

NFPA Standards Update

Controlling Exposure to Fireground Toxic Contaminants

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Director of Health, Safety, and EMS; Ohio Assoc. of Professional Fire Fighters
Principal Member, NFPA Technical Committee for Occupational Safety & Health

Overview

- 1. NFPA 1500:** Standard on Fire Department Occupational Safety, Health, and Wellness Program (2018)
- 2. NFPA 1971:** Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting (2018)
- 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**

Fireground Contaminants

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

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**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**

Fireground Contaminants (Chapter 3)

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)

Fire Department Administration (Chapter 4)

- 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

The screenshot shows a software window titled "NFIRS Incident Report User Fields". It has three tabs: "SO-1 Incident Hazard Info" (selected), "FP-356 Form", and "CAD Call Types". Below the tabs, there is a question: "During this incident where any of the following hazards present: Yes No". Below this is a note: "(check all that apply)". A list of hazards follows, each with an unchecked checkbox: Smoke/Products of Combustion, Diesel Exhaust, Burning Plastic, Heavy Metals, Black Mold, Hazardous Materials, Asbestos, Chemical Vapors, Biological Agents, Radiation, Infectious Disease, Unknown Vapor or Mists, Bed Bugs, and Other*. To the right of this list is a "Comments/Notes:" label and a large yellow rectangular text area. At the bottom of the window, there is a text box and three buttons: "Save", "Delete", and "Cancel". A footer note at the bottom of the window reads: "SO-4 should be notified for any significant exposure to infectious disease, blood or body fluids."

NFIRS Incident Report User Fields

SO-1 Incident Hazard Info | **FP-356 Form** | CAD Call Types

During this incident where any of the following hazards present: Yes No

(check all that apply)

- Smoke/Products of Combustion
- Diesel Exhaust
- Burning Plastic
- Heavy Metals
- Black Mold
- Hazardous Materials
- Asbestos
- Chemical Vapors
- Biological Agents
- Radiation
- Infectious Disease
- Unknown Vapor or Mists
- Bed Bugs
- Other*

Comments/Notes:

SO-4 should be notified for any significant exposure to infectious disease, blood or body fluids.

Save Delete Cancel



THE CITY OF
COLUMBUS
ANDREW J. GINTHER, MAYOR

Incident Hazard Report

October

Total Incidents for the month: 16,262

DIVISION OF FIRE

Smoke/Products of Combustion	178	1.095 %
Diesel Exhaust	2,880	17.587 %
Burning Plastic	54	0.332 %
Heavy Metals	4	0.025 %
Black Mold	24	0.148 %
Hazardous Materials	4	0.025 %
Asbestos	2	0.012 %
Chemical Vapors	15	0.092 %
Biological Agents	3	0.018 %
Radiation	11	0.068 %
Infectious Disease	14	0.088 %
Unknown Vapor or Mists	11	0.068 %
Bed Bugs	25	0.154 %



**Training,
Education, and
Professional
Development
(Chapter 5)**

- **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*)**

Protective Clothing and Protective Equipment (Chapter 7)

- 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.

Emergency Operations (Chapter 8)

- 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.

**Medical and
Physical
Requirements
(Chapter 11)**

- **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
(14.1)

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**

Cleaning and Maintenance (14.3)

