}{t_d} \right)^{n_d} \right) & t_g + t_p < t \leq t_d + t_g + t_p \end{cases} \quad [5-1]$$

where

\dot{Q}	=	HRR of the ignition source (kW)
\dot{Q}_{peak}	=	Peak HRR of the ignition source (kW)
t	=	Time (s)
t_g	=	Growth time (s)
n_g	=	Growth exponent
t_p	=	Plateau time (s)
t_d	=	Decay time (s)
n_d	=	Decay exponent

The HRR gamma distribution parameters for fixed ignition sources are given in Table A5.1. The HRR profile parameters for fixed ignition sources are provided in Table A5.2. The distribution and profile parameters in the two tables were taken from NUREG 2178, Vol. 1 (for electrical enclosures) and NUREG 2178, Vol. 2 (for motors and dry transformers).

Figure A5.1 shows the 98th and 75th percentile HRR profiles for a large open electrical enclosure, to illustrate the shape of the HRR profile and how it is affected by the value of the peak HRR. According to Table A5.2, the HRR for electrical enclosures initially grows at a t^2 rate ($n_g = 2$) to reach the peak HRR in 12 min ($t_g = 720$ s), subsequently remains steady at the peak HRR for 8 min ($t_p = 480$ s), and finally decays at a linear rate ($n_d = 1$) back to 0 in 19 min ($t_d = 1140$ s). The 98th and 75th percentile peak HRR for a large open electrical enclosure (1000

and 200 kW, respectively) can be calculated by using the inverse gamma distribution function with $\alpha = 0.377$ and $\beta = 427.9$ (from Table A5.1) and a probability of 0.98 and 0.75, respectively.

Table A5.1 – HRR Gamma Distribution Parameters for Fixed Ignition Sources				
Ignition Source	α	β	75 th % peak HRR (kW)	98 th % peak HRR (kW)
Class A Motors (>5-30 hp)	1.34	3.26	6	15
Class B Motors (>30-100 hp)	1.17	8.69	14	37
Class C Motors (>100 hp)	1.10	24.19	37	100
Class A Dry Transformers (>45-75 kVA)	0.38	12.84	6	30
Class B Dry Transformers (>75-750 kVA)	0.41	28.57	15	70
Class C Dry Transformers (>750 kVA)	0.46	50.26	30	130
Group 1 Switchgear and Load Center (TP, Closed)	0.991	43.7	60	170
Group 2 MCCs and Battery Chargers (TP, Closed)	1.213	29.8	50	130
Group 3 Power Inverters (TP, Closed)	0.518	72.6	50	200
Group 4a Large Enclosures [$>50 \text{ ft}^3$] (TP, Closed)	0.518	145.2	100	400
Group 4a Large Enclosures [$>50 \text{ ft}^3$] (TP, Open)	0.377	427.9	200	1000
Group 4b Medium Enclosures [$>12 \text{ ft}^3$] (TP, Closed)	0.518	72.6	50	200
Group 4b Medium Enclosures [$>12 \text{ ft}^3$] (TP, Open)	0.505	119.5	80	325
Group 4c Small Enclosures [$\leq 12 \text{ ft}^3$] (All)	0.875	12.4	15	45

Table A5.2 – HRR Profile Parameters for Fixed Ignition Sources					
Ignition Source	t_g (s)	n_g (s)	t_p (s)	t_d (s)	n_d (s)
Motors	120	2	780	120	1
Dry Transformers	0		600	600	1
Electrical Enclosures	720	2	480	1140	1

