NFPA® 1585

Standard for Exposure and Contamination Control

2025 Edition

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

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NFPA® 1585

Standard for

Exposure and Contamination Control

2025 Edition

This edition of NFPA 1585, *Standard for Exposure and Contamination Control*, was prepared by the Technical Committee for Emergency Responders Occupational Health. It was issued by the Standards Council on April 22, 2024, with an effective date of May 12, 2024.

This edition of NFPA 1585 was approved as an American National Standard on May 12, 2024.

Origin and Development of NFPA 1585

NFPA 1585, *Standard for Exposure and Contamination Control*, 2025 edition, is the first NFPA document to address minimum requirements for limiting emergency responders' exposure to fireground contaminants and controlling those contaminants in the emergency responder's workplace.

The proposed standard was submitted to the NFPA Standards Council as a project request in September 2017. This project request was to consolidate the requirements on contamination control into one source. A "New Projects Being Explored" post was included in the October 2017 edition of NFPA News to solicit feedback from a stakeholders on developing a new standard or modifying a current standard to address contamination control. Additionally, the NFPA Standards Council took into consideration a report issued by the Fire Protection Research Foundation, *Developing and Implementing a Fire Service Contamination Control Campaign*, that outlined the breadth of requirements on contamination control being dispersed throughout many NFPA documents. Based on feedback received from the public, a task group consisting of many individuals representing major stakeholder groups and technical committees with requirements already addressing contamination control were assembled and held their first meeting in June 2018.

The NFPA Standards Council determined that a new technical committee was needed to develop a one-source document on contamination control. Additionally, the NFPA Standards Council identified that the scope of this new technical committee would address the occupational health, medical, and wellness requirements for all emergency responders, including those with a primary role in emergency medical and law enforcement agencies.

This document represents the work of a diverse group of subject matter experts from the various backgrounds related to contamination control and the occupational health of emergency responders. The document provides organizations with the necessary information to develop an exposure and contamination control program and draws in content from many existing sources.

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This list represents the membership at the time the Committee was balloted on the final text of this edition. Since that time, changes in the membership may have occurred. A key to classifications is found at the back of the document.

NOTE: Membership on a committee shall not in and of itself constitute an endorsement of the Association or any document developed by the committee on which the member serves.

Committee Scope: This committee shall have primary responsibility for documents on occupational health, medical, and wellness requirements for emergency responders. The committee shall also have responsibility for documents pertaining to contamination and infection control.

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Standard for

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NOTICE: An asterisk (*) following the number or letter designating a paragraph indicates that explanatory material on the paragraph can be found in Annex A.

A reference in brackets [ ] following a section or paragraph indicates material that has been extracted from another NFPA document. Extracted text may be edited for consistency and style and may include the revision of internal paragraph references and other references as appropriate. Requests for interpretations or revisions of extracted text shall be sent to the technical committee responsible for the source document.

Information on referenced and extracted publications can be found in Chapter 2 and Annex C.

Chapter 1 Administration

1.1 Scope. This standard shall contain minimum requirements for an ECCP for emergency services incident scene operations and training.

1.2 Purpose. The purpose of this standard shall be to provide minimum criteria for exposure and contamination control in emergency services facilities, in emergency vehicles and apparatus, during procedures at an incident scene, and at any other area where emergency service members are involved in routine or emergency operations.

1.3 Application.

1.3.1 The requirements of this standard shall apply to public, military, private, and industrial emergency services departments providing law enforcement, rescue, fire suppression, fire investigation, and emergency medical services, as well as other emergency services and special operations.

1.3.2 This standard shall not apply to hazardous material incidents exposures or infectious disease exposures.

1.4 Retroactivity. The provisions of this standard shall reflect a consensus of what is necessary to provide an acceptable degree of protection from the hazards addressed in this standard at the time the standard was issued.

1.4.1 Unless otherwise specified, the provisions of this standard shall not apply to facilities, equipment, structures, or installations that existed or were approved for construction or installation prior to the effective date of the standard.

1.4.2 Where specified, the provisions of this standard shall be retroactive.

1.4.3 In those cases where the authority having jurisdiction determines that the existing situation presents an unacceptable degree of risk, the authority having jurisdiction shall be permitted to apply retroactively any portions of this standard.

1.4.4 The retroactive requirements of this standard shall be permitted to be modified if, in the judgment of the authority having jurisdiction, their application would be impractical or it is evident that a reasonable degree of safety is provided.

1.5 Equivalency. Nothing in this standard shall be intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability, and safety over those prescribed by this standard.

1.5.1* The requirements of this standard shall be intended to meet or exceed the most current applicable federal regulations of the Occupational Safety and Health Administration (OSHA) and guidelines of the US Centers for Disease Control and Prevention (CDC).

1.5.2 Technical documentation shall be submitted to the authority having jurisdiction to demonstrate equivalency.

1.5.3 The system, method, or device shall be approved for the intended purpose by the authority having jurisdiction.

1.6 Units.

1.6.1* In this standard, values for measurement in US customary units are followed by an International System (SI) unit equivalent in parentheses, but only the first stated value shall be regarded as the requirement.

1.6.2 Equivalent values in parentheses shall not be considered as the requirement because these values are approximate.

Chapter 2 Referenced Publications

2.1 General. The documents or portions thereof listed in this chapter are referenced within this standard and shall be considered part of the requirements of this document.

2.2 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 1550 , *Standard for Emergency Responder Health and Safety,* 2024 edition.

NFPA 1584, *Standard on the Rehabilitation Process for Members During Emergency Operations and Training Exercises,* 2022 edition.

NFPA 1851, *Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting,* 2020 edition.

NFPA 1855, *Standard on Selection, Care, and Maintenance of Protective Ensembles for Technical Rescue Incidents,* 2018 edition.

NFPA 1877, *Standard on Selection, Care, and Maintenance of Wildland Firefighting Protective Clothing and Equipment,* 2022 edition.

NFPA 1910, *Standard for the Inspection, Maintenance, Refurbishment, Testing, and Retirement of In-Service Emergency Vehicles and Marine Firefighting Vessels,* 2024 edition.

NFPA 1937, *Standard for the Selection, Care, and Maintenance of Rescue Tools,* 2021 edition.

NFPA 1962, *Standard for the Care, Use, Inspection, Service Testing, and Replacement of Fire Hose, Couplings, Nozzles, and Fire Hose Appliances,* 2018 edition.

NFPA 1970, *Standard on Protective Ensembles for Structural and Proximity Firefighting, Work Apparel and Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services and Personal Alert Safety Systems (PASS),* 2025 edition.

2.3 Other Publications.

2.3.1 ANSI Publications. American National Standards Institute, Inc., 25 West 43rd Street, 4th Floor, New York, NY 10036.

ANSI Z535.4, *Product Safety Signs and Labels,* 2017.

2.3.2 Other Publications.

Merriam-Webster's Collegiate Dictionary, 11th edition, Merriam-Webster, Inc., Springfield, MA, 2020.

2.4 References for Extracts in Mandatory Sections.

NFPA 1010, *Standard on Professional Qualifications for Firefighters,* 2024 edition.

NFPA 1250, *Recommended Practice in Fire and Emergency Service Organization Risk Management,* 2020 edition.

NFPA 1451, *Standard for a Fire and Emergency Service Vehicle Operations Training Program,* 2018 edition.

NFPA 1550, *Standard for Emergency Responder Health and Safety,* 2024 edition.

NFPA 1581, *Standard on Fire Department Infection Control Program,* 2022 edition.

NFPA 1584, *Standard on the Rehabilitation Process for Members During Emergency Operations and Training Exercises,* 2022 edition.

NFPA 1660, *Standard for Emergency, Continuity, and Crisis Management: Preparedness, Response, and Recovery,* 2024 edition.

NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments,* 2020 edition.

NFPA 1851, *Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting,* 2020 edition.

NFPA 1900, *Standard for Aircraft Rescue and Firefighting Vehicles, Automotive Fire Apparatus, Wildland Fire Apparatus, and Automotive Ambulances,* 2023 edition.

NFPA 1970, *Standard on Protective Ensembles for Structural and Proximity Firefighting, Work Apparel and Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services, and Personal Alert Safety Systems (PASS),* 2025 edition.

NFPA 1977, *Standard on Protective Clothing and Equipment for Wildland Fire Fighting and Urban Interface Fire Fighting,* 2022 edition.

NFPA 2500, *Standards for Operations and Training for Technical Search and Rescue Incidents and Life Safety Rope and Equipment for Emergency Services,* 2022 edition.

Chapter 3 Definitions

3.1 General.

3.1.1 The definitions contained in this chapter shall apply to the terms used in this standard.

3.1.2 Where terms are not defined in this chapter or within another chapter, they shall be defined using their ordinarily accepted meanings within the context in which they are used.

3.1.3 *Merriam-Webster's Collegiate Dictionary*, 11th edition, shall be the source for the ordinarily accepted meaning.

3.2 NFPA Official Definitions.

3.2.1* Approved. Acceptable to the authority having jurisdiction.

3.2.2* Authority Having Jurisdiction (AHJ). An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

3.2.3* Code. A standard that is an extensive compilation of provisions covering broad subject matter or that is suitable for adoption into law independently of other codes and standards.

3.2.4 Guide. An NFPA standard that is advisory or informative in nature and that contains only nonmandatory provisions. A guide may contain mandatory statements such as when a guide can be used, but the NFPA standard as a whole is not suitable for adoption into law.

3.2.5 Labeled. Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

3.2.6* Listed. Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose.

3.2.7 Recommended Practice. An NFPA standard similar in content and structure to a code or standard but that contains only nonmandatory provisions using the word "should" to indicate recommendations in the body of the text.

3.2.8 Shall. Indicates a mandatory requirement.

3.2.9 Should. Indicates a recommendation or that which is advised but not required.

3.2.10 Standard. An NFPA standard, the main text of which contains only mandatory provisions using the word "shall" to indicate requirements and that is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions are not to be considered a part of the requirements of a standard and shall be located in an appendix, annex, footnote, informational

note, or other means as permitted in the NFPA manuals of style. When used in a generic sense, such as in the phrases "standards development process" or "standards development activities," the term "standards" includes all NFPA standards, including codes, standards, recommended practices, and guides.

