

FAQ Number **18-0018**

FAQ Revision **0 (Draft G)**

FAQ Title **Updated Non-Suppression Probability (NSP)**

Plant: Various

Date: February 11, 2019 (Received by NRC
4/3/2019)

Contact: Beth Meade

Phone: (508) 532-7139

 Mark Schairer

 (508) 532-7137

 Rob Cavedo

 (301) 938-0397

Email: bah@epm-inc.com

mvs@epm-inc.com

robert.cavedo@exeloncorp.com

Distribution: *(NEI Internal Use)*

FPRA TF BWROG PWROG

Purpose of FAQ:

This FAQ provides an update to the non-suppression probabilities (NSPs) based on Bayesian approach separating the data before Jan 1st, 2000 and after.

Relevant NRC document(s):

NUREG/CR-6850

NUREG/CR-6850 Supplement 1 (FAQ 08-0050)

NUREG 2169

Details:

NRC document needing interpretation (include document number and title, section, paragraph, and line numbers as applicable):

See list of relevant NRC documents

Circumstances requiring interpretation or new guidance:

The non-suppression probabilities (NSP) provided in NUREG 2169 Table 5-1 are considered overly conservative due to the equal treatment of fire data over a prolonged period. As a result, the risk associated with fires may not reflect the current NSP rates.

Detail contentious points if licensee and NRC have not reached consensus on the facts and circumstances:

FAQ Number **18-0018**

FAQ Revision **0 (Draft G)**

FAQ Title **Updated Non-Suppression Probability (NSP)**

Although recent guidance has sought to provide a better estimate of non-suppression probability, in the case of fire events over a prolonged period, the probability of non-suppression is believed to be non-representative of the current NSPs.

Potentially relevant existing FAQ numbers:

FAQ 08-0050, “Manual Non-Suppression Probability”

Response Section:

Proposed resolution of FAQ and the basis for the proposal:

The fire NSPs are adjusted using a Gamma-Poisson Bayesian model using the data before Jan 1st, 2000 as a prior distribution. There have been numerous improvements to plant process controls that affect both the likelihood, control, and severity of fire scenarios. This includes smoking controls, foreign material exclusion, cutting and welding improvements, combustion controls, brigade training, etc. It is for these reasons among others, that the conclusion in NUREG 2169 is that data from 2000 and later is the most applicable in fire analysis.

It seems reasonable to assume that the data before 2000 would have some influence on the data 2000 and beyond but certainly not more influence. The prior distribution must have less influence than the posterior data. This is ensured by making the alpha factor of the prior distribution half that of the posterior data while maintaining the mean. This ensures that the data after 2000 has more influence than the data prior to 2000.

The NSP for HEAF is developed using the data from FAQ 17-0013.

The results for this process are presented for each suppression curve:

T/G Fires:

	<u>Before 2000</u>	<u>After 2000</u>		<u>Combined</u>
<u>Alpha</u>	23	7	Alpha	30
<u>Beta</u>	1057	110		1167
<u>Mean</u>	0.022	0.064		0.026
<u>5th%</u>	0.0149	0.0299		0.019
<u>25th%</u>	0.0186	0.0462		
<u>50th%</u>	0.0214	0.0606		0.025
<u>75th%</u>	0.0246	0.0778		
<u>95th%</u>	0.0297	0.1077		0.034

Prior Development Rule:

The prior Alpha factor from the before 2000 data is considered to be half that of the distribution that would be developed without a prior (i.e. the data after 2000 is more significant than the data prior to 2000)

	<u>Weak Prior Before 2000</u>	<u>After 2000</u>		<u>Gamma/Poisson Bayesian Model Combined</u>
<u>Alpha</u>	4	7	<u>Alpha</u>	11
<u>Beta</u>	184	110	<u>Beta</u>	294
<u>Mean</u>	0.022	0.064	<u>Mean</u>	0.037
<u>5th%</u>	0.007	0.030	<u>5th%</u>	0.021
<u>25th%</u>	0.014	0.046	<u>25th%</u>	0.029
<u>50th%</u>	0.020	0.061	<u>50th%</u>	0.036
<u>75th%</u>	0.028	0.078	<u>75th%</u>	0.044
<u>95th%</u>	0.042	0.108	<u>95th%</u>	0.058

Control Room:

	<u>Before 2000</u>	<u>After 2000</u>		<u>Combined</u>
<u>Alpha</u>	7	4	Alpha	11
<u>Beta</u>	28	8		36
<u>Mean</u>	0.250	0.500		0.306
<u>5th%</u>	0.1173	0.1708		0.171
<u>25th%</u>	0.1815	0.3169		
<u>50th%</u>	0.2382	0.4590		0.296
<u>75th%</u>	0.3057	0.6387		
<u>95th%</u>	0.4229	0.9692		0.471

Prior Development Rule:

The prior Alpha factor from the before 2000 data is considered to be half that of the distribution that would be developed without a prior (i.e. the data after 2000 is more significant than the data prior to 2000)

	<u>Weak Prior Before 2000</u>	<u>After 2000</u>		<u>Gamma/Poisson Bayesian Model Combined</u>
<u>Alpha</u>	2	4	<u>Alpha</u>	6
<u>Beta</u>	8	8	<u>Beta</u>	16
<u>Mean</u>	0.250	0.500	<u>Mean</u>	0.375
<u>5th%</u>	0.044	0.171	<u>5th%</u>	0.163
<u>25th%</u>	0.120	0.317	<u>25th%</u>	0.264
<u>50th%</u>	0.210	0.459	<u>50th%</u>	0.354
<u>75th%</u>	0.337	0.639	<u>75th%</u>	0.464
<u>95th%</u>	0.593	0.969	<u>95th%</u>	0.657

Notes: The calculation sheet for NUREG-2169 uses one additional event: 537, 9/4/1986, 1 minute. This event is excluded as the event occurred during pre-operation testing and will no longer counted in the upcoming suppression rate as estimated for Chapter 8 of Rachele Fire II.

PWR Containment (AP):

	<u>Before 2000</u>	<u>After 2000</u>		<u>Combined</u>
<u>Alpha</u>	3	0	Alpha	3
<u>Beta</u>	36	0		36
<u>Mean</u>	0.083	N/A		0.083
<u>5th%</u>	0.0227	N/A		0.023
<u>25th%</u>	0.0480	N/A		
<u>50th%</u>	0.0743	N/A		0.074
<u>75th%</u>	0.1089	N/A		
<u>95th%</u>	0.1749	N/A		0.175

Prior Development Rule:

The prior Alpha factor from the before 2000 data is considered to be half that of the distribution that would be developed without a prior (i.e. the data after 2000 is more significant than the data prior to 2000)

	<u>Weak Prior Before 2000</u>	<u>After 2000</u>		<u>Gamma/Poisson Bayesian Model Combined</u>
<u>Alpha</u>	1	0	<u>Alpha</u>	1
<u>Beta</u>	12	0	<u>Beta</u>	12
<u>Mean</u>	0.083	N/A	<u>Mean</u>	0.083
<u>5th%</u>	0.004	N/A	<u>5th%</u>	0.004
<u>25th%</u>	0.024	N/A	<u>25th%</u>	0.024
<u>50th%</u>	0.058	N/A	<u>50th%</u>	0.058
<u>75th%</u>	0.116	N/A	<u>75th%</u>	0.116
<u>95th%</u>	0.250	N/A	<u>95th%</u>	0.250

Note: The calculations utilized to develop the NSP values in NUREG-2169 Table 5-3 included an error. Fire Event 66 was associated with a suppression duration of 14 minutes, but the actual duration is 10 minutes. Therefore, the combined duration is 36 minutes versus the 40 minutes reported in NUREG-2169.

Containment (LPSD):

	<u>Before 2000</u>	<u>After 2000</u>		<u>Combined</u>
Alpha	10	21	Alpha	31
Beta	141	158		299
Mean	0.071	0.133		0.104
5th%	0.0385	0.0891		0.075
25th%	0.0548	0.1124		
50th%	0.0686	0.1308		0.103
75th%	0.0845	0.1512		
95th%	0.1114	0.1839		0.136

Prior Development Rule:

The prior Alpha factor from the before 2000 data is considered to be half that of the distribution that would be developed without a prior (i.e. the data after 2000 is more significant than the data prior to 2000)

	<u>Weak Prior Before 2000</u>	<u>After 2000</u>		<u>Gamma/Poisson Bayesian Model Combined</u>
Alpha	10	21	Alpha	31
Beta	141	158	Beta	299
Mean	0.071	0.133	Mean	0.104
5th%	0.038	0.089	5th%	0.075
25th%	0.055	0.112	25th%	0.091
50th%	0.069	0.131	50th%	0.103
75th%	0.084	0.151	75th%	0.116
95th%	0.111	0.184	95th%	0.136

