Houston Fire Department
PPE Risk Assessment Document

**Type of duties performed:**

- Standard Structural Fire Fighting Duties
- Interior Fire Fighting
- High-Rise Fire Fighting
- Fire Victim Rescue
- Fire Suppression
- Vertical Ventilation
- Horizontal Ventilation
- Forcible Entry
- Overhaul
- Building System Control
- Vehicle Rescue
- Technical Rescue
- Hazardous Materials Response
- Aircraft Rescue Fire Fighters
- Emergency Medical First Responder

**Type of PPE Needed:** Structural-Yes  Proximity- No

**Frequency of use of ensemble elements:**

Frequency of event is defined as:
- Rare – (0 to 1%)
- Routine – (1% to 7%)
- Daily – (7% to 100%)

**HFD Response from January 1, 2016 - December 31, 2018**

<table>
<thead>
<tr>
<th></th>
<th>0.00%</th>
<th>Rare</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usage of proximity PPE due to high levels of radiant heat, per HFD SOG</td>
<td>100.00%</td>
<td>Daily</td>
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</table>

HFD uses structural PPE for fire response per HFD guidelines 100% of the time.

**Type of PPE Needed:** Structural-Yes  Proximity-No

**Organization's experiences:**

PPE Performance at Incidents: See nature of emergencies on chart.

- Chart: Three-year frequency of Fire events for HFD.
Frequency of experiences and/or events based specifically on this emergency response data and is explained utilizing the following charts:

Frequency of event is defined as:
- Rare – (0 to 1%)
- Routine – (1% to 7%)
- Daily – (7% to 100%)