3.3 General Definitions.

3.3.1 Ambulance. A vehicle used for out-of-hospital medical care and patient transport, which provides a driver's compartment; a patient compartment to accommodate an emergency medical services provider (EMSP) and one patient located on the primary cot so positioned that the primary patient can be given emergency care during transit; equipment and supplies for emergency care at the scene as well as during transport; safety, comfort, and avoidance of aggravation of the patient's injury or illness; two-way radio communication; and audible and visual traffic warning devices. [**1900,** 2023]

3.3.2 Awareness. Having knowledge of a situation or fact.

3.3.3 Cleaning. The physical removal of dirt and debris, which generally is accomplished with soap and water and physical scrubbing. [**1581,** 2022]

3.3.3.1* ***Advanced Cleaning.*** The act of removing both soiling and contamination generally associated with products of combustion. [**1851,** 2020]

3.3.3.2* ***Specialized Cleaning.*** The act of removing hazardous materials, soiling associated with body fluids, or other forms of contamination. [**1851,** 2020]

3.3.4 Company. A group of members (1) under the direct supervision of an officer; (2) trained and equipped to perform assigned tasks; (3) usually organized and identified as engine companies, ladder companies, rescue companies, squad companies, or multi-functional companies; (4) operating with one piece of fire apparatus (pumper, aerial fire apparatus, elevating platform, quint, rescue, squad, ambulance) except where multiple apparatus are assigned that are dispatched and arrive together, continuously operate together, and are managed by a single company officer; (5) arriving at the incident scene on fire apparatus. [**1550,** 2024]

3.3.5* Contaminants. Harmful, irritating, or nuisance material foreign to the normal atmosphere. [**1550,** 2024]

3.3.6 Contaminated. The presence or anticipated presence of contaminants on an item or surface.

3.3.7 Contamination Control Areas Within Fire Department Facilities. Areas inside a facility that are designated to indicate the likelihood of exposure to contaminants.

3.3.7.1* ***Green Area.*** Portion(s) of an emergency services facility considered uncontaminated.

3.3.7.2* ***Red Area.*** Areas within a facility that are likely to be exposed to contaminants.

3.3.7.3* ***Yellow Area.*** Portion(s) of a facility used to remove or reduce contamination from people or equipment before transitioning to a green area.

3.3.8* Contamination. The accumulation of products of combustion and other hazardous materials on or in an ensemble element that includes carcinogenic, toxic, corrosive, or allergy-causing chemicals, body fluids, infectious microorganisms, or CBRN terrorism agents. [**1851,** 2020]

3.3.9 Control Zones. The areas at an incident that are designated based upon safety and the degree of hazard. [**1550,** 2024]

3.3.9.1 ***Cold Zone.*** The control zone of an incident that contains the command post and such other support functions as are deemed necessary to control the incident. [**1550,** 2024]

3.3.9.2 ***Collapse Zone.*** The area that is exposed to trauma, debris, and/or thrust should a building or part of a building collapse. [**1550,** 2024]

3.3.9.3 ***Hot Zone.*** The control zone immediately surrounding a hazardous area, which extends far enough to prevent adverse effects to personnel outside the zone. [**1550,** 2024]

3.3.9.4 ***No-Entry Zone.*** Those areas at an incident scene that no person(s) are allowed to enter, regardless of what personal protective equipment (PPE) they are wearing due to dangerous conditions. [**1550,** 2024]

3.3.9.5 ***Warm Zone.*** The control zone outside the hot zone where personnel and equipment decontamination and hot zone support takes place. [**1550,** 2024]

3.3.10 Decontamination. The removal of hazardous substances (e.g., biological, chemical, and radioactive materials) from an ESO's vehicles and employees, as well as clothing, equipment, tools, and sites to the extent necessary to prevent occurrences of adverse health and environmental effects.

3.3.11 Emergency Incident. Any situation to which an ESO responds to deliver emergency services.

3.3.12 Emergency Medical Services. The provision of treatment, such as first aid, cardiopulmonary resuscitation, basic life support, advanced life support, and other pre-hospital procedures including ambulance transportation, to patients. [**1550,** 2024]

3.3.13 Emergency Services Apparatus. Patrol cars, ambulances, fire apparatus, and other emergency services department vehicles, including patient compartments and areas used by emergency services firefighters or EMS providers.

3.3.14* Emergency Services Facility. Any building or area owned, operated, occupied, or used by an emergency services provider on a routine basis.

3.3.15* Emergency Services Organization (ESO). Any public, private, governmental, or military organization that provides emergency response and other related activities, whether for profit, not for profit, or government owned and operated.

3.3.16 Emergency Service Organization (ESO) Vehicle. Any vehicle operated by an ESO, including any privately owned vehicle (POV) operated by a member while performing ESO operations.

3.3.17* Environmentally Preferable Products (EPP) Cleaning Program. Products or services that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose.

3.3.18 ESO. See 3.3.16, Emergency Service Organization.

3.3.19* Exposure. The process by which members, PPE, and equipment are subjected to, or come in contact with, products of combustion or other harmful substances.

3.3.20 Exposure and Contamination Control Program (ECCP). The ESO's formal policy and implementation of procedures relating to preventing exposure and the control of contamination and contaminated waste where employees, patients, or the general public could be exposed to contamination or potentially contaminated materials in the emergency services work environment.

3.3.21 Exposure Management. A contaminant control and reduction program to reduce the risk of contact with harmful substances and actions to mitigate harmful substance spread after it occurs.

3.3.22 Facility. See 3.3.14, Emergency Services Facility.

3.3.23 Fire Apparatus. A vehicle designed to be used under emergency conditions to transport personnel and equipment, and to support the suppression of fires and mitigation of other hazardous situations. [**1900,** 2023]

3.3.24 Fire Department. An organization providing rescue, fire suppression, and related activities, including any public, governmental, private, industrial, or military organization engaging in this type of activity. [**1010,** 2024]

3.3.25 Fire Department Member. See 3.3.37, Member.

3.3.26 Firefighting.

3.3.26.1* *Proximity Firefighting.* Specialized firefighting operations that can include the activities of rescue, fire suppression, and property conservation at incidents involving fires producing high levels of radiant heat as well as conductive and convective heat. [**1970,** 2025]

3.3.26.2 *Structural Firefighting.* The activities of rescue, fire suppression, and property conservation in buildings or other structures, vehicles, rail cars, marine vessels, aircraft, or like properties. [**1710,** 2020]

3.3.26.3 *Wildland Firefighting.* The activities of fire suppression and property conservation in woodlands, forests, grasslands, brush, prairies, and other such vegetation, or any combination of vegetation, that is involved in a fire situation but is not within buildings or structures. [**1977,** 2022]

3.3.27 Fireground Contaminants. Airborne, dermal, ocular, or respiratory hazards consisting of products of combustion, carcinogens, toxic chemicals, ultrafine particles, and other incident health hazards.

3.3.28 Garment. The coat, trouser, or coverall elements of the protective ensemble designed to provide minimum protection to the upper and lower torso, arms, and legs, excluding the head, hands, and feet.

3.3.29 Gross Decontamination. A phase of the decontamination process where significant reduction of the amount of surface contamination takes place as soon as possible, most often accomplished by mechanical removal of the contaminant or initial rinsing from handheld hose lines, emergency showers, or other nearby sources of water. [**1550**, 2024]

3.3.30 Handwashing Facility. A facility providing a location with a supply of running potable water, liquid soap, and single-use towels or hot-air drying machines.

3.3.31* Hazardous Atmosphere. Any atmosphere that is oxygen deficient or that contains a toxic or disease-producing contaminant. [**1550,** 2024]

3.3.32 Health and Safety Officer (HSO). The member of the ESO assigned and authorized as the manager of the safety and health program.

3.3.33 Hot Zone. See 3.3.9.3.

3.3.34 Immediately Dangerous to Life or Health (IDLH). Any condition that would pose an immediate or delayed threat to life, cause irreversible adverse health effects, or interfere with an individual's ability to escape unaided from a hazardous environment. [**2500,** 2022]

3.3.35* Incident Management System (IMS). A system that defines the roles and responsibilities to be assumed by responders and the standard operating procedures to be used in the management and direction of emergency incidents and other functions. [**1550,** 2024]

3.3.36* Kitchen. An area designated for storage, preparation, cooking, and serving of food for members. [**1581,** 2022]

3.3.37* Member. A person involved in performing the duties and responsibilities of an ESO under the auspices of the organization.

3.3.38 Occupational Exposure. An exposure that resulted from performance of a member's duties.

3.3.39 Occupational Illness. An illness or disease contracted through or aggravated by the performance of the duties, responsibilities, and functions of a member.

3.3.40 Occupational Injury. An injury sustained during the performance of the duties, responsibilities, and functions of a member.

3.3.41 Patient. An individual, living or dead, whose body fluids, tissues, or organs could be a source of exposure to the member.

3.3.42 Personal Protective Equipment (PPE). Specialized clothing or equipment worn by a member for protection against a hazard.

3.3.43* Preliminary Exposure Reduction (PER). The systematic removal of contaminants acquired on the fireground that remain on tools, equipment, PPE, and ESO personnel.

3.3.44 Privately Owned Vehicle (POV). A vehicle owned by a private party.

3.3.45 Procedure. An organizational directive issued by the authority having jurisdiction or by the department that establishes a specific policy that must be followed. [**1550,** 2024]

3.3.46* Protective Ensemble. Multiple elements of compliant protective clothing that when worn together can reduce, but not eliminate, the health and safety risks of emergency incident operations.

3.3.47 Recovery. The process of returning a member's physiological and psychological states to levels that indicate the

person is able to perform additional emergency tasks, be reassigned, or released without any adverse effects.

3.3.48* Rehabilitation. An intervention designed to mitigate against the physical, physiological, and emotional stress of firefighting in order to sustain a member's energy, improve performance, and decrease the likelihood of on-scene injury or death. [**1584,** 2022]

3.3.49 Relative Risk. The likelihood of occurrence of a given hazard and severity of its effects from products of combustion, carcinogens, fireground contaminants, and other incident-related health hazards.

3.3.50* Response and Support Vehicles (RSV). Patrol cars, ambulances, fire apparatus, and other emergency services department vehicles.

3.3.51 Risk. A measure of the probability and severity of adverse effects that result from an exposure to a hazard. [**1451,** 2018]

3.3.52 Risk Assessment. The process of identifying threats and hazards to life, property, operations, the environment, and entities, and the analysis of probabilities, vulnerabilities, and impacts. [**1660,** 2024]

3.3.53* Risk Control. The management of risk through stopping losses via exposure avoidance, prevention of loss (addressing frequency) and reduction of loss (addressing severity), segregation of exposures, and contractual transfer techniques. [**1250,** 2020]

3.3.54 Risk Management. The process of planning, organizing, directing, and controlling the resources and activities of an organization in order to minimize detrimental effects on that organization. [**1250,** 2020]

3.3.55 Standard Operating Guideline (SOG). A written organizational directive that establishes or prescribes specific operational or administrative methods to be followed routinely, which can be varied due to operational need in the performance of designated operations or actions.