Outdoor Transformers:

	<u>Before 2000</u>	<u>After 2000</u>		<u>Combined</u>
<u>Alpha</u>	18	6	Alpha	24
<u>Beta</u>	635	293		928
<u>Mean</u>	0.028	0.020		0.026
<u>5th%</u>	0.0183	0.0089		0.018
<u>25th%</u>	0.0236	0.0144		
<u>50th%</u>	0.0278	0.0194		0.026
<u>75th%</u>	0.0325	0.0253		
<u>95th%</u>	0.0402	0.0359		0.035

Prior Development Rule:

The prior Alpha factor from the before 2000 data is considered to be half that of the distribution that would be developed without a prior (i.e. the data after 2000 is more significant than the data prior to 2000)

	<u>Weak Prior Before 2000</u>	<u>After 2000</u>		<u>Gamma/Poisson Bayesian Model Combined</u>
<u>Alpha</u>	3	6	<u>Alpha</u>	9
<u>Beta</u>	106	293	<u>Beta</u>	399
<u>Mean</u>	0.028	0.020	<u>Mean</u>	0.023
<u>5th%</u>	0.008	0.009	<u>5th%</u>	0.012
<u>25th%</u>	0.016	0.014	<u>25th%</u>	0.017
<u>50th%</u>	0.025	0.019	<u>50th%</u>	0.022
<u>75th%</u>	0.037	0.025	<u>75th%</u>	0.027
<u>95th%</u>	0.059	0.036	<u>95th%</u>	0.036

Flammable Gas:

	<u>Before 2000</u>	<u>After 2000</u>		<u>Combined</u>
<u>Alpha</u>	5	3	Alpha	8
<u>Beta</u>	199	35		234
<u>Mean</u>	0.025	0.086		0.034
<u>5th%</u>	0.0099	0.0234		0.017
<u>25th%</u>	0.0169	0.0494		
<u>50th%</u>	0.0235	0.0764		0.033
<u>75th%</u>	0.0315	0.1120		
<u>95th%</u>	0.0460	0.1799		0.056
<u>Prior Development Rule:</u>				

The prior Alpha factor from the before 2000 data is considered to be half that of the distribution that would be developed without a prior (i.e. the data after 2000 is more significant than the data prior to 2000)

	<u>Weak Prior Before 2000</u>	<u>After 2000</u>		<u>Gamma/Poisson Bayesian Model Combined</u>
<u>Alpha</u>	2	3	<u>Alpha</u>	5
<u>Beta</u>	80	35	<u>Beta</u>	115
<u>Mean</u>	0.025	0.086	<u>Mean</u>	0.044
<u>5th%</u>	0.004	0.023	<u>5th%</u>	0.017
<u>25th%</u>	0.012	0.049	<u>25th%</u>	0.029
<u>50th%</u>	0.021	0.076	<u>50th%</u>	0.041
<u>75th%</u>	0.034	0.112	<u>75th%</u>	0.055
<u>95th%</u>	0.060	0.180	<u>95th%</u>	0.080

Oil Fires:

	<u>Before 2000</u>	<u>After 2000</u>		<u>Combined</u>
<u>Alpha</u>	32	18	Alpha	50
<u>Beta</u>	464	98		562
<u>Mean</u>	0.069	0.184		0.089
<u>5th%</u>	0.0502	0.1187		0.069
<u>25th%</u>	0.0604	0.1529		
<u>50th%</u>	0.0682	0.1803		0.088
<u>75th%</u>	0.0768	0.2107		
<u>95th%</u>	0.0902	0.2602		0.111

Prior Development Rule:

The prior Alpha factor from the before 2000 data is considered to be half that of the distribution that would be developed without a prior (i.e. the data after 2000 is more significant than the data prior to 2000)

	<u>Weak Prior Before 2000</u>	<u>After 2000</u>		<u>Gamma/Poisson Bayesian Model Combined</u>
<u>Alpha</u>	9	18	<u>Alpha</u>	27
<u>Beta</u>	131	98	<u>Beta</u>	229
<u>Mean</u>	0.069	0.184	<u>Mean</u>	0.118
<u>5th%</u>	0.036	0.119	<u>5th%</u>	0.083
<u>25th%</u>	0.052	0.153	<u>25th%</u>	0.102
<u>50th%</u>	0.066	0.180	<u>50th%</u>	0.117
<u>75th%</u>	0.083	0.211	<u>75th%</u>	0.133
<u>95th%</u>	0.111	0.260	<u>95th%</u>	0.158