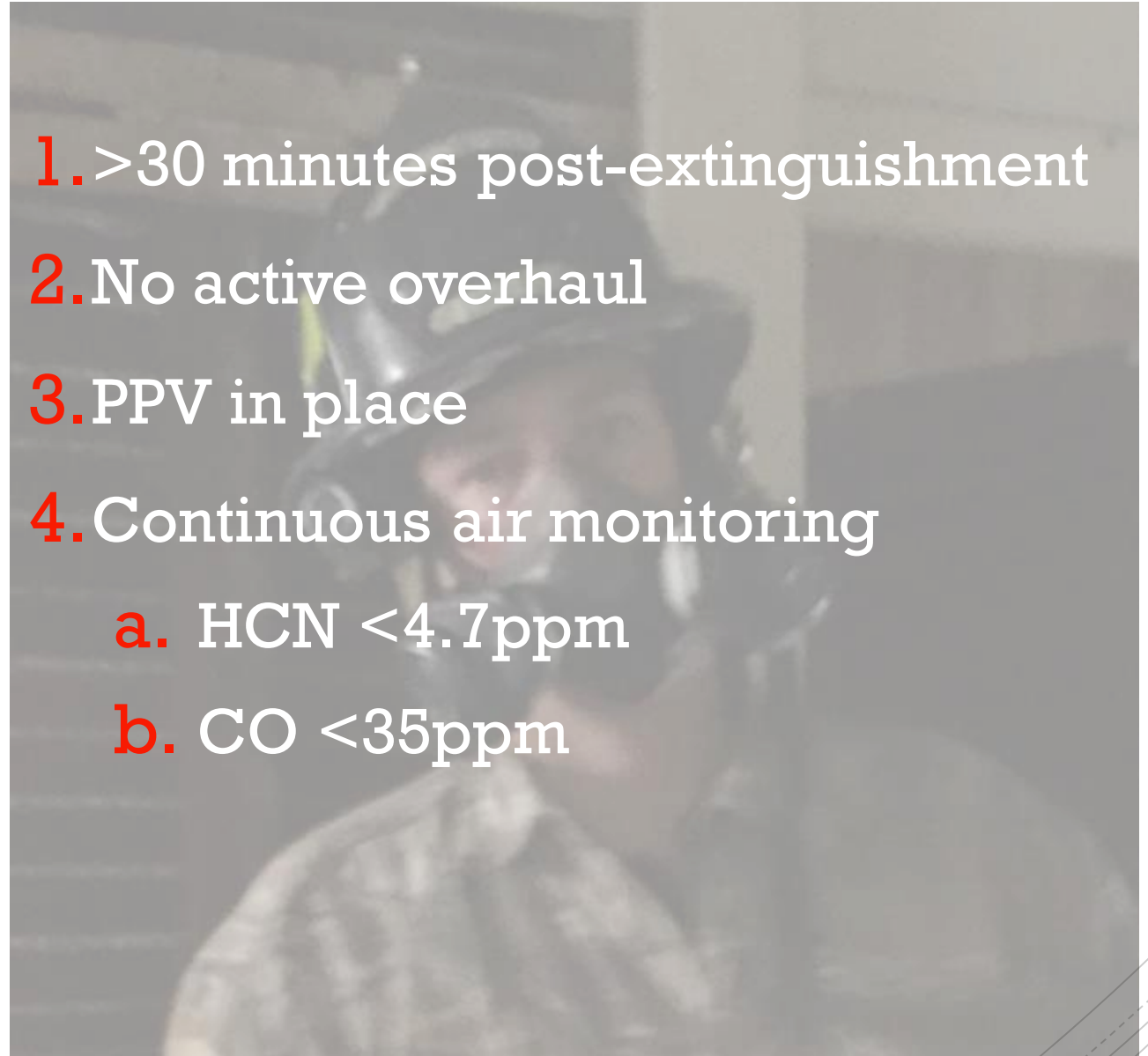
- The AHJ shall provide for the cleaning and maintenance of protective clothing and equipment
- The AHJ shall ensure that soiled or contaminated protective clothing and equipment is removed from service until cleaned and disinfected in accordance with NFPA 1851