3.3.56* Standard Operating Procedure (SOP). A written organizational directive that establishes or prescribes specific operational or administrative methods to be followed routinely for the performance of designated operations or actions. [**1550,** 2024]

3.3.57 Supervisor. An emergency services responder responsible for overseeing the performance of other responders assigned to a specific division or group.

3.3.58 Warm Zone. See 3.3.9.5.

3.3.59 Wildland Firefighting. See 3.3.26.3.

Chapter 4 Program Components

4.1 Program Overview.

4.1.1* The emergency services organization (ESO) shall have a written exposure and contamination control program (ECCP) designed to identify and limit the possibility of members' exposure to contaminants during the performance of their duties and within the ESO working and living environment.

4.1.2 As part of the overall ESO's occupational safety and health program, ESO management shall implement an ECCP that meets the requirements of this standard, including the following:

(1) Program components, which includes the following:
   (a) Initial program risk assessment
   (b) Roles and responsibilities
   (c) Training requirements, both initial and updates
   (d) Ongoing education and awareness
   (e) Standard operating procedures and guidelines
   (f) Exposure reporting
(2) Emergency services facilities
(3) Contamination control for response and support vehicles
(4) Emergency operations and training exercises, including the following:
   (a) Ongoing risk assessment
   (b) Tactical considerations
(5) The cleaning, disinfecting, and disposal of personal protective clothing and ensembles
(6) Cleaning of equipment at the incident scene and postincident

4.2 ECCP Risk Assessment.

4.2.1 Prior to establishing or updating an ECCP, ESO management shall conduct a risk assessment to determine potential contamination hazards and how to mitigate them.

4.2.2* A risk assessment shall incorporate the following:

(1) Risk identification and assessment, including potential and actual hazards
(2) Risk evaluation, including the relative risk of each hazard
(3)* Establishment of priorities for action
(4)* Risk control techniques using the hierarchy of controls
(5)* Risk management monitoring

4.3 Roles and Responsibilities of Personnel Involved with the ECCP.

4.3.1* Program Management. It shall be the responsibility of the ESO to implement an ECCP that identifies and mitigates occupational exposures from the workplace, including incident scene operations and training exercises.

4.3.2 Responsibilities of ESO Management.

4.3.2.1* ESO management shall be responsible for compliance with all applicable laws and legal requirements with respect to the ECCP.

4.3.2.2 ESO management shall establish and enforce rules, regulations, and standard operating procedures (SOPs) to meet the requirements of this standard.

4.3.2.3 ESO management shall take corrective action to avoid repetition of accidental contamination control incidents, releases, and exposures that present a hazard to responders.

4.3.2.4 ESO management shall give the HSO the authority to administer the ECCP as part of the overall health and safety program.

4.3.2.5 ESO management shall make additional personnel or other resources available as needed to meet ECCP requirements.

4.3.2.6 ESO management shall oversee the ECCP requirements.

4.3.2.7 ESO management shall determine annually whether or not the program is accomplishing the goals set out in the risk assessment used to establish the ECCP.

4.3.3 Responsibilities of the ESO Health and Safety Officer (HSO).

4.3.3.1* The ESO HSO shall develop an organizational risk assessment and management plan that addresses the risks specified in Section 4.2.

4.3.3.2* The ESO HSO shall manage the ECCP plan, which includes the following:

(1) Organizational activities
(2) Risk management plan results
(3) Program elements, including those in compliance with this standard
(4) Communication methods for distributing the ECCP plan

4.3.3.3 The ESO HSO shall function as the ESO ECCP officer to ensure that the objectives of the ESO's ECCP are met.

4.3.4 Laws, Codes, and Standards. The ESO HSO shall ensure SOPs or standard operating guidelines (SOGs) for the ECCP comply with applicable laws, codes, and standards, and are reviewed and revised, as needed.

4.3.5 Training and Education.

4.3.5.1 The ESO HSO shall develop and distribute health and safety information to educate and train ESO members on the ECCP.

4.3.5.2* The ESO HSO shall implement the safety provisions of the organization's ECCP plan into training and education programs.

4.3.5.3* The ESO HSO shall conduct an annual safety audit of the ECCP.

4.3.5.4 The ESO HSO shall develop a policy for reporting accident and injury investigations that involve ECCP incidents.

4.3.6 Apparatus, Clothing, and Equipment.

4.3.6.1 The ESO HSO shall recommend safety-related specifications for ESO apparatus and equipment that meet the ESO needs identified in the ECCP risk management plan.

4.3.6.2 The ESO HSO shall ensure safety-related specifications for ESO apparatus and equipment comply with federal, state/provincial, and local laws, as well as with the applicable NFPA codes and standards.

4.3.6.3 The ESO HSO shall verify the development, implementation, and maintenance of a protective clothing and protective equipment program that both provides for the selection, care, maintenance, storage, and periodic inspection and evaluation of all protective clothing and equipment and complies with the ESO ECCP.

4.3.6.4* The ESO HSO shall identify minimum criteria for a station ECCP.

4.3.7 Responsibilities of the Member.

4.3.7.1 Members shall participate in exposure and contamination control prevention activities as outlined in this standard.

4.3.7.2 Members shall minimize their exposure to contaminates as much as possible in accordance with the ECCP.

4.3.7.3 Members shall remain current of the elements of the ECCP.

4.3.7.4 Members shall be aware of the health and safety of other members of their crew in accordance with the ECCP.

4.3.7.5 Members shall ensure their personal protective equipment (PPE) is worn according to the manufacturer's instructions and the ESO's ECCP.

4.3.8 Responsibilities of the Company Officer.

4.3.8.1 Company officers shall both maintain an awareness of the contamination exposure of each member operating within their span of control and ensure steps are taken to provide for each member's safety and health.

4.3.8.2* Company officers shall maintain compliance with the ESO ECCP in nonemergency activities.

4.3.8.3* Company officers shall ensure personal protective equipment (PPE) is worn according to the manufacturer's instructions and the ESO's ECCP.

4.3.8.4 Company officers shall ensure interfaces between PPE items for each member limit exposure and contamination.

4.3.8.5 Company officers shall ensure the following:

(1) Members are decontaminated after every incident.
(2) All equipment is decontaminated, isolated, or disposed of prior to returning to service whether at the scene or at the station.

4.3.8.6 Company officers shall ensure that members are trained in the elements of the ESO's ECCP and the associated SOPs and SOGs.

4.3.8.7 Company officers shall ensure that each member within their span of control documents any exposures as part of the exposure recordkeeping process.

4.3.9 Responsibilities of the ESO Instructor.

4.3.9.1 The ESO instructor shall incorporate the ESO's ECCP into any training activities.

4.3.9.2 Wherever personnel or students are exposed to contaminants during training, ESO instructors shall ensure PER actions are conducted in accordance with Chapter 6.

4.3.9.3 The ESO instructor shall ensure that the training participants' PPE is serviceable, and worn in accordance with manufacturer's instructions.

4.3.9.4 While operating on the training ground, ESO instructors shall ensure PPE is worn during all phases of training where contaminants exist.

4.3.9.5 Wherever personnel or students are exposed to fireground contaminants, ESO instructors shall ensure PER actions are conducted in accordance with Chapter 7.

4.3.9.6 The ESO instructor shall ensure doffing of equipment and PER actions are conducted in accordance with 7.6.4 and NFPA 1851.

4.3.9.7 The ESO instructor shall ensure fuels used are in accordance with 7.8.1 and NFPA 1403.

4.3.10 Training—Initial and Updates.

4.3.10.1 The ESO shall conduct initial and annual training on the ECCP for all members.

4.3.10.2 The ESO shall ensure that all training is in accordance with state, provincial, or federal regulations on exposure and contamination prevention.

4.3.11* Education and Awareness Program. The education and awareness program shall provide the following:

(1) Information on contamination control and exposure prevention
(2) Ongoing education/awareness to responders on the hazards and protective measures
(3) Means to encourage member support for the implementation of the ECCP

4.3.12 SOPs and SOGs.

4.3.12.1 ESO management shall develop SOPs and SOGs that outline a systematic approach for both exposure and contamination control and release prevention, and recovery of members operating at incidents and training exercises.

4.3.12.2* SOPs and SOGs shall address the following:

(1) Processes for contamination reduction, including the following:
    (a) Prevention and mitigation of firefighter and emergency responder exposure to contaminants
    (b) Decontamination of firefighters and emergency responders exposed to contaminants
    (c) Mitigation of on-scene exposure to contaminants for personnel exiting the warm and hot zones
(2) Operation of laundry and cleaning facilities in the ESO facility, including the following:
    (a) SOPs shall require that protective ensembles or ensemble elements not be worn or stored in the living areas of ESO facilities.
    (b) The public shall not be exposed at any time, except during emergency operations, to soiled or potentially contaminated protective ensembles or ensemble elements.
    (c) Soiled or potentially contaminated ensembles or ensemble elements shall not be brought into the home, taken to public facilities, or transported in private vehicles.
(3) Segregation of contaminated clothing from vehicles until that equipment can be decontaminated
(4) Cleaning of vehicle equipment prior to being returned to the vehicle
(5) Vehicle decontamination by outlining how to identify, evaluate, control, and decontaminate vehicles and their equipment where exposed to contaminates that could be harmful
(6) How to minimize the public and ESO personnel's exposure to soiled or contaminated tools and equipment during cleaning
(7) Other SOPs, as needed, to implement the requirements of this standard as part of an ECCP

4.3.13 Exposure Reporting. The ESO shall ensure that a member who has a confirmed or possible contamination or exposure receives immediate medical guidance, evaluation, and, if needed, postexposure prophylaxis and confidential postexposure testing and counseling.

4.3.13.1 Postincident Exposure Reporting. ESO management shall ensure a record is made of all contaminant exposures to members as soon as possible after the exposure using a standardized form designed to allow for follow-up.

4.3.13.1.1 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.

4.3.13.1.2 Where the National Fire Operations Reporting System (NFORS) is used, the member making the report shall complete the documentation.

4.3.13.1.3 Where NFORS is not used, the exposed member's direct supervisor shall complete the documentation.

4.3.13.2* Exposure Documentation. The ESO shall retain employee documentation for 30 years after separation of that employee.