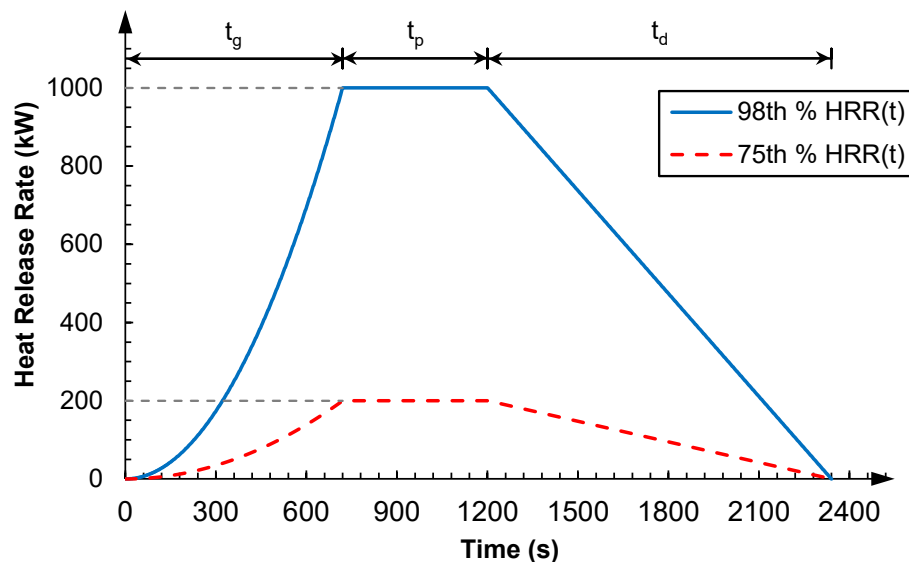


Figure A5.1-98th and 75th HRR Profiles for a Large Open Electrical Enclosure

02.02 HRR Profile of High Energy Arcing Faults (HEAFs)

Switchgear and load centers (440V and above) are subject to HEAFs in addition to the possibility of a general or thermal fire. As a result, two ignition scenarios need to be considered for electrical enclosures ≥ 440 V; HEAF and non-HEAF. For the HEAF scenario in switchgear, the vertical ZOI above the top of the enclosure and the radial ZOI from the edge on all sides of the enclosure is 4.5 ft. for thermoplastic (TP) cable targets and 3.5 ft. for thermoset (TS) cable targets (see IMC 0609 Appendix F Attachment 3 for details). All unprotected targets within this region are assumed to be damaged instantaneously when the HEAF occurs and all unprotected secondary combustibles within the region are assumed to ignite instantaneously. The ZOI for the HEAF scenario in load centers is provided in Table A3.1 in Attachment 3 as a function of the location of the circuit breaker at which the HEAF is postulated and the fragility the target. The HRR profile for a HEAF fire has no t-squared growth stage ($t_g = 0$ s). The HEAF fire reaches HRR_{peak} instantaneously at ignition ($t = 0$ s), remains at HRR_{peak} for 8 min ($t_p = 480$ s), and subsequently decays linearly to 0 kW in 19 min (1140 s).

For HEAFs in switchgear (MV Zone 1 and 2), fire spread to switchgear vertical sections that are adjacent to where the HEAF initiated is postulated due to the potential for the arc to breach the shared boundary. A breach in the shared boundary could allow the HEAF and ensuing fire to expose the combustible contents of an adjacent section to an energy flux high enough to sustain ignition. The HRR profile for the vertical section where the HEAF originated uses the 98th percentile peak HRR without a growth stage for switchgear and load centers (as described in NUREG-2262; Figure 6-12). The HRR profile for each adjacent switchgear is conservatively set to a HRR distribution with a 98th percentile peak HRR of 170 kW. The adjacent ignited switchgear vertical sections have a HRR growth, steady, and decay stage following a growing electrical enclosure fire consistent with the growth profiles in NUREG 6850.

- The growth stage is 12 minutes and is in proportion to time squared (profile)
- The steady burning stage at the peak HRR is 8 minutes
- The decay stage is linear and is 19 minutes

The overall HRR profile for the ensuing fire with one or two adjacent switchgear vertical sections includes the ensuing fire from the initiating HEAF vertical section and the HRR profile for the adjacent vertical sections. For a more detailed description of fire spread see NUREG-2262 Section 6.5.1.

02.03 HRR Profile of Main Control Board Panel Fires

The HRR of Main Control Board (MCB) panel fires used in an analysis to determine the probability for control room abandonment is identical to that for the electrical enclosures with the same volume.

02.04 HRR Profile for Propagating Electrical Enclosure Fires

Electrical enclosure fires can be assumed not to propagate to adjacent enclosures if at least one of the following conditions are met:

- Both the exposing and exposed enclosures have solid steel panels on their adjacent sides (that is, the double wall configuration).
- The exposing or exposed enclosure (or both) has (have) an open top; and there is an internal wall between the sections, even if that wall has some unsealed openings; and there are no cables running in an upward direction (that is, either vertically or diagonally)

leading from the exposing enclosure into the exposed enclosure through the partition wall between sections. All three conditions must be met for the exclusion to apply.