*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



*APR Use in the
Post-Fire
Environment*

- 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

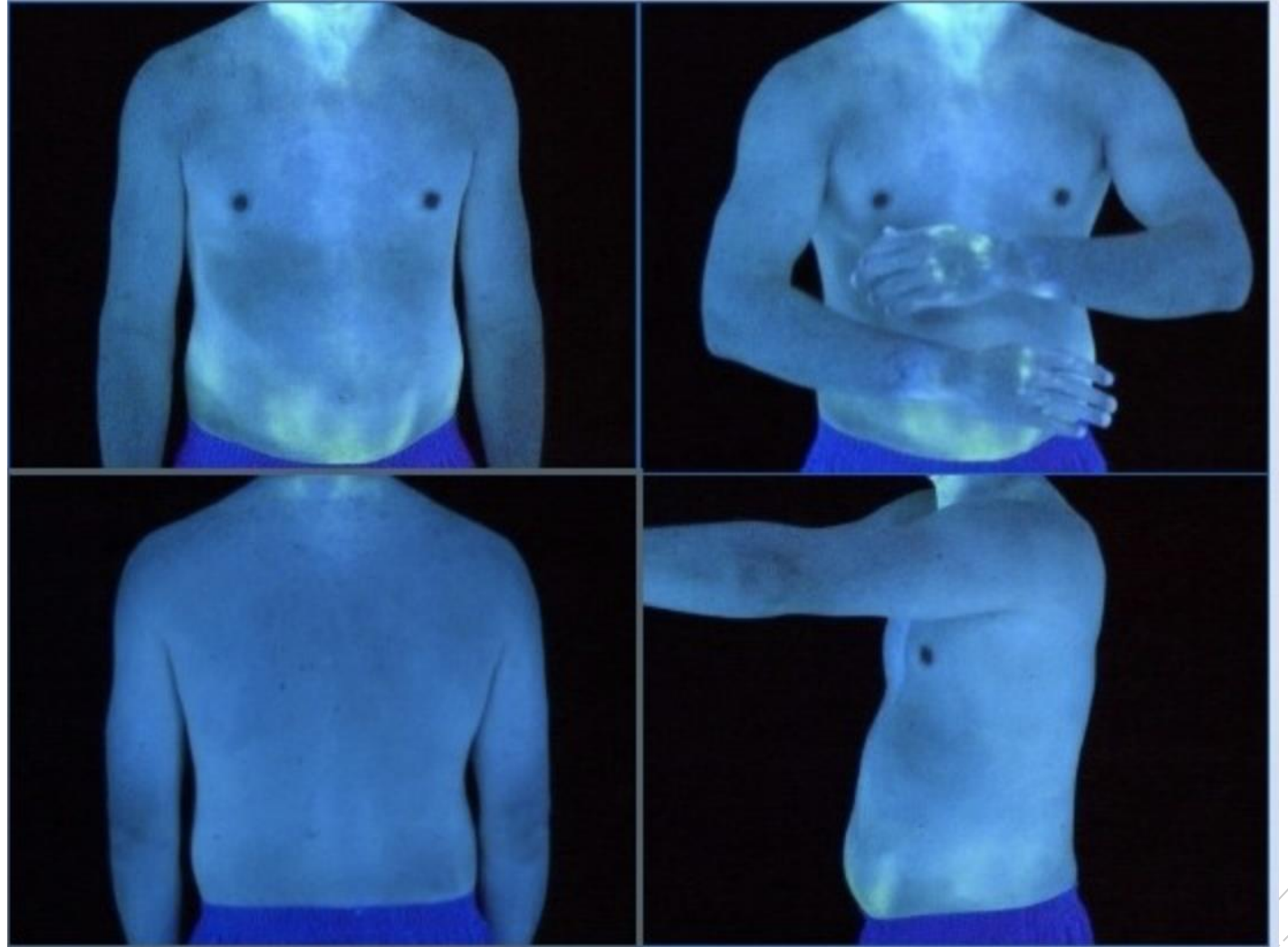
*Exposure
Reporting
Requirements
(14.6)*

- 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

NFPA 1971 (2018)

**Standard on Protective
Ensembles for Structural
Fire Fighting and
Proximity Fire Fighting**

Liquid and
Particulate
Contaminant
Protection
(Optional)



*Particulate
Blocking Hood
(7.14)*

- **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 μm to 1.0 μm .**

*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)