4.3.13.2.1 A member's documentation shall include, at a minimum, the following:

(1) Employee name
(2) Incident number
(3) Date of incident
(4) Nature of incident
(5) Cumulative on-scene time of the employee
(6) Function of the employee at the incident
(7) PPE worn
(8) Any specific known extinguishing media or suspected contaminants
(9) Highest level of exposure incurred at the incident as identified in an ongoing risk assessment

4.3.13.2.2 The requirements in 4.3.13.2 and 4.3.13.2.1 shall be satisfied by existing reporting channels where the requirements in Section 4.7 are met.

4.4 Emergency Services Facilities.

4.4.1 All ESO facilities shall comply with all applicable health and contamination control laws and regulations.

4.4.2 All ESOs shall implement a facility ECCP in accordance with Chapter 5 that includes each of the following components:

(1) Protecting the public and personnel from exposure to fireground contamination as well as contamination inside and outside an emergency services facility
(2) Designating areas in the facility based on the likelihood of exposure to contamination, such as the following:
    (a) Contamination control areas
    (b) Transition areas
    (c) Living, administrative, or public areas
(3) Identifying, cleaning, and maintaining all areas within the fire and ESO facility

4.5 Contamination Control for Response and Support Vehicles (RSVs). The ESO shall address contamination control concerns in the specification, design, construction, acquisition, operation, maintenance, inspection, repair, and retirement of all RSVs in the following areas:

(1) Preventive contamination activities for vehicles
(2) On-scene activities for vehicles
(3) Vehicle staging by zone
(4) Condition at the scene
(5) Ongoing decontamination

(6) Contaminated equipment
(7) Post-incident and event activities for vehicles
(8) Documentation

4.6 Emergency Operations and Training Exercises.

4.6.1 Fireground Contaminants Identification. For a given fire incident or training exercise, a site-specific hazard and risk assessment shall be performed to both identify all primary hazard contaminants that can potentially harm response personnel and ascertain the likelihood and effects of exposure to the specific hazard's contaminants.

4.6.2* Ongoing Risk Assessment. An ongoing risk assessment for contamination hazards during emergency scene and training operations shall be conducted.

4.6.3 Tactical Considerations. Incident hazard control zones shall be established according to the procedures in Chapter 7.

4.7* Personal Protective Clothing and Ensembles. A PPE contamination control program should include each of the following components:

(1) Protecting the public and personnel from exposure to contaminated PPE
(2) Contamination control considerations for procurement of PPE
(3) Preresponse activities for PPE
(4) On-scene activities
(5) Immediate post-incident analysis and cleaning
(6) Doffing of PPE
(7) Secondary postincident cleaning, inspection, and analysis
(8) Documentation of PPE
(9) Storage of PPE
(10) Disposal of PPE

4.8 Cleaning of Equipment.

4.8.1 The ESO shall develop preincident activities to ensure that tools and equipment are clean and disinfected as needed in accordance with Chapter 9.

4.8.2 The ESO shall define criteria to determine when tools and equipment have been contaminated postincident beyond the ability to remedy by cleaning and disinfecting in accordance with Chapter 9.

4.8.3 The ESO shall development specific cleaning actions in accordance with Chapter 9 for equipment and tools, including, but not limited to, the following:

(1) Lifting bags and lifting bag components
(2) Rescue tools and components
(3) Hand tools and components
(4) Life safety rope and equipment
(5) Fire hose, couplings, nozzles and fire house appliances
(6) Portable ladders

Chapter 5 Fire and Emergency Services Organization (ESO) Facilities

5.1* General. A fire and emergency services facility ECCP shall include each of the following components:

(1) Protecting the public and personnel from exposure to fireground contamination as well as contamination interior and exterior of an emergency services facility
(2) Designating areas in the facility based on the likelihood of exposure to contamination, such as the following:
    (a) Contamination control areas
    (b) Transition areas
    (c) Living, administrative, or public areas
(3) Identifying, cleaning, and maintaining all areas within the fire and ESO facility

5.2 Protecting Personnel and the Public from Exposure to Fireground Contamination.

5.2.1 The ESO shall design and implement an emergency services facility design approach that minimizes personnel and public exposure to contaminants within the facility.

5.2.2* All facilities shall be designed to both prevent or minimize the spread of contaminants and facilitate cleaning and decontamination of the facility.

5.2.3* All contamination control areas shall have posted signage that indicates any dangers or hazards related to that area in accordance with ANSI Z535.4, *Product Safety Signs and Labels*.

5.2.4* Hand washing stations with soap and hot and cold running water shall be available in all areas of the facility.

5.2.5* Where possible, doors, sinks, and all other fixtures shall be designed to minimize surface contact.

5.2.6* All exposed floor and wall materials shall be hard surface, nonporous, and easy to clean or sanitize.

5.2.7* The ESO shall design and implement a cleaning program based on the possible types of contamination present.

5.3 Designating Areas in the Facility Based on the Likelihood of Exposure to Contamination.

5.3.1 General.

5.3.1.1 All emergency services facility areas shall be designated by the likelihood of exposure to contamination.

5.3.1.2* Each area shall have an isolated heating, ventilation, and air conditioning (HVAC) system.

5.3.2 Areas inside a facility shall be designated as follows:

(1) Red — Spaces likely to be exposed to contaminants
(2) Yellow — Transition spaces between a contaminated (red) area and a clean (green) area, where contamination control takes place
(3) Green — Clean spaces, such as living, administrative, or public areas

5.3.2.1* Red areas shall include areas of the facility that are likely to be exposed to contaminants or carcinogens.

5.3.2.1.1* Restroom and shower facilities shall be available for use prior to entering a green area to prevent cross contamination.

5.3.2.2 Red Areas.

5.3.2.2.1 The decontamination of contaminated PPE, contaminated clothing, and contaminated equipment shall take place in the red area.

5.3.2.2.2 PPE and firefighting equipment that is stored in a facility when not in use shall be in an enclosed and ventilated

locker or in an enclosed area off the apparatus floor that prevents exposure to contaminants and UV light.

5.3.2.2.3 All protective clothing ensembles and ensemble elements shall be stored in accordance with NFPA 1851.

5.3.2.2.4 Wet, soiled, or contaminated protective clothing and equipment shall not be permitted in areas designated for clean storage.

5.3.2.3 Yellow Areas.

5.3.2.3.1* Yellow areas shall include areas of the facility used to remove or reduce contamination from members or equipment before transitioning to green areas.

5.3.2.3.2* The yellow area shall include restroom and shower facilities.

5.3.2.4 Green Areas.

5.3.2.4.1* Green areas shall include areas of the facility considered uncontaminated.

5.3.2.4.2* The living, administrative, or public areas shall have higher air pressure than areas leading into it.

5.3.3 The ESO shall provide designated storage for items allowed in each area.

5.3.4 The ESO shall develop procedures for a systematic approach to clean and sanitize all areas of the facility based on the contamination level and risk.

5.3.5* Ice machines, refrigerators, and food storage shall not be located in contamination control or transition areas.

5.3.6* The ESO shall consider the effect all materials used in the facility have on contamination control.

5.4* Identifying, Cleaning, and Maintaining All Areas Within the Emergency Services Facility. The contamination control program shall include procedures to identify, clean, and maintain all areas within the emergency services facility.

5.5* Contamination Control Areas.

5.5.1 Contamination control areas shall be cleaned or sanitized following each use.

5.5.2 An independent storage area shall be provided for cleaning and housekeeping supplies used in the contamination control area so as not to spread contaminants to other areas of the facility.

5.5.3 Members shall limit time spent in the contamination control area to that which is necessary to complete their tasks.

5.5.4* Public access to contamination control areas shall be restricted when the area is in use and until the area has been cleaned or sanitized.

5.5.5* Where possible, gross decontamination shall be completed outside the facility before apparatus and equipment are brought into the facility.

5.6 Yellow Areas.

5.6.1* The ESO shall create a yellow area for personnel and equipment moving out of a red area and into a green area.

5.6.2* All yellow areas shall have a shower and a changing room.

5.6.3* Yellow areas shall have decontamination protocols, staging for responders to decontaminate, and cleaning equipment, including, but not limited to, the following:

(1)* Hand wash sink or station with hot and cold running water and soap
(2)* Boot washer or cleaner
(3) Touchless towel dispenser filled with disposable towels
(4) Trash receptacle
(5) Walk-off mat—recessed or surface
(6) Solid, nonporous surface bench or seating
(7) Clothing hooks
(8) Hamper for soiled clothing

5.6.4* Yellow areas shall be cleaned and disinfected on a minimum regular schedule and as needed depending on use.

5.6.5* Entries into yellow areas shall meet air pressure differential requirements as established by the AHJ.

5.6.6* Where the yellow area is outside of the facility or located remotely, such yellow areas shall have the minimum equipment and protocols as the described in 5.6.3.

5.7* Green Areas.

5.7.1* Green areas shall remain free from contamination.

5.7.2 Contaminated personnel, clothing, and equipment shall not be permitted in the green areas.

5.7.3 The ESO shall prevent both exhaust emission exposure to members and exhaust emission contamination of green areas as required by NFPA 1550.

5.7.4 The ESO shall ensure that all personnel and equipment that enter the green area have been cleaned and disinfected.

5.7.5* HVAC units in green areas shall be inspected, cleaned, and maintained, as recommended by the manufacturer.

Chapter 6 Contamination Control for Response and Support Vehicles (RSVs)

6.1 General. The requirements of this chapter shall apply to any emergency response vehicle and related support vehicles.

6.1.1* For this standard, RSVs shall include, but not be limited to, the following:

(1) Patrol cars
(2) Ambulances
(3) Fire apparatus
(4) Other ESO vehicles

6.1.2 The emergency services organization (ESO) shall address contamination control in the specification, design, construction, acquisition, operation, maintenance, inspection, repair, and retirement of all RSVs.

6.1.3 All new RSVs shall be specified and ordered to meet all applicable NFPA standards.

6.1.4 The ESO shall develop standard operating procedures (SOPs) and standard operating guidelines (SOGs) in accordance with Chapter 7 to both manage and minimize contamination and cross-contamination of all RSVs during all incidents, events, and training exercises that include the following:

(1) Preventative contamination activities
(2) On-scene activities
(3) Postincident or event activities
(4) Documentation of exposure and decontamination

6.1.4.1 The ESO shall develop SOPs in accordance with 6.5.2 for all maintenance, transfers, and retirement of RSVs.

6.1.4.2 All RSVs shall park according to guidance received from incident command.

6.1.4.3 Where incident command has not yet been established or direction has not been provided, RSVs shall park in accordance with 6.1.4 and Chapter 7.

6.1.5 Where possible and practical, RSVs that have been contaminated with smoke or other contaminants shall receive PER actions prior to return to service.