- The exposing enclosure has been categorized as a small electrical enclosure (Group 4c in NUREG-2178 Volume 1).
- Do not postulate propagation between two adjacent vertical sections of motor control centers (Group 2 in NUREG-2178 Volume 1).
- Do not postulate propagation between two adjacent vertical sections of switchgear or load centers (Group 1 in NUREG-2178 Volume 1).

If none of these conditions are met, electrical enclosure fires are assumed to propagate from the exposing enclosure to an adjacent exposed enclosure. There can be one or two exposed enclosures, depending on whether the fire originates in an enclosure located at one end of a bank or in an enclosure that has adjacent enclosures on both sides, respectively. However, fire spread is limited to one adjacent enclosure, i.e., for an interior enclosure within a bank, HRR calculations should be postulated to a single enclosure on either side of the exposing enclosure but not to both adjacent enclosures. The HRR profile of a propagating electrical enclosure fire is obtained by combining the HRR profiles of the exposing and exposed enclosures, assuming the exposed enclosure ignites 10 min after the exposing enclosure. When fire spread to an adjacent enclosure is postulated, a conditional probability of 0.02 can be applied against the frequency of fires initiated in the exposing enclosure in the form of a split fraction between single- and multi-enclosure fire scenarios.

02.05 HRR Profile of Transient Combustible Fires

The HRR profiles for transient combustible fires is given by Equation 5-1, but the profile parameters are dependent on the total energy release (TER), which is the area under the HRR curve. The HRR and TER gamma distribution parameters for generic and transient combustible control location (TCCL) transient fires are given in Table A5.3.

Table A5.3 – HRR Gamma Distribution Parameters for Transient Ignition Sources				
Ignition Source	α	β	75 th Percentile (kW)	98 th Percentile (kW)
Generic transient HRR distribution	0.271	14.1	41.6	278
Generic transient TER distribution	0.184	77.1	11.8	123
TCCL transient HRR distribution	0.314	67.3	24.6	143
TCCL transient TER distribution	0.214	34.5	7.0	59.8

The growth and decay exponents are the same for generic and TCCL transient fires and are equal to 2.7 for n_g and 0.32 for n_d , respectively. The following equations are used to calculate the growth, plateau, and decay times:

$$t_g = \frac{690}{\dot{Q}_{peak}} TER^{1.01} \quad [5-2]$$

$$t_d = \frac{3940}{\dot{Q}_{peak}} TER^{0.94} \quad [5-3]$$

$$t_p = \frac{1000 TER}{\dot{Q}_{peak}} - \frac{t_g}{n_g + 1} - \frac{n_d t_d}{n_d + 1} \quad [5-4]$$

If t_p calculated according to Equation 5-4 is negative, t_p is set equal to 1 s and the t_g and t_d are determined from

$$t_g = \frac{3700}{\dot{Q}_{\text{peak}}} \left(\text{TER} - \frac{\dot{Q}_{\text{peak}}}{1000} \right) \frac{0.186 \text{ TER}^{1.01}}{0.186 \text{ TER}^{1.01} + 0.955 \text{ TER}^{0.940}} \quad [5-5]$$

$$t_d = \frac{1320}{0.32 \dot{Q}_{\text{peak}}} \left(\text{TER} - \frac{\dot{Q}_{\text{peak}}}{1000} \right) \frac{0.955 \text{ TER}^{0.940}}{0.186 \text{ TER}^{1.01} + 0.955 \text{ TER}^{0.940}} \quad [5-6]$$

The 98th percentile HRR profile parameters for transient fires are given in Table A5.4.

Table A5.4 – HRR Profile Parameters for Transient Ignition Sources					
Ignition Source	t_g (s)	n_g (s)	t_p (s)	t_d (s)	n_d (s)
Generic Transients	322	2.70	39.5	1311	0.32
TCCL Transients	301	2.70	25	1290	0.32

A TCCL is a designated location in a nuclear power plant that meets the conditions described in Section 3.3.1.1 of NUREG-2233. The TCCL fire characteristics in this attachment can be used if the following conditions are met:

- Control of transient combustible materials in these locations is procedurally controlled with visual indication clearly marked (for example, floor is painted, the location is roped off or identified with multiple signs, or other method of clearly marking the area) so that someone unfamiliar with the administrative procedures would conclude that transient combustible storage is strictly controlled in that location.
- No trend of violations of transient combustible administrative controls have been observed for the subject TCCL for five years.
- Long-term storage of transient combustible material is strictly prohibited with no exceptions.
- Temporary storage of transient combustible material is strictly controlled with appropriate compensatory measures for exceptions, as necessary. Any combustible material that is greater than negligible and required to be in a TCCL must meet one of the following:
 - Have a transient combustible permit evaluated by the fire protection program to show that there is no impact to credited equipment and cables.
 - Be constantly attended. Exceptions are allowed for shift changes and short breaks such as a lunch break.
 - Be removed from the TCCL or contained (for example, closed metal containers, covered by fire blanket) when not constantly attended.

If the TCCL characteristics are not met, the generic fire characteristics should be used. The generic fire characteristics bound transient fire sources with the following characteristics:

- A single plastic or metal trash can of up to 55 gallons size loaded with general waste materials such as paper, packing materials, etc.
- Up to three small office-size trash cans with general waste (e.g., on the order of 2-4 gallons each, typically either plastic or fiberglass construction).
- A single wooden pallet.

- A single small packing crate (no more than 24" cube).
- A plastic bucket of up to 7 gallons in size (e.g., a used paint bucket) with cleaning materials (e.g., rags, brushes, no more than a pint of cleaning solvents).
- One or two plastic trash bags containing general waste materials.
- An open grease bucket up to 1 gallon.
- A single collection bin for protective clothing (e.g., at a step-off / dress-out area).

If, in the judgement of the analyst, the as-found conditions exceed the above examples, the fire intensity may have to be increased to reflect the as-found conditions. In that case it is recommended that additional guidance be sought from either the Regional or Headquarters fire protection staff.

0609F.5-03 HRR PROFILE OF OIL FIRES

Liquid fuel spills can be confined or unconfined. For confined liquid fuel pool fires the area is known and the HRR is a function of the size of the containment area (pool) and combustion properties of the fuel. The area of an unconfined liquid fuel spill is a function of the spill volume, and the HRR is therefore a function of the volume and combustion properties of the spilled fuel.

Two distinct oil spill fires may need to be considered. The first scenario assumes a spill of 100 percent of the amount of oil that can be spilled. The second scenario considers a 10 percent spill. A severity factor of 0.02 is assigned to the first scenario, and 0.98 is used for the second scenario. For confined liquid pool fires it is not necessary to evaluate the two scenarios separately if the containment area is large enough to hold 100 percent of the amount of oil that can be spilled.

03.01 Confined Liquid Pool Fires

Table A5.5 gives the steady HRR and burning rate of confined liquid pool fires as a function of the pool diameter for the following liquid fuels: (1) diesel fuel and fuel oil, (2) lube oil and mineral oil, and (3) silicone fluid.

Table A5.5 - HRRs and Burning Rates for Confined Liquid Pool Fires						
D _{eff} (ft.)	Diesel Fuel & Fuel Oil		Lube Oil & Mineral Oil		Silicone Fluid	
	HRR (kW)	Burning Rate (gal/min)	HRR (kW)	Burning Rate (gal/min)	HRR (kW)	Burning Rate (gal/min)
1.0	41	0.017	25	0.011	2.7	0.002
1.5	123	0.051	81	0.037	8.5	0.005
2.0	262	0.108	183	0.083	19	0.011
2.5	460	0.190	341	0.154	34	0.020
3.0	720	0.297	562	0.253	55	0.032
3.5	1039	0.428	851	0.383	82	0.047
4.0	1418	0.584	1213	0.546	116	0.067
4.5	1854	0.764	1650	0.743	155	0.089
5.0	2345	0.966	2165	0.975	200	0.116
5.5	2890	1.191	2759	1.242	252	0.145
6.0	3487	1.437	3432	1.545	310	0.179
6.5	4136	1.705	4185	1.884	373	0.215
7.0	4836	1.993	5017	2.258	443	0.255
7.5	5586	2.302	5928	2.668	518	0.299
8.0	6386	2.632	6917	3.114	599	0.345
8.5	7236	2.982	7984	3.594	685	0.395
9.0	8135	3.353	9128	4.108	777	0.448
9.5	9083	3.744	10347	4.657	874	0.504
10	10082	4.156	11640	5.240	977	0.563
11	12227	5.040	14448	6.504	1197	0.690
12	14570	6.006	17544	7.897	1438	0.829
13	17114	7.054	20921	9.417	1700	0.980
14	19858	8.185	24574	11.06	1981	1.142
15	22802	9.399	28498	12.83	2283	1.316
16	25948	10.70	32689	14.71	2604	1.501
17	29296	12.08	37145	16.72	2946	1.698
18	32846	13.54	41862	18.84	3308	1.907
19	36598	15.09	46839	21.08	3690	2.127
20	40553	16.72	52075	23.44	4091	2.358
21	44710	18.43	57570	25.91	4513	2.602
22	49070	20.23	63322	28.50	4956	2.857
23	53633	22.11	69332	31.21	5418	3.123
24	58398	24.07	75600	34.03	5901	3.401
25	63366	26.12	82126	36.97	6404	3.691