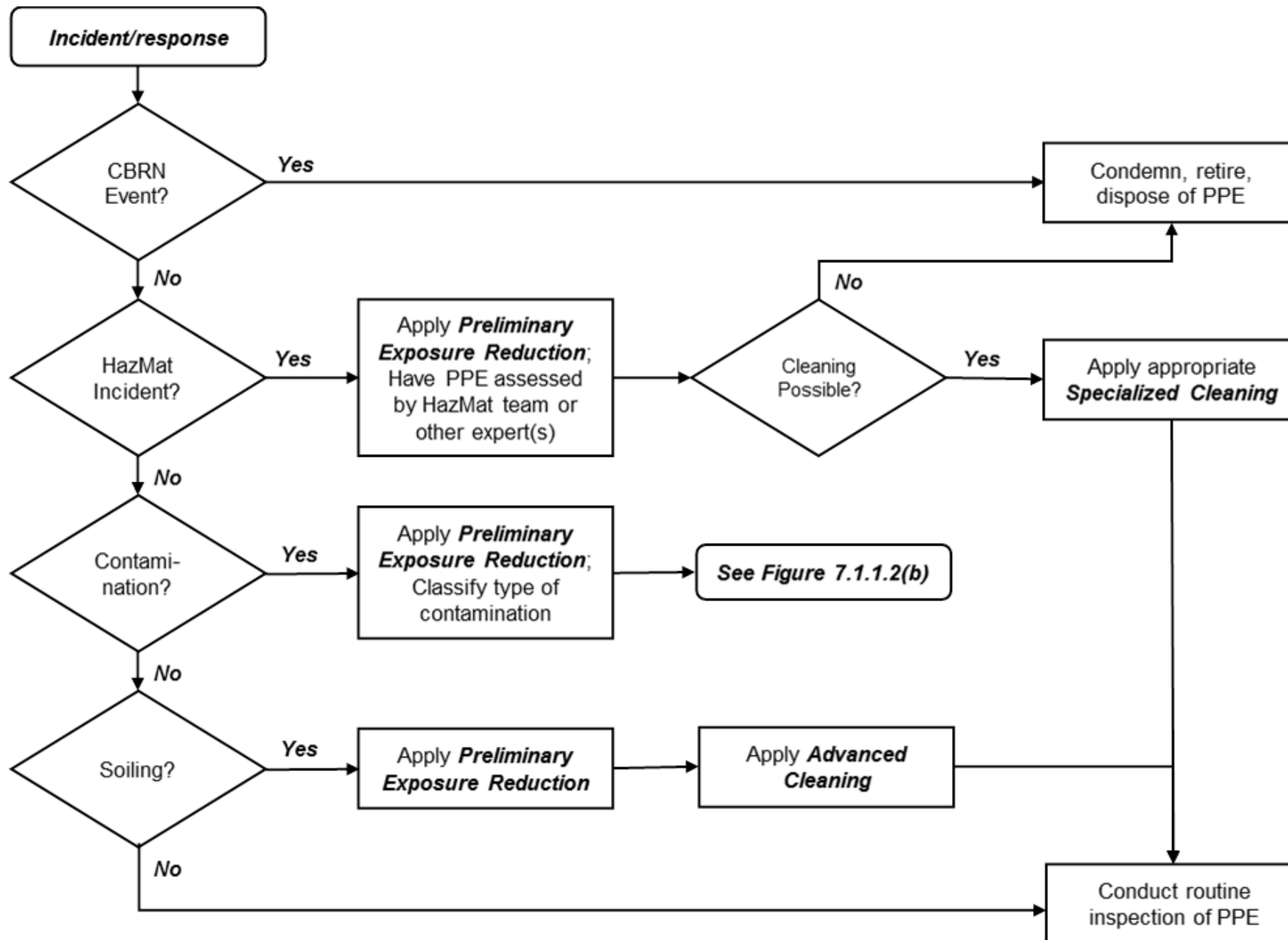
- **Contamination**
- **Disinfectant**
- **Decontamination**
- **Gross-Decontamination**
- **Preliminary Exposure Reduction**
- **Products of Combustion**
- **Sanitizer**