6.1.5.1 All RSVs shall remain in the cold zone or staging area unless directed by incident command or SOGs.

6.1.5.2 Where an RSV is stationary and subject to contamination, both of the following shall apply:

(1) Ventilation systems shall be engaged to use interior air only.
(2) All windows shall be closed.

6.2 Preventive Contamination Activities for RSVs.

6.2.1 RSV interior materials shall be physically and chemically inert to detergents and other solvents or solutions used to clean and disinfect.

6.2.2 The ESO shall limit contaminated equipment in the interior cab of RSVs.

6.2.3* The ESO shall establish a process to transport contaminated equipment and PPE in a container or outside of an RSV cab.

6.2.4 The ESO shall provide exhaust capture or diversion systems on RSVs.

6.2.5* The ESO shall establish methods to minimize the cleaning and decontamination process for RSVs.

6.3 On-scene Activities for RSVs.

6.3.1 Procedures. The ESO shall develop procedures for on-scene activities in accordance with Chapter 7.

6.3.2 Ongoing Decontamination.

6.3.2.1* The ESO shall develop and implement a clean RSV plan to ensure that RSVs remain free from contamination between incidents.

6.3.2.2 The clean RSV plan shall include protocols to minimize the spread of contamination to privately owned vehicles (POVs), support vehicles, and the environment.

6.3.2.3 The clean RSV plan shall include protocols to minimize opportunities for cross-contamination of RSVs, POVs, and emergency service facilities.

6.3.2.4* In the event an RSV apparatus provides treatment to or transport of a contaminated person, the RSV apparatus shall have advanced cleaning according to the clean RSV plan prior to return to service.

6.3.2.5* The clean RSV plan shall ensure that postincident personal hygiene is conducted in an order that does not cause cross-contamination.

6.3.2.6 Decontamination procedures shall be conducted using PPE in accordance with Chapter 8.

6.3.3 Contaminated Equipment.

6.3.3.1* Contaminated equipment (e.g., SCBA, spare air cylinders, tools, radios, PPE) shall be kept out of RSV occupant areas until PER actions have been completed and a risk assessment follow-up is conducted to determine if advanced cleaning or isolation is needed.

6.3.3.2 If a risk assessment determines advanced cleaning is required, then equipment shall be isolated from RSV occupant areas.

6.3.3.3 RSV occupant areas exposed to contamination shall be identified for advanced cleaning.

6.4 Postincident or Event Activities for RSVs.

6.4.1 RSV Designation.

6.4.1.1* The ESO shall establish procedures to designate RSVs as either clean or contaminated.

6.4.1.2 Procedures shall include methods for transporting personnel and equipment in a manner that limits contamination in the crew cab.

6.4.2* RSV Occupant Area. Contaminated equipment shall not enter or be stored in RSVs unless the ESO has an approved method to contain contamination.

6.4.3 RSV Preliminary Exposure Reduction (PER) Process. The ESO shall establish a procedure for RSV PER.

6.4.3.1* The RSV PER process shall be utilized for all incidents where RSVs are exposed to contaminants.

6.4.3.2 The PER process shall be performed after exposures at structural fires, brush fires, vehicle fires, training fires, or any other emergency or nonemergency incident where contamination is present.

6.4.3.3 The PER process shall be performed as close as practical to the scene so as to limit cross-contamination to other RSV.

6.4.4 Training Events. If an RSV is exposed to contamination during a training event, it shall be decontaminated and cleaned in accordance with the ESO's SOPs and SOGs.

6.5 Documentation.

6.5.1 RSV Maintenance, Service, and Asset Management.

6.5.1.1 All RSVs shall be serviced and maintained in accordance with NFPA 1910.

6.5.1.2 Prior to RSV service or maintenance, the ESO shall ensure PER actions have been completed.

6.5.1.3* The ESO shall establish a documentation system to maintain permanent records on inspections, maintenance, out

of service, and return to service on all RSVs in accordance with NFPA 1910.

6.5.2 Retirement of RSVs.

6.5.2.1 Where an RSV is retired, the ESO shall ensure the RSV is no longer used for emergency operations.

6.5.2.2 Where an RSV is retired, the ESO shall include with the vehicle the organization's SOPs and SOGs for RSV gross decontamination and advanced cleaning.

Chapter 7 Emergency Operations and Training Exercises

7.1 General.

7.1.1 Emergency operations and training exercises shall be conducted in a manner that minimizes contamination of personnel, apparatus, and equipment.

7.1.2 Emergency services organizations (ESOs) shall incorporate the following to minimize exposure and contamination in emergency operations and training exercises:

(1) The link between fire dynamics and health hygiene in exposure and contamination control
(2) The principles of science-based research to minimize firefighters' risk on the fireground, including training, to reduce secondary impacts of exposure and contamination before and after an incident

7.1.3 A contamination control program for emergency operations and training exercises shall include the following components:

(1) Fireground contaminant identification
(2) Emergency incident hazard control zones
(3) Apparatus considerations
(4) Responsibilities of on-scene personnel
(5) Tactical considerations

7.2 Fireground Contaminant Identification.

7.2.1* An ongoing risk assessment for contamination hazards shall be conducted during emergency scene and training operations.

7.2.2* For a given incident or training exercise, a site-specific hazard and risk assessment shall be performed to identify all primary contaminants and the likelihood and effects of exposure.

7.2.3* When engaged in any operation where members could encounter hazardous atmospheres that are IDLH or potentially IDLH, or where the atmosphere is undefined or hazardous, including overhaul, the ESO shall provide all members NFPA 1981–compliant SCBA.

7.2.4 Members using SCBA shall not compromise the protective integrity of the SCBA for any reason when operating in IDLH, potentially IDLH, or undefined or in hazardous atmospheres (including overhaul) by removing the facepiece or disconnecting any portion of the SCBA that would allow the ambient atmosphere to be breathed. [**1550:**9.11.8]

7.3 Emergency Incident Hazard Control Zones.

7.3.1* Hazard control zones shall be established in accordance with NFPA 1550 wherever the potential for contamination exists.

7.3.2 The perimeters of the hazard control zones shall be designated and communicated by the IC.

7.3.3 The perimeters of the hazard control zones shall be marked where possible.

7.3.4 The IC shall ensure that protective clothing and equipment for each control zone are commensurate with the hazards in the zone.

7.3.5 All supervisors and members shall ensure the use of personal protective equipment (PPE) within each zone.

7.3.6* The use of hazard control zones shall continue until the incident hazards have been mitigated or the incident is over.

7.3.7 No-Entry Zone.

7.3.7.1 No person(s) shall be permitted to enter a no-entry zone, regardless of PPE, due to imminent hazard(s), dangerous conditions, or the need to protect evidence.

7.3.7.2 In the event that personnel are exposed to a no-entry zone, contamination reduction strategies for the hazards encountered shall be utilized.

7.3.8 Hot Zone.

7.3.8.1* All members shall be trained and equipped for operating in a hot zone.

7.3.8.2 The hot zone includes, but is not limited to, the area of the smoke plume, which shall be considered when the IC designates the hot zone.

7.3.9 Warm Zone.

7.3.9.1* The warm zone shall serve as a limited-access area where contamination reduction activities are implemented.

7.3.9.2 PER actions shall be conducted in the warm zone.

7.3.10* The cold zone shall be established outside the warm zone.

7.4 Apparatus Considerations.

7.4.1* Where possible, RSVs shall be positioned upwind or otherwise outside an area of potential or actual contamination.

7.4.2 All RSV cabs shall be both of the following:

(1) Kept shut during operations
(2) Aired out when operations have ended

7.4.3 The ESO shall be responsible for taking RSVs out of service if any of the deficiencies defined in this chapter or Chapter 6 are encountered.

7.4.4* Incident hazard control zones shall be according to Section 7.3 and Chapter 10 of NFPA 1550.

7.4.5* Each member shall be informed of the control zone perimeters as they arrive on scene.

7.4.6* Any RSV arriving at a scene that is contaminated or potentially contaminated shall be staged in accordance with Section 7.4.

7.4.7 RSVs and RSV components, including, but not limited to, the following shall be positioned so as to limit their exposure during all operations in proximity to products of combustion:

(1) Pump panel of fire apparatus
(2) Command vehicles
(3) Rehabilitation vehicles

7.4.8 RSVs and RSV components shall be positioned so as to limit exposure due to wind shift, changes in scene dynamics, or on-scene complications.

7.4.9 Any RSV that does not support direct fire suppression or chemical hazard mitigation shall be staged in the cold zone.

7.4.10* Any RSV involved in direct fire suppression or training activity where products of combustion (i.e., contaminants) are present shall be staged only as close to the hazard as necessary to perform the needed function.

7.4.11* Where members respond to an incident in their personal vehicle, the ESO shall ensure that both PER actions are performed and the member's PPE is bagged in accordance with NFPA 1851 prior to the member returning to their vehicle.

7.4.12 No RSV shall be staged or driven into a no-entry zone.

7.4.13 Any RSV located at a scene that is contaminated or potentially contaminated shall meet the conditions of Section 7.4.

7.4.14* All RSV windows shall remain closed unless needed for emergency operations.

7.4.15 RSV heating, air conditioning, and ventilation systems shall be placed in recirculation mode if so equipped.

7.4.16 RSVs shall be staged to minimize exhaust emissions exposure.

7.4.17 RSV exhaust direction or filtration systems shall be engaged if so equipped.

7.4.18 Where personnel respond to an incident in their POV, the IC shall ensure that the member undergoes PER actions.

7.4.19 In the event an RSV provides treatment or transport, the RSV shall undergo advanced cleaning.

7.4.20 Where an RSV provides treatment to or transport of a member, the member's PPE shall be removed where possible and as early as practical to avoid or minimize cross-contamination of the RSV and the emergency room of the receiving facility.

7.5 Responsibilities of On-Scene Personnel.

7.5.1* Responsibilities of the Incident Commander (IC). The IC shall ensure that PER actions and gross decontamination is completed when needed.

7.5.1.1 The IC shall provide for relief of members exposed to contaminates to limit individual exposure to the lowest possible levels.

7.5.1.2 The IC or manager(s) shall identify the locations for the incident command post, the staging area, and the rehabilitation area with respect to on-scene contamination reduction efforts.

7.5.2 Responsibilities of Company Officers. Company officers shall ensure PPE is worn per manufacturers' instructions.

7.5.2.1 Company officers shall ensure that interfaces between PPE items for each member limit exposure and contamination prior to operations and thorough PER actions.

7.5.2.2 Company officers shall ensure that members adhere to on-scene PER operations.

7.5.3 Responsibility of Members.

7.5.3.1 Members operating on-scene of an incident or training exercise shall participate in contamination control and on-scene PER actions.