For non-circular fires with an area A_r, an equivalent effective diameter is used, which is calculated as follows:

$$D_{\text{eff}} = \sqrt{\frac{4A_f}{\pi}} \quad [5-7]$$

Liquid pool fires are conservatively assumed to reach the steady HRR instantaneously at ignition (t=0 s). The burning time is calculated by dividing the spill volume by the burning rate.

03.02 Unconfined Liquid Spill Fires

Table A5.6 gives the steady HRR and burning time of unconfined liquid spill fires as a function of spill volume for the same three liquid fuels.

Table A5.6 - HRRs and Burning Rates for Unconfined Liquid Spill Fires						
V (gal)	Diesel Fuel & Fuel Oil		Lube Oil & Mineral Oil		Silicone Fluid	
	HRR (kW)	Burning Time (s)	HRR (kW)	Burning Time (s)	HRR (kW)	Burning Time (s)
1	2438	226	2265	222	209	1880
2	5126	215	5368	188	472	1668
3	7797	212	8696	174	742	1590
4	10451	211	12121	166	1014	1551
5	13095	210	15592	162	1286	1529
6	15732	210	19085	158	1558	1516
7	18366	210	22588	156	1828	1507
8	20997	210	26093	154	2098	1500
9	23627	210	29597	153	2367	1496
10	26255	210	33098	152	2636	1493
11	28883	210	36595	151	2904	1490
12	31143	212	39599	153	3134	1506
13	33059	216	42144	155	3329	1536
14	34950	220	44654	158	3522	1564
15	36820	224	47132	160	3712	1590
16	38668	228	49580	163	3900	1614
17	40498	231	52002	165	4086	1637
18	42310	234	54398	167	4270	1659
19	44106	237	56771	169	4452	1679
20	45886	240	59122	170	4633	1699
21	47653	242	61453	172	4812	1717
22	49406	245	63764	174	4990	1735
23	51146	247	66057	175	5166	1752
24	52874	250	68334	177	5341	1768
25	54591	252	70594	178	5515	1784
26	56298	254	72838	180	5688	1798
27	57994	256	75069	181	5860	1813
28	59680	258	77285	183	6031	1827
29	61357	260	79488	184	6201	1840
30	63026	262	81679	185	6370	1853

0609F.5-04 CABLE TRAY FIRES

04.01 Fires in Vertical Stacks of Horizontal Cable Trays

Vertical stacks of horizontal cable trays located within the ZOI of an ignition source may act as secondary combustibles and contribute to the HRR in the area under evaluation. Tables and plots of the combined HRR as a function of time for various cable types (TS and TP), tray widths (1.5 or 3.0 ft.), and ignition source/cable tray configurations can be found in table/plot set C in Attachment 8. These tables and plots are applicable for non-HEAF scenarios. For HEAF

scenarios, add HRR_{peak} of the ignition source to the cable tray HRR from Figures C.01 (for 1.5 ft. wide trays) or C.02 (for 3.0 ft. wide trays) in Attachment 8.

Flame spread and fire propagation characteristics for fires involving stacks of cable trays are discussed in the section for FDS 2 scenarios in Attachment 3 to IMC 0609 Appendix F and in Section 06.03.03 of the basis document (IMC 0308 Attachment 3 Appendix F). It can be assumed that flame spread and fire propagation will not occur under the following conditions:

- All trays within the ZOI are fully enclosed, i.e., they have solid bottom and top covers.
- All trays within the ZOI have solid bottoms and are tightly covered with at least one in. of ceramic fiber blanket (e.g., Kaowool).
- All trays are within the ZOI are protected with a rated fire barrier or wrap, except for HEAF scenarios, in which case wraps within the ZOI are assumed to be destroyed and ineffective.