<table>
<thead>
<tr>
<th>Nature of Emergency</th>
<th>Total Incidents</th>
<th>Percentile</th>
<th>Frequency</th>
<th>Total Incidents</th>
<th>Percentile</th>
<th>Frequency</th>
<th>Total Incidents</th>
<th>Percentile</th>
<th>Frequency</th>
</tr>
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<tbody>
<tr>
<td>Aircraft fire</td>
<td>3</td>
<td>0.06</td>
<td>Rare</td>
<td>0</td>
<td>0.00</td>
<td>Rare</td>
<td>1</td>
<td>0.02</td>
<td>Rare</td>
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<tr>
<td>Brush or brush-and-grass mixture fire</td>
<td>150</td>
<td>2.90</td>
<td>Routine</td>
<td>123</td>
<td>2.29</td>
<td>Routine</td>
<td>148</td>
<td>2.50</td>
<td>Routine</td>
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<tr>
<td>Building fire</td>
<td>980</td>
<td>18.92</td>
<td>Daily</td>
<td>1000</td>
<td>18.62</td>
<td>Daily</td>
<td>1132</td>
<td>19.15</td>
<td>Daily</td>
</tr>
<tr>
<td>Camper or recreational vehicle (RV) fire</td>
<td>4</td>
<td>0.08</td>
<td>Rare</td>
<td>10</td>
<td>0.19</td>
<td>Rare</td>
<td>6</td>
<td>0.10</td>
<td>Rare</td>
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<tr>
<td>Chimney or flue fire, confined to chimney or flue</td>
<td>6</td>
<td>0.12</td>
<td>Rare</td>
<td>20</td>
<td>0.37</td>
<td>Rare</td>
<td>15</td>
<td>0.25</td>
<td>Rare</td>
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<tr>
<td>Commercial Compactor fire, confined to rubbish</td>
<td>1</td>
<td>0.02</td>
<td>Rare</td>
<td>6</td>
<td>0.11</td>
<td>Rare</td>
<td>12</td>
<td>0.20</td>
<td>Rare</td>
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<tr>
<td>Construction or demolition landfill fire</td>
<td>6</td>
<td>0.12</td>
<td>Rare</td>
<td>3</td>
<td>0.06</td>
<td>Rare</td>
<td>6</td>
<td>0.10</td>
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<td>Cooking fire, confined to container</td>
<td>405</td>
<td>7.82</td>
<td>Daily</td>
<td>462</td>
<td>8.60</td>
<td>Daily</td>
<td>550</td>
<td>9.30</td>
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<tr>
<td>Cultivated vegetation, crop fire, Other</td>
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<td>0.08</td>
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<td>3</td>
<td>0.06</td>
<td>Rare</td>
<td>5</td>
<td>0.08</td>
<td>Rare</td>
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<td>Dumpster or other outside trash receptacle fire</td>
<td>456</td>
<td>8.80</td>
<td>Daily</td>
<td>432</td>
<td>8.04</td>
<td>Daily</td>
<td>390</td>
<td>6.60</td>
<td>Daily</td>
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<tr>
<td>Fire in mobile home used as fixed residence</td>
<td>6</td>
<td>0.12</td>
<td>Rare</td>
<td>14</td>
<td>0.26</td>
<td>Rare</td>
<td>5</td>
<td>0.08</td>
<td>Rare</td>
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<td>Fire in mobile prop used as a fixed struc, Other</td>
<td>2</td>
<td>0.04</td>
<td>Rare</td>
<td>1</td>
<td>0.02</td>
<td>Rare</td>
<td>2</td>
<td>0.03</td>
<td>Rare</td>
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<tr>
<td>Fire in motor home, camper, recreational vehicle</td>
<td>11</td>
<td>0.21</td>
<td>Rare</td>
<td>3</td>
<td>0.06</td>
<td>Rare</td>
<td>10</td>
<td>0.17</td>
<td>Rare</td>
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<td>Fire in portable building, fixed location</td>
<td>6</td>
<td>0.12</td>
<td>Rare</td>
<td>5</td>
<td>0.09</td>
<td>Rare</td>
<td>10</td>
<td>0.17</td>
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<tr>
<td>Fires in structure other than in a building</td>
<td>111</td>
<td>2.14</td>
<td>Routine</td>
<td>110</td>
<td>2.05</td>
<td>Routine</td>
<td>124</td>
<td>2.10</td>
<td>Routine</td>
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<td>Forest, woods or wildland fire</td>
<td>23</td>
<td>0.44</td>
<td>Rare</td>
<td>22</td>
<td>0.41</td>
<td>Rare</td>
<td>20</td>
<td>0.34</td>
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<td>Fuel burner/boiler malfunction, fire confined</td>
<td>10</td>
<td>0.19</td>
<td>Rare</td>
<td>18</td>
<td>0.34</td>
<td>Rare</td>
<td>17</td>
<td>0.29</td>
<td>Rare</td>