7.5.3.2 Members shall maintain their PPE in accordance with Section 7.5.

7.6 Tactical Considerations.

7.6.1 PPE shall be worn during all phases of fireground operations.

7.6.2 Staging area operations shall be located in the cold zone in a location where resources can be placed until given a tactical assignment.

7.6.3 The rehabilitation operations site shall be both conducted in accordance with NFPA 1584 and located in the cold zone in accordance with 7.3.10.

7.6.3.1 The rehabilitation site shall be free of exhaust fumes from apparatus, vehicles, or equipment.

7.6.3.2 Members shall perform PER actions prior to entering the rehabilitation site.

7.6.3.3 Members shall wash face and hands with soap and water or, at a minimum, with a wet wipe immediately after doffing and before consuming any food or drink.

7.6.4 PPE.

7.6.4.1* The IC shall select PPE based on the on-going risk assessment.

7.6.4.2* Where the ongoing risk assessment dictates a change in PPE, the updated PPE shall be donned in the cold zone.

7.6.4.3 Members shall wear full PPE during all emergency incidents in accordance with NFPA 1550.

7.6.4.4* Members shall wear PPE to emergency incidents in accordance with NFPA 1550.

7.6.4.5 Ensembles and ensemble elements that are contaminated or possibly contaminated with bulk chemicals; asbestos; other designated hazardous substances, body fluids, or other microbial contamination; or products of combustion from a structural or other fire shall be subject to PER actions as specified in 7.6.4 and NFPA 1851.

7.6.4.6 Ensembles and ensemble elements that are soiled but not contaminated shall be subject to PER actions as specified in 7.6.4 and NFPA 1851.

7.6.4.7 Where the form of contamination cannot be identified, contaminated ensembles and ensemble elements shall be both isolated and subject to PER actions as specified in 7.6.4 and NFPA 1851.

7.6.4.8 Where tools or equipment have become soiled or contaminated, they shall undergo PER actions prior to PER actions for members.

7.6.4.9 SCBAs shall be cleaned and disinfected according to manufacturers' instructions.

7.6.4.10 ESOs shall be responsible for implementing PER procedures on-scene for ensemble and ensemble elements.

7.6.4.11 PER actions for PPE and firefighting equipment shall be completed in the warm zone before removal from the warm zone.

7.6.4.12* Dry or wet mitigation techniques shall be conducted prior to removal of any ensemble or ensemble elements.

7.6.4.13 Members shall remain on supplied air or other designated respiratory protection during PER actions.

7.6.4.14 Members assisting with PER actions shall use designated protective equipment based on the ongoing risk assessment.

7.6.4.15 Members shall carry out doffing of contaminated PPE in the warm zone as established by the IC in accordance with Section 10.7 of NFPA 1550.

7.6.4.16 Doffing of PPE.

7.6.4.16.1 Members shall doff their PPE in a manner to avoid transfer of contamination to themselves, other personnel, and the environment.

7.6.4.16.2 In cases where a member might be in distress, or exhibiting signs of distress, as a result of metabolic heat stress or high thermal exposures, both of the following shall apply:

(1) Emergency doffing procedures shall be followed immediately upon exiting the structure.
(2) No PER shall be performed.

7.6.4.17 Following dry or wet mitigation, ensemble or ensemble elements shall be isolated to avoid cross-contamination until further cleaning is completed.

7.6.4.18 Where possible, ensemble or ensemble elements, even when bagged, shall not be transported in the passenger areas of RSVs.

7.7* Investigation Operations. The fire department shall conduct a risk assessment of all fire investigation activities.

7.7.1* All rest, eating, and drinking shall be done in an uncontaminated location away from the incident scene or decontamination area.

7.7.2* The fire investigator shall be trained in both personal decontamination methodologies and decontamination or disposal of PPE, standard cloth coveralls, and firefighting turnout gear to avoid exposure or cross-contamination from residues in clothing and gear.

7.7.3* Fire investigators shall either perform PER actions on all potentially contaminated PPE or change their clothes prior to leaving the incident scene so as to limit exposure to their vehicles, offices, and residences.

7.7.4* In situations where 7.7.3 is not utilized or practical, fire investigators shall employ a basic PER process that consists of scrubbing and rinsing contaminated gear and equipment with soap (i.e., detergent) and water.

7.7.5* Dermal and airway protection shall be used anytime the fire investigator is working in an environment where a fire occurred and soot is present.

7.7.6 The ESO shall develop SOPs for fire investigators outlining minimum levels of protection based on the incident timeline and activities on the fireground.

7.7.7 Fire investigators shall use a NIOSH-certified SCBA for any entry into a post-fire environment before or after overhaul for at least the first two hours after extinguishment.

7.7.8* K-9 dogs used by fire investigators shall be decontaminated to minimize cross-contamination with their handler.

7.8* Training Exercise Operations.

7.8.1 Fuel. All live fire training that utilizes Class A fuels shall comply with the requirements of this chapter to minimize contamination and cross-contamination from fireground contaminates.

7.8.2 Responsibility of Fire Instructors. While operating on the training ground, fire instructors shall ensure PPE is worn during all phases of the training where contaminants exist.

7.8.2.1 Wherever members or students are exposed to fireground contaminants, fire instructors shall ensure PER actions are conducted in accordance with the provisions outlined in this chapter.

7.8.2.2 The fire instructor shall inspect all live fire participants' PPE and SCBA to confirm that all PPE and SCBA are serviceable and worn in accordance with manufactures' instructions.

7.8.2.3 The fire instructor shall ensure both doffing of equipment and PER actions are conducted in accordance with the provisions outlined in this chapter.

7.8.2.4 Fire instructors shall be cognizant of fuel loads and their potential for increased contamination for members involved in training.

Chapter 8 Personal Protective Clothing and Ensembles

8.1* General. A personal protective equipment (PPE) contamination control program shall include the following components:

(1) Planning, resources, budgeting, and accountability
(2) Protecting members and the public from exposure to contaminated PPE
(3) Contamination control considerations for procurement of PPE
(4) Preresponse activities for PPE
(5) On-scene activities requiring PPE
(6) Immediate post-incident analysis and cleaning of PPE
(7) Doffing of PPE
(8) Secondary postincident cleaning, inspection, and analysis of PPE
(9) Storage of PPE
(10) Documentation of PPE
(11) Disposal of PPE

8.2 Planning, Resources, Budgeting, and Accountability.

8.2.1 The emergency services organization (ESO) shall develop a contamination control program for personal protective clothing and ensembles that meets the requirements of this standard.

8.2.2 The contamination control program shall include the following:

(1) Responsibility of members
(2) Member accountability
(3) Program goals
(4) Key program metrics
(5) Program resources
(6) Program budget
(7) Project management processes and tools
(8) Other related program elements

8.3 Protecting Members and the Public from Exposure to Contaminated PPE.

8.3.1 The ESO shall develop SOPs to minimize member and public exposure to soiled or contaminated structural firefighting protective ensembles and ensemble elements in accordance with Chapter 4 of NFPA 1851.

8.3.2 The SOPs shall require that protective ensembles or ensemble elements be worn or stored in accordance with Chapter 4 of NFPA 1851.

8.3.3 The public shall not be exposed to soiled or potentially contaminated protective ensembles or ensemble elements in accordance with Chapter 4 of NFPA 1851.

8.3.4* Soiled or potentially contaminated ensembles or ensemble elements shall not be brought home, taken to public facilities, or transported in private vehicles in accordance with Chapter 4 of NFPA 1851.

8.4 Contamination Control Considerations for Procurement of PPE.

8.4.1 Hazard and Risk Assessment.

8.4.1.1* Prior to starting the PPE selection process, the ESO shall perform a hazard and risk assessment in accordance with NFPA 1550.

8.4.1.2* The results of the hazard and risk assessment shall determine the PPE selection for an incident.

8.4.2 The ESO shall review the hazard and risk assessment or conduct a new hazard and risk assessment every 2 years, at a minimum, or under specific circumstances, including, but not limited to, the following:

(1) Where changes affect the findings of the current risk assessment in terms of hazard identification or PPE product technology
(2) Where changes in the ESO's SOPs affect the use of PPE ensembles
(3) Where any new personal protective ensembles or ensemble elements are selected or purchased.

8.4.3 ESOs shall either evaluate the effectiveness and compatibility of cleaning agents for PPE prior to procurement, or obtain recommendations for cleaning agents, procedures, and equipment from PPE manufacturers or from an independent service provider (ISP) verified in accordance with NFPA 1851.

8.4.4* ESOs shall maintain a supply of PPE components to provide members, at a minimum, two complete, clean PPE ensembles per shift or incident deployment.

8.5 Preresponse Activities for PPE.

8.5.1 Compatibility and Interfaces.

8.5.1.1* Where new gear is assigned and, at a minimum, yearly thereafter, members shall both assess the compatibility of their PPE and check for gaps in their PPE.

8.5.1.2 If any gaps are found in PPE interface areas, members shall notify their supervisor or ESO for replacement PPE or alterations to existing PPE.

8.5.2 To avoid cross-contamination of vehicles and to the public, members shall ensure that PPE is clean and ready for deployment.

8.5.3* Members shall verify the availability of, at a minimum, an assigned second set of PPE or spare gear from the PPE and equipment manager.

8.6 On-Scene Activities. The on-scene incident commander (IC) shall follow the PPE-related requirements in 7.5.1.

8.7 Immediate Postincident Analysis and Disposition Activities. ESOs shall follow the PPE-related requirements in 7.6.4.

8.8 Doffing of PPE. ESOs shall follow the PPE-related requirements in 7.6.4.

8.9 Determination of Postincident Cleaning and Inspection. After every incident, ensembles and ensemble elements shall be assessed and handled according to Chapter 7 of NFPA 1851.

8.10 Storage.

8.10.1 PPE shall be stored in accordance with NFPA 1550 to avoid contamination of emergency facility storage areas.

8.10.2 Ensembles and ensemble elements shall be transported, cleaned, dried, and stored in accordance with NFPA 1851.

8.11* Documentation. Records related to the care and maintenance for PPE shall be maintained in accordance with Chapter 4 of NFPA 1851.

8.12 Disposal.

8.12.1* Contaminated PPE shall be disposed of in accordance with the following:

(1) Subsection 10.2.1 of NFPA 1851
(2) NFPA 1550
(3) Manufacturers' instructions
(4) Federal, state, and local regulations

8.12.2 PPE contaminated with hazardous materials shall be disposed of in accordance with federal, state, and local hazardous materials disposal regulations.

8.13 Structural- and Proximity-Specific PPE Considerations. ESOs shall conform to the structural- and proximity-specific PPE requirements in NFPA 1851.