Cable Fires:

	<u>Before 2000</u>	<u>After 2000</u>		<u>Combined</u>
<u>Alpha</u>	4	0	Alpha	4
<u>Beta</u>	29	0		29
<u>Mean</u>	0.138	N/A		0.138
<u>5th%</u>	0.0471	N/A		0.047
<u>25th%</u>	0.0874	N/A		
<u>50th%</u>	0.1266	N/A		0.127
<u>75th%</u>	0.1762	N/A		
<u>95th%</u>	0.2674	N/A		0.267
<u>Prior Development Rule:</u>				
The prior Alpha factor from the before 2000 data is considered to be half that of the distribution that would be developed without a prior (i.e. the data after 2000 is more significant than the data prior to 2000)				
	<u>Weak Prior Before 2000</u>	<u>After 2000</u>		<u>Gamma/Poisson Bayesian Model Combined</u>
<u>Alpha</u>	1	0	<u>Alpha</u>	1
<u>Beta</u>	7	0	<u>Beta</u>	7
<u>Mean</u>	0.138	N/A	<u>Mean</u>	0.138
<u>5th%</u>	0.007	N/A	<u>5th%</u>	0.007
<u>25th%</u>	0.040	N/A	<u>25th%</u>	0.040
<u>50th%</u>	0.096	N/A	<u>50th%</u>	0.096
<u>75th%</u>	0.191	N/A	<u>75th%</u>	0.191
<u>95th%</u>	0.413	N/A	<u>95th%</u>	0.413
				0.0%

Electrical NSP (relocated two events to HEAF per FAQ 17-013):

	<u>Before 2000</u>	<u>After 2000</u>		<u>Combined</u>
<u>Alpha</u>	110	64	Alpha	174
<u>Beta</u>	1177	628		1805
<u>Mean</u>	0.093	0.102		0.096
<u>5th%</u>	0.0793	0.0819		0.085
<u>25th%</u>	0.0873	0.0931		
<u>50th%</u>	0.0932	0.1014		0.096
<u>75th%</u>	0.0993	0.1102		
<u>95th%</u>	0.1086	0.1237		0.109
<u>Prior Development Rule:</u>				
The prior Alpha factor from the before 2000 data is considered to be half that of the distribution that would be developed without a prior (i.e. the data after 2000 is more significant than the data prior to 2000)				
	<u>Weak Prior Before 2000</u>	<u>After 2000</u>		<u>Gamma/Poisson Bayesian Model Combined</u>
<u>Alpha</u>	32	64	<u>Alpha</u>	96
<u>Beta</u>	342	628	<u>Beta</u>	970
<u>Mean</u>	0.093	0.102	<u>Mean</u>	0.099
<u>5th%</u>	0.068	0.082	<u>5th%</u>	0.083
<u>25th%</u>	0.082	0.093	<u>25th%</u>	0.092
<u>50th%</u>	0.092	0.101	<u>50th%</u>	0.099
<u>75th%</u>	0.104	0.110	<u>75th%</u>	0.106
<u>95th%</u>	0.122	0.124	<u>95th%</u>	0.116

Note: FAQ 17-0013 revised the event count by removing fire events #792 and #922 with a duration of 5 and 3 minutes respectively. Even without the HEAF FAQ adjustments, the totals obtained from the fire event data differ slightly from those reported in NREG-2169. When the data from NUREG 2169 is totaled there are 177 events with a duration of 1816 minutes, versus the total of 1815 minutes reported in NUREG-2169 Table 5-3. This one-minute increase from the original data results in a minor decrease to the lambda mean (from 0.098 to 0.097) that is not expected to result in statistically significant changes to the overall risk calculations.