04.02 Vertical Cable Tray Fires

The HRR of a vertical cable tray is conservatively estimated as the product of the width of the tray covered with cables, the height of the tray, and the HRR per unit area (HRRPUA) of the cables. The latter is equal to 150 kW/m² for TS cables, and 250 kW/m² for TP and Kerite cables (from NUREG/CR-7010). Flames are assumed to spread very rapidly in the vertical direction, and the HRR is therefore assumed to be instantaneous at ignition.

04.03 Self-Ignited Cable Fires

The HRR profile of vertical stacks of horizontal cable trays involved in a self-ignited cable fire scenario can be obtained from Figures C.01 (for 1.5 ft. wide trays) or C.02 (for 3.0 ft. wide trays) in Attachment 8. A conservative estimate of the HRR of a vertical self-ignited cable tray can be obtained as discussed in the previous section.

0609F.5-05 HOT WORK FIRES

For hot work fires, it will be assumed that the hot work leads to ignition of either transient combustibles, exposed cables, or insulation materials depending on the specific situation. Transient combustibles could include flammable materials used in conjunction with the hot work itself (e.g., plastic sheeting or non-fire-retardant scaffold materials).

- If the hot work is assumed to ignite transients, treat the subsequent fire like any other transient fuel fire. As-found conditions may be reflected in fire characterization.
- If the hot work is assumed to ignite exposed cables, treat the subsequent fire like a self-ignited cable fire.
- If the hot work fire is assumed to ignite insulation materials, seek additional guidance from Regional or Headquarters fire protection staff.

0609F.5-06 SEVERE FIRES INVOLVING THE MAIN TURBINE GENERATOR SET

For inspections involving the turbine building, a need to address severe fires involving the main turbine generator set may arise. In this case, additional guidance will be needed to complete the Phase 2 analysis. Guidance from either Regional or Headquarters fire protection staff should be sought in the treatment of these fires.

0609F.5-07 HYDROGEN FIRES

If for a given fire area, hydrogen fires might be a significant factor in the risk quantification, additional guidance will be needed to complete the Phase 2 analysis. Guidance from either Regional or Headquarters fire protection staff should be sought in the treatment of these fires.

END

Attachment 1: Revision History for IMC 0609, Appendix F Attachment 5

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment Resolution and Feedback Form Accession Number (Pre-Decisional, Non-Public)
	ML041700310 05/28/2004 CN 04-016	IMC 0609, App F, Att 5 "Characterizing Non-Simple Fire Ignition Sources," is added to provide guidance on the need to consider whether non-simple ignition sources such as self-ignited cable fires, energetic electrical arcing faults, transient combustibles, hot work, liquid fuel spills, and hydrogen are plausible fire ignition sources.	None	N/A
	ML050700212 02/28/2005 CN 05-007	IMC 0609, App F, Att 5 "Characterizing Non-Simple Fire Ignition Sources," is revised to change all references from 50th and 95th percentile to 75th and 98th percentile, respectively, for expected and high confidence fire intensity values.		
	ML17089A422 DRAFT CN 17-XXX	Revised to reflect changes to the Phase 2 process and for consistency with the guidance in NUREG/CR-6850 and superseding guidance in NFPA 805 FAQs and NUREG-2178. CA Note sent 7/18/17 for information only, ML17191A681. Issued 10/11/17 as a draft publicly available document to allow for public comments.	November 2017	ML17093A184
	ML18087A409 05/02/18 CN 18-010	Draft document revised to incorporate minor public comments and re-issued with new accession number in order to issue as an official revision after receipt of public comments.	Gap training covering changes to the procedure completed November 2017	ML17093A184

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment Resolution and Feedback Form Accession Number (Pre-Decisional, Non-Public)
	ML24145A032 09/05/24 CN 24-024	This revision includes updating IMC 0609 Appendix F, its associated attachments, and the basis document to incorporate updated guidance for modeling transient fires per NUREG-2233, high energy arcing faults per NUREG-2262, and electrical enclosure, electric motor, dry transformer and main control room fires per NUREG-2178 Volume 2. This revision also implements the heat soak method in the HRR and ZOI calculations.		ML24155A260