8.14* Wildland- Specific PPE Considerations. ESOs shall conform to the wildland-specific PPE requirements of NFPA 1877.

8.15* Fire-Investigator-Specific PPE Considerations. ESOs shall conform to the fire investigation PPE requirements in Chapters 9 and 16 of NFPA 1550.

8.15.1 ESOs shall develop SOPs for use by fire investigators that reflect the specific decision-making process requirements for PPE selection and use.

8.16* EMS-Specific PPE Considerations. ESOs shall design and implement procedures to handle EMS garments exposed to fireground contamination.

8.17 Law-Enforcement-Specific PPE Considerations. Law enforcement organizations shall design and implement procedures to handle members and PPE exposed to fireground contamination.

8.18* Technical-Rescue-Specific PPE Considerations. ESOs that specialize in technical rescues shall implement the requirements of NFPA 1855.

8.19* Canine Considerations. ESOs shall establish procedures to address canines exposed to fireground contamination.

Chapter 9 Cleaning of Equipment

9.1 Program Components.

9.1.1 A contamination control program for tools and equipment shall include each of the following components:

(1) Preincident activities for tools and equipment
(2) Postincident activities for tools and equipment

9.1.2 Emergency services organizations (ESOs) shall design and implement a contamination control program in accordance with NFPA 1937 to minimize exposure of members and the public to soiled or contaminated tools and equipment.

9.1.3 ESOs shall include contamination risks and contamination control features as part of a risk assessment prior to procurement of tools and equipment.

9.2 Preincident Activities for Tools and Equipment.

9.2.1 Routine Inspections.

9.2.1.1 During routine inspections, members shall assess the cleanliness of tools and equipment stored in emergency services facilities (ESFs) and emergency services vehicles (ESVs).

9.2.1.2 Any potentially contaminated tools or equipment found during routine inspections shall be removed from service until decontaminated.

9.3* Postincident Activities for Tools and Equipment.

9.3.1 Cleaning and Disinfecting Lifting Bags and Lifting Bag Components. The ESO shall design and implement a contamination control program for lifting bags and lifting bag components in accordance with NFPA 1937 with the following components:

(1) Drying lifting bags and lifting bag components prior to storage
(2) Identifying and tagging contaminated or potentially contaminated lifting bags and lifting bag components
(3) Cleaning and disinfecting lifting bags and lifting bag components
(4) Disposal of lifting bags or lifting bag components

9.3.2 Rescue Tools and Rescue Tool Components. The ESO shall design and implement a contamination control program for rescue tools and rescue tool components in accordance with NFPA 1937 with the following components:

(1) Cleaning and disinfecting rescue tools and rescue tool components on-scene postincident
(2) Identifying and tagging contaminated or potentially contaminated rescue tools and rescue tool components
(3) Cleaning and disinfecting rescue tools and rescue tool components at the ESF
(4) Identification, separation, and disposal of rescue tools and rescue tool components

9.3.3 Hand Tools and Hand Tool Components. The ESO shall design and implement a contamination control program for hand tools and hand tool components in accordance with NFPA 1937 with the following elements:

(1) Cleaning and disinfecting hand tools and hand tool components on-scene post-incident
(2) Identifying, tagging, and removing contaminated or potentially contaminated hand tools and hand tool components from service until cleaned and sanitized
(3) Cleaning and disinfecting hand tools and hand tool components at the ESF
(4) Identification, separation, and disposal of hand tools and hand tool components where permanently removed from service

9.3.4 Life Safety Rope and Equipment. The ESO shall design and implement a contamination control program for life safety rope and equipment in accordance with NFPA 1937 with the following elements:

(1) Cleaning and disinfecting life safety rope and equipment on-scene post-incident
(2) Identifying and tagging contaminated or potentially contaminated life safety rope and equipment
(3) Cleaning and disinfecting life safety rope and equipment at the ESF
(4) Identification, separation, and disposal of life safety rope and equipment

9.3.5 Fire Hose, Couplings, Nozzles, and Fire House Appliances. The ESO shall design and implement a contamination control program for fire hose, couplings, nozzles, and fire house appliances in accordance with NFPA 1962 with the following elements:

(1) Fire hose in-service requirements
(2) Identifying and tagging contaminated potentially contaminated fire hose, couplings, nozzles, and fire house appliances
(3) Cleaning and disinfecting fire hose, couplings, nozzles, and fire house appliances at the ESF
(4) Identification, separation, and disposal of fire hose, couplings, nozzles, and fire house appliances

9.3.6 Ground Ladders. The ESO shall design and implement a contamination control program for ground ladders based on the criteria for hand tools and hand tool components found in 9.3.3.

Annex A Explanatory Material

Annex A is not a part of the requirements of this NFPA document but is included for informational purposes only. This annex contains explanatory material, numbered to correspond with the applicable text paragraphs.

A.1.5.1 The "applicable federal regulations of the Occupational Safety and Health Administration" refers specifically to 29 CFR 1910.

A.1.6.1 Metric units of measurement in this standard are in accordance with the modernized metric system known as the International System (SI) of Units.

A.3.2.1 Approved. The National Fire Protection Association does not approve, inspect, or certify any installations, procedures, equipment, or materials nor does it approve or evaluate testing laboratories. In determining the acceptability of installations or procedures, equipment, or materials, the "authority having jurisdiction" may base acceptance on compliance with NFPA or other appropriate standards. In the absence of such standards, said authority may require evidence of proper installation, procedure, or use. The "authority having jurisdiction" may also refer to the listings or labeling practices of an organization that is concerned with product evaluations and is thus in a position to determine compliance with appropriate standards for the current production of listed items.

A.3.2.2 Authority Having Jurisdiction (AHJ) The phrase "authority having jurisdiction," or its acronym AHJ, is used in NFPA standards in a broad manner because jurisdictions and approval agencies vary, as do their responsibilities. Where public safety is primary, the authority having jurisdiction may be a federal, state, local, or other regional department or individual such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the authority having jurisdiction. In many circumstances, the property owner or his or her designated agent assumes the role of the authority having jurisdiction; at government installations, the commanding officer or departmental official may be the authority having jurisdiction.

A.3.2.3 Code. The decision to designate a standard as a "code" is based on such factors as the size and scope of the NFPA standard, its intended use and form of adoption, and whether it contains substantial enforcement and administrative provisions.

A.3.2.6 Listed. The means for identifying listed equipment may vary for each organization concerned with product evaluation; some organizations do not recognize equipment as listed unless it is also labeled. The authority having jurisdiction should utilize the system employed by the listing organization to identify a listed product.

A.3.3.3.1 Advanced Cleaning. Advanced cleaning usually requires that ensemble elements be temporarily taken out of service. Examples include hand washing and machine washing, depending on the type of protective element involved. It should be noted that advanced cleaning might not remove all contaminants. [**1851,** 2020]

A.3.3.3.2 Specialized Cleaning. This level of cleaning involves specific procedures and specialized cleaning agents and processes primarily for the removal of hazardous materials such as bulk chemicals and other designated substances but excluding disinfection or sanitization of microbial contamination. Different approaches can be used for removing specific types of contamination. Specialized cleaning can also be an enhanced form of advanced cleaning. [**1851,** 2020]

A.3.3.5 Contaminants. These can be airborne, dermal, ocular, or respiratory hazards consisting of products of combustion, carcinogens, toxic chemicals, ultrafine particles, corrosive or sensitizing allergy-causing chemicals, potentially infectious body fluids, other infectious microorganisms, or CBRN terrorism agents and other incident health hazards. [**1550,** 2024]

A.3.3.7.1 Green Area. Some examples of green areas include administrative office space, kitchens, dormitories, bathrooms, and TV rooms. Essentially, any area that is not considered a red area or a yellow area should be considered a living, administrative, or public area.

A.3.3.7.2 Red Area. Some examples of red areas include areas used or reserved for decontamination, apparatus bays, disinfecting facilities, disposal facilities, and areas used to store contaminated equipment or PPE, including personnel decontamination showering facilities and personal clothing.

A.3.3.7.3 Yellow Area. Some examples of yellow areas include dedicated showers or bathroom facilities, lockers for clean clothes, or hand-washing stations.

A.3.3.8 Contamination. Contamination occurs when a foreign substance gets on, or in, clothing, equipment, or the body (via absorption, ingestion, inhalation, and so forth). Contamination implies such substances be avoided because of their potential negative health effects.

A.3.3.14 Emergency Services Facility. An emergency services facility can be a building that houses emergency services personnel, apparatus, or equipment.

Emergency services facilities do not include locations where an emergency services provider can be summoned to perform emergency operations or other duties unless such premises are normally under the control of the emergency services provider.

A.3.3.15 Emergency Services Organization (ESO). ESOs can include law enforcement; emergency medical services; fire departments; the American Red Cross; the Salvation Army; public works; federal, state, or local government agencies; private contractors; environmental agencies; facility fire brigades; and other organizations.

A.3.3.17 Environmentally Preferable Products (EPP) Cleaning Program. The product or service comparison might consider raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance, or disposal.

A.3.3.19 Exposure. Exposure creates a situation or condition where someone is likely to be harmed, especially because the person has not been protected from something dangerous.

A.3.3.26.1 Proximity Firefighting. Examples of fires that commonly produce high levels of radiant heat, as well as convective and conductive heat, and could result in incidents incorporating proximity firefighting operations include, but are not limited to, bulk flammable liquid fires, bulk flammable gas fires, bulk flammable metal fires, and aircraft fires. These operations usually are exterior operations but might be combined with interior operations. Proximity firefighting is not

structural firefighting but might be combined with structural firefighting operations. Proximity firefighting also is not entry firefighting. The firefighting activities differ from "entry firefighting" as proximity firefighting does not include direct entry of firefighters into flames. Proximity operations are performed close to the actual fire where the high levels of radiant heat as well as the convective and conductive heat would overcome the thermal protection provided by structural firefighting protective ensembles and the proximity firefighting protective ensembles provide enhanced protection from these thermal exposures. After the fire and heat have been controlled at a proximity firefighting incident, entry into structures or enclosures by firefighters protected by proximity firefighting protective ensembles could be made where the incident requires additional operations for control of the incident**.** [**1970,** 2024]

A.3.3.31 Hazardous Atmosphere. A hazardous atmosphere can be immediately dangerous to life and health. [**1550,** 2024]

A hazardous atmosphere can expose a person to the risk of death, incapacitation, impairment of ability of self-rescue, injury, or acute illness from one of the following causes: flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit (LFL); airborne combustible dust in a concentration that meets or exceeds its LFL; atmospheric oxygen concentration below 19.5 percent or above 23.5 percent; atmospheric concentration of any substance in excess of its published or permissible exposure limit; or any other atmosphere that is immediately dangerous to life or health.