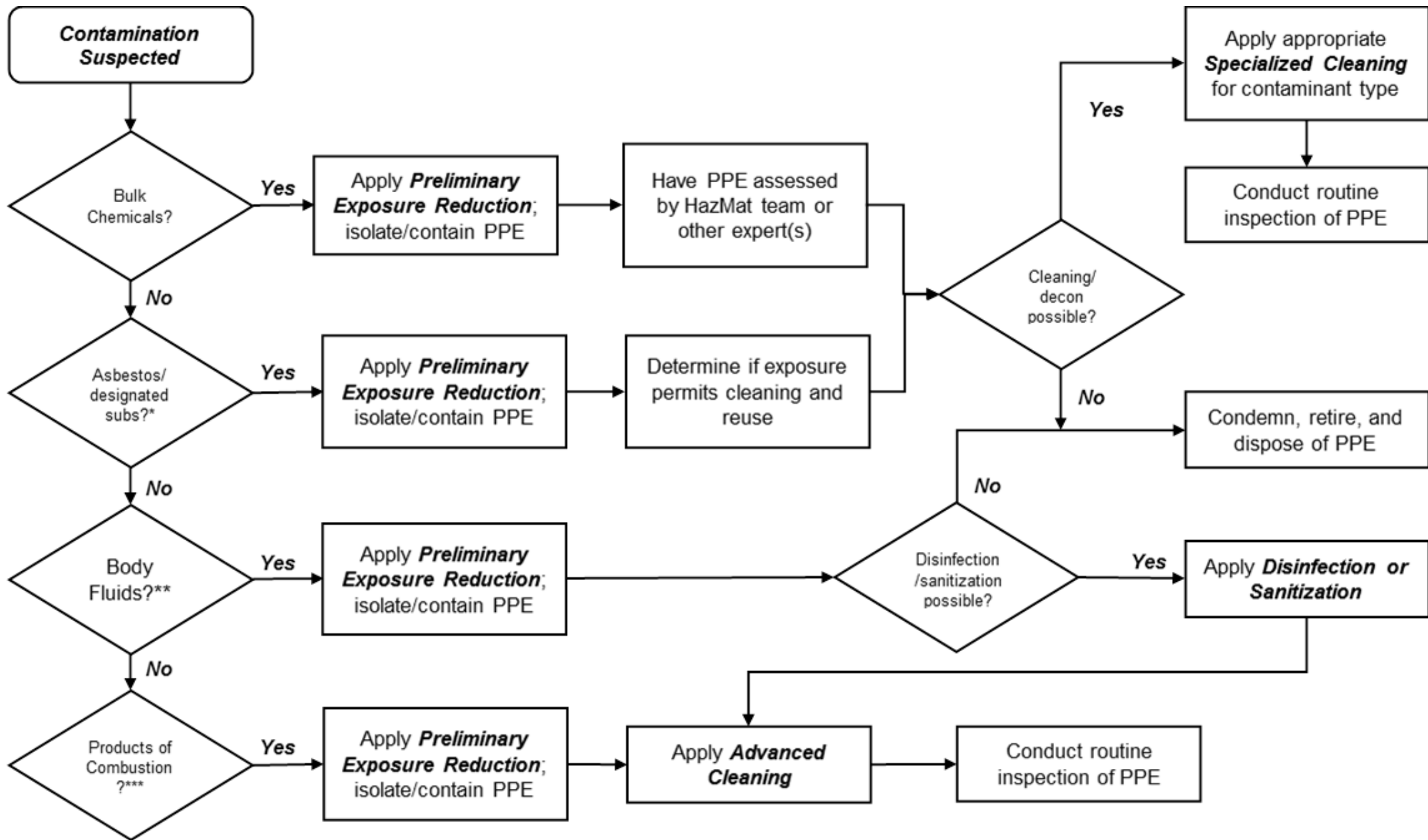
Cleaning and Decontamination (Chapter 7)

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

1ST DRAFT

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

Training, Education, and Professional Development (Chapter 5)

- 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

What Next?

- 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

NFPA® 1584

Standard on the Rehabilitation Process for Members During Emergency Operations and Training Exercises

2015 Edition



NFPA®, 1 Batterymarch Park, Quincy, MA 02169-7471, USA
An International Codes and Standards Organization

Who Else Addresses CC?

- 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

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Thanks for Listening

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