Welding Fires:

	<u>Before 2000</u>	<u>After 2000</u>		<u>Combined</u>
<u>Alpha</u>	26	26	Alpha	52
<u>Beta</u>	248	236		484
<u>Mean</u>	0.105	0.110		0.107
<u>5th%</u>	0.0735	0.0772		0.084
<u>25th%</u>	0.0903	0.0949		
<u>50th%</u>	0.1035	0.1088		0.107
<u>75th%</u>	0.1179	0.1239		
<u>95th%</u>	0.1408	0.1479		0.133

Prior Development Rule:

The prior Alpha factor from the before 2000 data is considered to be half that of the distribution that would be developed without a prior (i.e. the data after 2000 is more significant than the data prior to 2000)

	<u>Weak Prior Before 2000</u>	<u>After 2000</u>		<u>Gamma/Poisson Bayesian Model Combined</u>
<u>Alpha</u>	13	26	<u>Alpha</u>	39
<u>Beta</u>	124	236	<u>Beta</u>	360
<u>Mean</u>	0.105	0.110	<u>Mean</u>	0.108
<u>5th%</u>	0.062	0.077	<u>5th%</u>	0.081
<u>25th%</u>	0.084	0.095	<u>25th%</u>	0.096
<u>50th%</u>	0.102	0.109	<u>50th%</u>	0.107
<u>75th%</u>	0.123	0.124	<u>75th%</u>	0.119
<u>95th%</u>	0.157	0.148	<u>95th%</u>	0.138

Transient fires:

	<u>Before 2000</u>	<u>After 2000</u>		<u>Combined</u>
<u>Alpha</u>	27	16	Alpha	43
<u>Beta</u>	252	136		388
<u>Mean</u>	0.107	0.118		0.111
<u>5th%</u>	0.0756	0.0738		0.085
<u>25th%</u>	0.0926	0.0967		
<u>50th%</u>	0.1058	0.1152		0.110
<u>75th%</u>	0.1202	0.1359		
<u>95th%</u>	0.1432	0.1698		0.140
Prior Development Rule:				
The prior Alpha factor from the before 2000 data is considered to be half that of the distribution that would be developed without a prior (i.e. the data after 2000 is more significant than the data prior to 2000)				
	<u>Weak Prior Before 2000</u>	<u>After 2000</u>		<u>Gamma/Poisson Bayesian Model Combined</u>
<u>Alpha</u>	8	16	<u>Alpha</u>	24
<u>Beta</u>	75	136	<u>Beta</u>	211
<u>Mean</u>	0.107	0.118	<u>Mean</u>	0.114
<u>5th%</u>	0.053	0.074	<u>5th%</u>	0.079
<u>25th%</u>	0.080	0.097	<u>25th%</u>	0.097
<u>50th%</u>	0.103	0.115	<u>50th%</u>	0.112
<u>75th%</u>	0.130	0.136	<u>75th%</u>	0.129
<u>95th%</u>	0.176	0.170	<u>95th%</u>	0.155

Note: The transient fire total duration is slightly larger than the NUREG-2169 total of 386. This two-minute difference over 388 minutes is conservative, but not significantly conservative.

HEAFs (updated per FAQ 17-0013):

	<u>Before 2000</u>	<u>After 2000</u>		<u>Combined</u>
<u>Alpha</u>	6	5	Alpha	11
<u>Beta</u>	146	239		385
<u>Mean</u>	0.041	0.021		0.029
<u>5th%</u>	0.0179	0.0082		0.016
<u>25th%</u>	0.0289	0.0141		
<u>50th%</u>	0.0388	0.0195		0.028
<u>75th%</u>	0.0508	0.0263		
<u>95th%</u>	0.0720	0.0383		0.044
<u>Prior Development Rule:</u>				
The prior Alpha factor from the before 2000 data is considered to be half that of the distribution that would be developed without a prior (i.e. the data after 2000 is more significant than the data prior to 2000)				
	<u>Weak Prior Before 2000</u>	<u>After 2000</u>		<u>Gamma/Poisson Bayesian Model Combined</u>
<u>Alpha</u>	3	5	<u>Alpha</u>	8
<u>Beta</u>	73	239	<u>Beta</u>	312
<u>Mean</u>	0.041	0.021	<u>Mean</u>	0.026
<u>5th%</u>	0.011	0.008	<u>5th%</u>	0.013
<u>25th%</u>	0.024	0.014	<u>25th%</u>	0.019
<u>50th%</u>	0.037	0.020	<u>50th%</u>	0.025
<u>75th%</u>	0.054	0.026	<u>75th%</u>	0.031
<u>95th%</u>	0.086	0.038	<u>95th%</u>	0.042