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<td>Garbage dump or sanitary landfill fire</td>
<td>13</td>
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<td>17</td>
<td>0.32</td>
<td>Rare</td>
<td>16</td>
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<td>Grass fire</td>
<td>218</td>
<td>4.21</td>
<td>Routine</td>
<td>235</td>
<td>4.38</td>
<td>Routine</td>
<td>270</td>
<td>4.57</td>
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<td>Incinerator overload or malfunction, fire confined</td>
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<td>0.04</td>
<td>Rare</td>
<td>10</td>
<td>0.19</td>
<td>Rare</td>
<td>12</td>
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<td>Rare</td>
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<td>Mobile property (vehicle) fire, Other</td>
<td>198</td>
<td>3.82</td>
<td>Routine</td>
<td>273</td>
<td>5.08</td>
<td>Routine</td>
<td>293</td>
<td>4.96</td>
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<td>Natural vegetation fire, Other</td>
<td>116</td>
<td>2.24</td>
<td>Routine</td>
<td>118</td>
<td>2.20</td>
<td>Routine</td>
<td>183</td>
<td>3.10</td>
<td>Routine</td>
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<tr>
<td>Off-road vehicle or heavy equipment fire</td>
<td>19</td>
<td>0.37</td>
<td>Rare</td>
<td>14</td>
<td>0.26</td>
<td>Rare</td>
<td>21</td>
<td>0.36</td>
<td>Rare</td>
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<tr>
<td>Outside equipment fire</td>
<td>43</td>
<td>0.83</td>
<td>Rare</td>
<td>61</td>
<td>1.14</td>
<td>Rare</td>
<td>61</td>
<td>1.03</td>
<td>Rare</td>
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<tr>
<td>Outside gas or vapor combustion explosion</td>
<td>3</td>
<td>0.06</td>
<td>Rare</td>
<td>2</td>
<td>0.04</td>
<td>Rare</td>
<td>1</td>
<td>0.02</td>
<td>Rare</td>
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<tr>
<td>Outside rubbish fire, Other</td>
<td>358</td>
<td>6.91</td>
<td>Routine</td>
<td>399</td>
<td>7.43</td>
<td>Daily</td>
<td>481</td>
<td>8.14</td>
<td>Daily</td>
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<td>Outside rubbish, trash or waste fire</td>
<td>616</td>
<td>11.89</td>
<td>Daily</td>
<td>626</td>
<td>11.66</td>
<td>Daily</td>
<td>572</td>
<td>9.68</td>
<td>Daily</td>
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<td>Outside stationary compactor/compacted trash fire</td>
<td>5</td>
<td>0.10</td>
<td>Rare</td>
<td>12</td>
<td>0.22</td>
<td>Rare</td>
<td>7</td>
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<tr>
<td>Outside storage fire</td>
<td>10</td>
<td>0.19</td>
<td>Rare</td>
<td>14</td>
<td>0.26</td>
<td>Rare</td>
<td>16</td>
<td>0.27</td>
<td>Rare</td>
</tr>
<tr>
<td>Passenger vehicle fire</td>
<td>1160</td>
<td>22.39</td>
<td>Daily</td>
<td>1046</td>
<td>19.48</td>
<td>Daily</td>
<td>1054</td>
<td>18.00</td>
<td>Daily</td>
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<tr>
<td>Rail vehicle fire</td>
<td>1</td>
<td>0.02</td>
<td>Rare</td>
<td>1</td>
<td>0.02</td>
<td>Rare</td>
<td>4</td>
<td>0.07</td>
<td>Rare</td>
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<tr>
<td>Road freight or transport vehicle fire</td>
<td>64</td>
<td>1.24</td>
<td>Rare</td>
<td>73</td>
<td>1.36</td>
<td>Rare</td>
<td>86</td>
<td>1.45</td>
<td>Rare</td>
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<tr>
<td>Self-propelled motor home or recreational vehicle</td>
<td>3</td>
<td>0.06</td>
<td>Rare</td>
<td>2</td>
<td>0.04</td>
<td>Rare</td>
<td>0</td>
<td>0.00</td>
<td>Rare</td>
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<tr>
<td>Special outside fire, Other</td>
<td>76</td>
<td>1.47</td>
<td>Rare</td>
<td>89</td>
<td>1.66</td>
<td>Rare</td>
<td>66</td>
<td>1.12</td>
<td>Rare</td>
</tr>
<tr>
<td>Trash or rubbish fire, contained</td>
<td>135</td>
<td>2.61</td>
<td>Routine</td>
<td>146</td>
<td>2.72</td>
<td>Routine</td>
<td>306</td>
<td>5.18</td>
<td>Routine</td>
</tr>
<tr>
<td>Water vehicle fire</td>
<td>6</td>
<td>0.12</td>
<td>Rare</td>
<td>0</td>
<td>0.00</td>
<td>Rare</td>
<td>0</td>
<td>0.00</td>
<td>Rare</td>
</tr>
</tbody>
</table>

