Controlling Exposure to Fireground Toxic Contaminants

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Overview


3. **NFPA 1851**: Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting (2019)

4. **NFPA 1500 (2020)**: First Draft

5. **Other Relevant Standards**
Prior to 2018 editions...

- Contamination control was not addressed
- Falls within the scope of several documents and technical committees
- No formal (NFPA) process to correlate across the various committees and documents prior to publication
Fire Service
Occupational Safety &
Health Technical
Committee
Standards Alignment & Revision Cycle Adjustments

**Safety Standards (Next Edition 2020)**
- NFPA 1500 *(Occupational Safety & Health Program)*
- NFPA 1561 *(Incident Management & Command Safety)*
- NFPA 1521 *(Fire Dept Safety Officer)*

**Health & Wellness Standards (Next Edition 2021)**
- NFPA 1582 *(Comprehensive Occupational Medical)*
- NFPA 1581 *(Infection Control Program)*
- NFPA 1583 *(Health Related Fitness Program)*
- NFPA 1584 *(Rehab: Emergency Ops and Training)*
NFPA 1500 (2018)

Standard on Fire Department Occupational Safety, Health, and Wellness Program
Airborne, dermal, ocular, or respiratory hazards consisting of products of combustion, carcinogens, toxic chemicals, and ultrafine particles and other incidental health hazards (3.3.20.3)
• Added products of combustion, carcinogens, contaminants to the FD risk management plan and risk reduction strategy and policy (4.2.2 & 4.3.1)

• Products of combustion, carcinogens, and fireground contaminants shall be collected as part of the data collection system (4.6.2)
Best Practice

Exposure reporting should be incorporated into Incident Reporting
## Incident Hazard Report
### October

Total Incidents for the month: 16,262

<table>
<thead>
<tr>
<th>Hazard Type</th>
<th>Incidents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoke/Products of Combustion</td>
<td>178</td>
<td>1.096 %</td>
</tr>
<tr>
<td>Diesel Exhaust</td>
<td>2,860</td>
<td>17.587 %</td>
</tr>
<tr>
<td>Burning Plastic</td>
<td>54</td>
<td>0.332 %</td>
</tr>
<tr>
<td>Heavy Metals</td>
<td>4</td>
<td>0.025 %</td>
</tr>
<tr>
<td>Black Mold</td>
<td>24</td>
<td>0.148 %</td>
</tr>
<tr>
<td>Hazardous Materials</td>
<td>4</td>
<td>0.025 %</td>
</tr>
<tr>
<td>Asbestos</td>
<td>2</td>
<td>0.012 %</td>
</tr>
<tr>
<td>Chemical Vapors</td>
<td>15</td>
<td>0.092 %</td>
</tr>
<tr>
<td>Biological Agents</td>
<td>3</td>
<td>0.018 %</td>
</tr>
<tr>
<td>Radiation</td>
<td>11</td>
<td>0.068 %</td>
</tr>
<tr>
<td>Infectious Disease</td>
<td>14</td>
<td>0.086 %</td>
</tr>
<tr>
<td>Unknown Vapor or Mists</td>
<td>11</td>
<td>0.088 %</td>
</tr>
<tr>
<td>Bed Bugs</td>
<td>25</td>
<td>0.154 %</td>
</tr>
</tbody>
</table>
• All members shall be trained in the risks associated with workplace exposure to products of combustion, carcinogens, fireground contaminants and other incident-related health hazards (5.3.13)

• Members shall be trained to recognize when a workplace exposure has occurred and to know the control methods for personal decontamination, decontamination of PC&E, and the risks of cross-contamination (5.3.13.1*)
- Members shall use NFPA 1981 certified SCBA when engaged in any operation where members could encounter atmospheres that are IDLH or potentially IDLH, or where the atmosphere is undefined or hazardous (including overhaul).

- Respiratory protection for any entry into the post-fire environment before or after overhaul shall be at least a fitted full-face air-purifying respirator (APR) with protection against fireground toxic contaminants when used in compliance with 14.4.2.1.
- Appropriate protective clothing and a supplied-air respirator during overhaul.
- When overhaul is not actively taking place, fire investigators or other members who enter the fire area following extinguishment shall wear protective clothing and a supplied air respirator or an appropriate air-purifying respirator for respiratory hazards that could be encountered.
Points to NFPA 1582 (2018)

- Cancer and Cardiovascular Disease Risk Reduction (7.7.22)
  - The fire department physician shall annually inform members of the heightened risks of cardiovascular disease and various types of cancer associated with fire fighting & the routes of hazardous exposures related to fire fighting, as well as common signs, symptoms, and preventive measures for both cardiovascular disease and cancers.
Cancer Screening Requirements: NFPA 1582 (2018)

1) Skin
2) Colon
3) Prostate
4) Lung
5) Cervical
6) Oral
7) Thyroid
8) Testicular
9) Bladder
Exposure to Fireground Toxic Contaminants (Chapter 14 NEW)

- Added products of combustion, carcinogens, contaminants to the FD risk management plan and risk reduction strategy and policy (4.2.2 & 4.3.1)
Training on the hazards associated with exposure to fireground toxic contaminants shall include the following:

1. Awareness
2. Prevention
3. Mitigation
4. Risk Factors
Prevention and Mitigation (14.2)

- The AHJ shall provide standard operating procedures (SOPs) related to the prevention and mitigation of fire fighter exposure to fireground toxic contaminants.
The AHJ shall provide for the cleaning and maintenance of protective clothing and equipment.