All Fires (adjusted per FAQ 17-013):

	<u>Before 2000</u>	<u>After 2000</u>		<u>Combined</u>
<u>Alpha</u>	271	170	Alpha	441
<u>Beta</u>	4412	1941		6353
<u>Mean</u>	0.061	0.088		0.069
<u>5th%</u>	0.0554	0.0768		0.064
<u>25th%</u>	0.0589	0.0830		
<u>50th%</u>	0.0613	0.0874		0.069
<u>75th%</u>	0.0639	0.0920		
<u>95th%</u>	0.0677	0.0989		0.075
<u>Prior Development Rule:</u>				
The prior Alpha factor from the before 2000 data is considered to be half that of the distribution that would be developed without a prior (i.e. the data after 2000 is more significant than the data prior to 2000)				
	<u>Weak Prior Before 2000</u>	<u>After 2000</u>		<u>Gamma/Poisson Bayesian Model Combined</u>
<u>Alpha</u>	85	170	<u>Alpha</u>	255
<u>Beta</u>	1384	1941	<u>Beta</u>	3325
<u>Mean</u>	0.061	0.088	<u>Mean</u>	0.077
<u>5th%</u>	0.051	0.077	<u>5th%</u>	0.069
<u>25th%</u>	0.057	0.083	<u>25th%</u>	0.073
<u>50th%</u>	0.061	0.087	<u>50th%</u>	0.077
<u>75th%</u>	0.066	0.092	<u>75th%</u>	0.080
<u>95th%</u>	0.073	0.099	<u>95th%</u>	0.085

Notes: The calculation sheet for NUREG-2169 uses one additional event: 537, 9/4/1986, 1 minute. This event is excluded as the event occurred during pre-operation testing and will no longer be counted in the upcoming suppression rate as estimated for Chapter 8 of Rachelle Fire II. As Part of FAQ 17-0013, Event 162 was added to HEAF. As discussed under the EC NSP, there is one event missing. Therefore, the total for this FAQ is one event lower than NUREG-2169.

FAQ Number 18-0018

FAQ Revision 0 (Draft G)

FAQ Title Updated Non-Suppression Probability (NSP)

Summary Results:

	Base	Adjusted		
Suppression Curve	Mean	Mean	Change	
T/G Fires	0.026	0.037	44.0%	
Control Room	0.324	0.375	15.7%	
PWR Containmnt AP	0.075	0.083	11.1%	
Containment LPSD	0.104	0.104	0.0%	No Post 2000 Data
Outdoor transformers	0.026	0.023	-13.2%	
Flammable gas	0.034	0.044	28.3%	
Oil Fires	0.089	0.118	32.8%	
Cable fires	0.138	0.138	0.0%	No Post 2000 Data
Electrical fires - adusted per FAQ 17-013	0.096	0.099	2.6%	
Welding fires	0.107	0.108	1.2%	
Transient fires	0.111	0.114	2.6%	
HEAFs - from FAQ-17-013	0.029	0.026	-10.3%	
All fires	0.067	0.077	14.5%	

If appropriate, provide proposed rewording of guidance for inclusion in the next Revision:

The following are proposed revisions to NUREG 2169:

Table 5-1
Probability distribution for rate of fires suppressed per unit time, λ (Originally, Table P-2 from NUREG/CR-6850)

Suppression Curve	Number of Events in Curve	Total Duration (minutes)	Rate of Fire Suppressed (λ)			
			Mean	5th Percent	50th Percent	95th Percent
T/G Fires	30	1167	0.037	0.021	0.036	0.058
Control Room	11	36	0.375	0.163	0.354	0.657
PWR Containment (AP)	3	36	0.083	0.004	0.058	0.250
Containment (LPSD)	31	299	0.104	0.075	0.103	0.136
Outdoor transformers	24	928	0.023	0.012	0.022	0.036
Flammable gas	8	234	0.044	0.017	0.041	0.080
Oil fires	50	562	0.118	0.083	0.117	0.158
Cable fire	4	29	0.138	0.007	0.096	0.413
Electrical fires	174	1805	0.099	0.083	0.099	0.116
Weld fires	52	484	0.108	0.081	0.107	0.138
Transient fire	43	388	0.114	0.079	0.112	0.155
HEAFs	11	385	0.026	0.013	0.025	0.031
All fires	441	6353	0.077	0.069	0.077	0.085