Total Fire Responses

2016: 5181
2017: 5370
2018: 5912
Type of PPE Needed: Structural-Yes       Proximity-No

Incident
Operations:

Guidelines and policies are an important tool for the Houston Fire Department and are mandated by the Fire Chief. As such, the following HFD Guidelines apply in answering Question # 4.

Primary Objectives (in order):
A.   Firefighter Safety
B.   Life Safety/Rescue
C.   Incident Control/Mitigation
D.   Property Conservation/Environmental Concerns

These objectives will be accomplished using a risk vs. benefit analysis. Firefighters should only take large risks when there is a large benefit at stake. Small benefits only deserve a small amount of risk.

I-00 Volume I
I-01 Rules & Regulations
I-16 Motor Vehicle Accidents
I-23 Fire Station Management
I-24 Uniform Guideline
I-25 Occupational Wellness Program
I-47 Classified Trainng-I-02 Protective Clothing (Logistics/Prof. Devel.)
II-00 Volume II Glossary
II-03 Electronic Accountability System
II-04 Highrise Survey
II-05 Highrise Firefighting (with Appendix)
II-06 Incident Management
II-07 Evacuation and Rescue Boat Operations
II-08 Rope Rescue
II-09 Trench Rescue Incidents
II-10 Tunnel Rescue Incidents
II-11 Water Rescue & Evacuation
II-12 Confined Space Rescue
II-14 Hazardous Chemicals Fight to Know
II-15 Hazardous Materials Incidents
II-17 Rehabilitation Sector
II-18 Airport Guideline
II-19 Tactical Evaluation and Assessment Plan
II-20 Pre-incident Apartment Diagramming
II-21 Rapid Intervention
II-22 Africanized Honey Bee Incidents
II-23 High Angle Rescue
II-24 MVA and Industrial Accident Extrication
II-25 Emergency Mobilization Plan
II-26 DTO-FTO Guideline
II-27 Chemical Exposure Evaluation
II-28 Stokes Basket
II-29 Civil Disorders
II-30 Elevator Operations
II-31 Hydrant Inspection
II-32 Developing Water Supplies  
II-33 Hurricane Guideline  
II-34 Water Supply Officer  
II-36 Decontamination  
II-37 Shipboard Firefighting  
II-38 Reporting of Automatic Alarms  
II-39 SCBA Inspections  
II-41 Weapons of Mass Destruction  
II-42 May-Day  
II-43 Thermal Imaging Camera  
II-44 Fire Hose  
II-47 Structure Fire Incidents  
II-49 Air Management  

Type of PPE Needed: Structural-Yes    Proximity-No  

☐ Geographic location and climate:  

Houston, seat of Harris County, Texas, is located on the upper Gulf coastal plain at 9522' West and 2946' North, 50 miles from the Gulf of Mexico.  

TOPOGRAPHY: Houston lies largely in the northern portion of the Gulf coastal plain, a 40- to 50-mile-wide swath along the Texas Gulf Coast. Typically, elevation rises approximately one foot per mile inland.  

Northern and eastern portions of the area are largely forested; southern and western portions are predominantly prairie grassland; coastal areas are prairie and sand.  

Surface water in the Houston region consists of lakes, rivers, and an extensive system of bayous and manmade canals that are part of the rainwater runoff management system. Some 25%-30% of Harris County lies within the 100-year flood plain. Elevation ranges (a.s.l.): Brazoria 0'-146', Chambers 0'-85', Fort Bend 12'-158', Galveston 0'-43', Harris 0'-310', Liberty 0'-269', Montgomery 43'-435', Waller 80'-357'.  

The climate of Houston is classified as humid subtropical climate, with tropical influences. August normally ranks as the warmest month at 84.6 °F (29.2 °C) and January the coldest month at 53.1 °F (11.7 °C). The normal annual precipitation measures 49.77 inches (1,264 mm).  

Type of PPE Needed: Structural-Yes    Proximity-No  

☐ Specific physical area of operation:  

City of Houston: Latitude 29.7604° N, 95.3698° W  

Houston, the most populous city in the Southern United States, is located along the upper Texas Gulf Coast, approximately 50 miles (80 km) northwest of the Gulf of Mexico at Galveston. The city, which is the ninth-largest in the United States by area, covers 601.7 square miles (1,558 km2), of which 579.4 square miles (1,501 km2), or 96.3%, is land and 22.3 square miles (58 km2), or 3.7%, is water.  

Exterior Operations  
Interior Operations  
Outdoors/ Wildland  

Type of PPE Needed: Structural-Yes    Proximity-No  

Likelihood of or response to CBRN terrorism incident:  

Likelihood of or response to a CBRN terrorism incident  
The likelihood of a response to a CBRN terrorism incident is LOW due to the LOW frequency/history of CBRN.
incidents in the city of Houston.
Three concerns HFD has regarding a CBRN Incident:
1. The increase of Global Terrorism, per the Institute of Economics and Peace.
2. The High Severity of human loss
3. The High Severity of long term environmental impact

To respond and mitigate a CBRN incident, HFD will refer to the Houston Fire Department Guidelines.
- Subject: Hazardous Materials, Volume NO. II, Reference NO. II -15
- Subject: Weapons of Mass Destruction, Volume NO. II, Reference NO. II -41

Type of PPE Needed: Structural-Yes Proximity-No

Circle PPE Determined from Assessment

NFPA 1971 Current Edition Structural Compliant PPE Determined
NFPA 1971 Current Edition Proximity Compliant PPE Determined

☐ NFPA 1971, have been reviewed before purchase of protective clothing. All protective clothing issued to members of the Houston FD shall be compliant with the minimum standards found in NFPA 1971.

☐ All ensemble elements considered for purchase have been evaluated for comparative strengths and weaknesses. The interface of all ensemble elements and equipment utilized by the department are considered for proper fit and function.

Sam Peña
Fire Chief
Houston Fire Department

5/31/2019