The AHJ shall ensure that soiled or contaminated protective clothing and equipment is removed from service until cleaned and disinfected in accordance with NFPA 1851.
Mitigation of Fireground Toxic Contaminant Exposure (14.4)

- Appropriate PC&E shall be worn during all phases of fireground operations
- Respiratory protection during overhaul shall consist of a supplied air respirator (SCBA)
APR Use in the Post-Fire Environment

1. >30 minutes post-extinguishment
2. No active overhaul
3. PPV in place
4. Continuous air monitoring
   a. HCN <4.7ppm
   b. CO <35ppm
The chemical cartridge shall be NIOSH approved to provide protection against atmospheres containing:

- particulates
- acid gases
- organic vapors
- formaldehyde

A filter change out schedule shall be established for the environmental hazards present at each incident.
Post-Incident Fireground Toxic Contaminant Exposure (14.5.1)

- The AHJ shall train its members on the proper doffing and containment of contaminated PC&E
  - prevention of cross-contamination
- The AHJ shall provide SOPs related to the decontamination of fire fighters exposed to fireground toxic contaminants
- The AHJ shall provide appropriate decontamination facilities and equipment for firefighters exposed to fireground toxic contaminants
Personal Hygiene Following Exposure (14.5.3.1)

- Wiping skin areas near interfaces of PC&E with wet wipes immediately after doffing
- Take a soap and water shower within an hour of an incident where an exposure could have occurred
Exposure Reporting Requirements (14.6)

- The AHJ shall establish an exposure reporting system for its members to use to record possible exposure to fireground toxic contaminants, airborne hazards, dusts, or chemicals.
- The exposure report records shall be maintained by the AHJ for at least 15 years following the member’s separation from the AHJ or until the death of the member, whichever occurs first.
- The member shall have access to their personal exposure records.
- All personnel potentially exposed to fireground toxic containments, airborne hazards, dusts, or chemicals shall complete an exposure report.

Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting
Liquid and Particulate Contaminant Protection (Optional)
Additional Performance Requirements for Optional Structural Fire Fighting Protective Hood Interface Components Providing Particulate Protection.

- Shall have a particulate filtration efficiency of 90 percent or greater for each particle size from 0.1 \( \mu \text{m} \) to 1.0 \( \mu \text{m} \).
Protection from Liquid and Particulate Contaminants

(7.20)

- Optional Performance Requirements for Protection from Liquid and Particulate Contaminants.
- Whole Garment and Ensemble Liquid Penetration Test
- Shall allow no visual particulate inward leakage, and shall show no liquid penetration.
NFPA 1851 (2019)
Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting
Definitions (Chapter 3)

- Contamination
- Disinfectant
- Decontamination
- Gross-Decontamination
- Preliminary Exposure Reduction
- Products of Combustion
- Sanitizer
1. Advance Cleaning

2. Specialized Cleaning
   - Preliminary Exposure Reduction
     - On-scene
     - Not a substitute for Advanced or Specialized Cleaning
   - Routine Cleaning removed
   - Decision Tree
NFPA 1500 (2020)
Standard on Fire Department Occupational Safety, Health, and Wellness Program
Definitions (Chapter 3)

- Better consistency with other relevant Standards
- Fireground Contaminants (global)
- Gross Decontamination
Fire Department Administration (Chapter 4)

- SOP for post-incident control and mitigation of emergency scene contaminants
- Improved exposure data collection
- Initial and on-going training regarding the risks associated with workplace exposure to products of combustion and other incident-related health hazards
Fire Apparatus, Equipment, and Drivers/Operators (Chapter 6)

- Contaminated PPE or equipment must be sealed if in the passenger areas
  - If cross contamination occurs, cleaning is mandated
- While operating at emergency incidents, engine exhaust shall be directed away from members operating
- Fire hose shall be decontaminated in accordance with NFPA 1962 and the manufacturer instructions prior to being returned to service
Protective Clothing and Protective Equipment (Chapter 7)

- Protective Clothing for Fire Investigators
Emergency Operations (Chapter 8)

- Incident Safety Officer responsibilities added…
  - includes preventative measures to reduce responder exposure to hazards, and contamination reductions procedures are in-place and followed
- Hazard Control Zones changed to *Emergency Incident Hazard Control Zones*
  - For clarification and contamination controls
- Gross decon and (on-scene) personal hygiene prior to demobilization
Facility Safety (Chapter 10)

- Direct or source-capture exhaust systems
- No PPE in sleeping or living areas
- FD facilities shall be designated smoke and tobacco-free, including e-devices
- Contamination Control inside facilities
  - CC Zones (red, yellow, green)
  - Activities identified
  - Pressure differential
  - No ice machines in red or yellow areas
Exposure to Fireground Toxic Contaminants (Chapter 14)

- Contaminants = Hot Zone
- More on on-scene mitigation and exposure reduction
- Post-fire sauna use contraindicated (annex)
- Exposure reports maintained for 30 years
- Annex (Explanatory) language added
Your Input Is Valued

NFPA 1500 (2020) Open for Public Input
Sept 6, 2018 – Nov 15, 2018
www.nfpa.org/1500
NFPA 1581 (2020) – Infection Control Program
- Addresses vehicles and living areas
- Considering expanding this to Contamination and Infection Control
- Plan B – new document…

NFPA 1584 (2020) - Rehab
- A complete overhaul of this document
  - Name and scope should evolve
Major Revision Planned (2021)

- Contamination control
- Post-fire hygiene
- Cross-contamination
- On-scene decon
- Station level decon
• ProQual documents establish the training requirements
• Training documents should address training requirements for awareness, prevention, mitigation and control
• PC&E Performance & Design documents address contamination controls where appropriate
• All PC&E SCAM documents should address decon, cleaning, and care following typical FG exposures
Thanks for Listening
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