A.3.3.35 Incident Management System (IMS). The system is also referred to as an incident command system (ICS). [**1550,** 2024]

The implementation of HSPD-5 led to the development of the National Incident Management System (NIMS). The NIMS is a system mandated by HSPD-5 that provides a consistent nationwide approach for federal, state, local, and tribal governments; the private sector; and nongovernmental organizations to work effectively and efficiently together to prepare for, respond to, and recover from domestic incidents, regardless of cause, size, or complexity. To provide for interoperability and compatibility among federal, state, local, and tribal capabilities, the NIMS includes a core set of concepts, principles, and terminology. HSPD-5 identifies these as the ICS; multi-agency coordination systems; training; identification and management of resources (including systems for classifying types of resources); qualification and certification; and the collection, tracking, and reporting of incident information and incident resources. [**1550,** 2024]

In addition to the NIMS, the process also incorporates the National Response Plan. The National Response Plan is defined as a plan mandated by HSPD-5 that integrates federal domestic prevention, preparedness, response, and recovery plans into one all-discipline, all-hazards plan. [**1550,** 2024]

A.3.3.36 Kitchen. Cleaning and washing of food service equipment and utensils also occur in this area. [**1581,** 2022]

A.3.3.37 Member. An ESO member can be a full-time or part-time employee or a paid or unpaid volunteer, can occupy any position or rank within the ESO, and can engage in emergency operation or support activities. Members can include, but are not limited to, operational firefighters, fire apparatus drivers/operators, law enforcement personnel, EMS personnel, support personnel, fire investigators, ARFF, wildland firefighters, industrial firefighters, and other public safety personnel.

A.3.3.43 Preliminary Exposure Reduction (PER). The primary purposes for preliminary exposure reduction (PER) actions are to reduce the exposure of the individual end users to soiling, products of combustion, and persistent contamination during doffing of ensembles and ensemble elements and to minimize the spread of that contamination to apparatus, vehicles, and the outside environment. PER techniques for the outside of the ensemble and ensemble elements include brushing off dry debris with a soft bristle brush, rinsing off debris with a low-pressure, low-volume water hose, and spot cleaning for non-aluminized elements. Only a soft cloth or sponge should be used to remove debris on aluminized element surfaces. [**1851,** 2020]

These actions, conducted by an individual with assistance, are intended to begin the removal of soiling and contamination as soon as practically possible following the exposure of the individual on the fireground or at the emergency scene. The goal of PER is reducing contamination for the exposed ensemble or ensemble elements prior to leaving the scene. These techniques should be applied while the member is still wearing their SCBA and is still on air to prevent respiratory exposure from any off-gassing of contaminants or to dust from airborne debris. It is realized that circumstances might not allow for this immediate action due to limitation of resources (e.g., spare ensembles or ensemble elements), inclement weather, and other factors. Therefore, PER can take place sometime or distance away from the specific exposure event. [**1851,** 2020]

In the hazardous materials industry, these actions are often referred to by the term *gross decontamination,* indicating the rinsing of the first responder or the actions to partially remove chemical residues or other hazardous substances after leaving the hot (contaminated) zone and before entering the cold (clean) zone during a hazardous materials incident. NFPA 1851 uses the term *PER* because the term *decontamination* suggests removal of contaminant. While there is an expectation that some of the surface contamination could be removed from protective ensembles or ensemble elements, gross decontamination or PER does not guarantee full cleaning or decontamination for all parts of the protective ensembles or ensemble elements. [**1851,** 2020]

A.3.3.46 Protective Ensemble. The elements of the protective ensemble are coats, trousers, coveralls, helmets, gloves, footwear, and interface components.

A.3.3.48 Rehabilitation. Rehabilitation efforts should include providing relief from extreme climate or incident conditions, rest and recovery, rehydration, replacement of calories and electrolytes (as needed for scheduled activities of moderate to high intensity and lasting 1 hour or longer), active or passive cooling as needed for incident type and climatic conditions, medical monitoring, and member accountability. [**1584,** 2022]

A.3.3.50 Response and Support Vehicles (RSV). Additional examples of RSVs include buses, public works vehicles, privately owned vehicles (POV), trailers, and so on.

A.3.3.53 Risk Control. A control for each should be implemented and documented. The two primary methods of controlling risk, in order of preference, are as follows:

(1) Wherever possible, eliminate or avoid the risk or the activity that presents the risk, for example, remove contaminates before removing PPE.
(2) Where it is not possible or practical to eliminate or avoid the risk, steps should be taken to control it. If the risk could not be removed, for example, PPE could not be cleaned after removal, then the PPE should be bagged to isolate the hazard from the responders and the apparatus returning to quarters.

A.3.3.56 Standard Operating Procedure (SOP). The intent of standard operating procedures is to establish directives that must be followed. Standard operating guidelines allow flexibility in application. [**1550,** 2024]

A.4.1.1 Controlling exposures to hazards in the workplace is vital to protecting workers. The hierarchy of controls is a way of determining which actions will best control exposures. The preferred order of action based on general effectiveness is as follows:

(1) Elimination
(2) Substitution
(3) Engineering controls
(4) Administrative controls
(5) Personal protective equipment (PPE)

Using this hierarchy on the fireground whenever possible can help lower worker exposures and reduce risk of illness or injury.

A.4.2.2 After identifying the actual hazards, an assessment should be made of the relative risk *(see 3.3.49)* of each hazard.

A.4.2.2(3) The establishment of priorities for action should be based on the degree of a hazard depending on the frequency, toxicity or severity, and risk of occurrence.

A.4.2.2(4) Risk control techniques should utilize solutions for elimination or mitigation of potential hazards based on this standard and other fire service best practices. See Annex B for more information on the process. Additionally see, "Hierarchy of contamination control in the fire service: Review of exposure control options to reduce cancer risk" (Horn, G. et al, 2022). Figure A.4.2.2(4) provides insight for firefighters to better understand potential routes of exposure, where they are most likely to be encountered, and highlights examples of protective measures to lessen exposure.

A.4.2.2(5) The ESO should evaluate the risk management plan for effectiveness of risk control techniques on an annual basis to ensure that exposure and contamination control goals are met.

A.4.3.1 The HSO is responsible for assisting in developing the overall ECCP and implementing it in an ESO. The incident safety officer is responsible for developing the incident-specific contamination and exposure elements as part of an incident action plan based on departmental SOPs and SOGs.

The ECCP implementation during emergency operations and training exercises using an incident management system's roles and responsibilities is outlined in Chapter 7.

The member, as outlined Chapter 7, has specific roles and responsibilities during an emergency operations and training exercise under the incident management system and the ECCP. That same member has additional responsibilities before and after the incident as outlined in Chapter 4. For example, in many cases, decontamination of the SCBA will only involve a PER at the incident scene by the member as part of the inci-

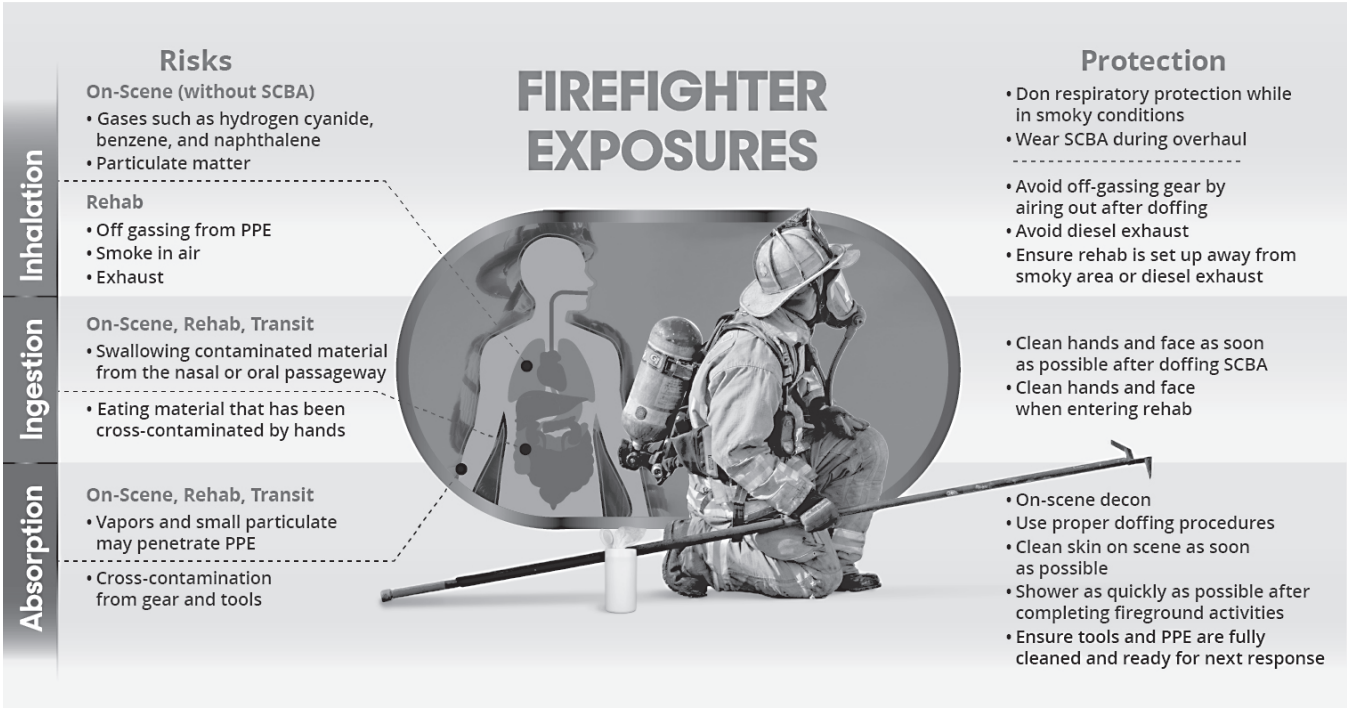

FIGURE A.4.2.2(4) Firefighter Exposures – Risks and Protections (Source: UL-FSRI).

dent management team. When the member returns to the station, they might do a complete decontamination of the SCBA as part of their role as a member of the ESO.

A.4.3.2.1 This is particularly important as it relates to proper disposal of contaminates such as fluorinated foam, which can pose a hazard to the public or other responders if not properly handled.

A.4.3.3.1 The ESO HSO should be provided with injury reports, vehicle incident reports, near-miss or equipment malfunction or failure reports, and other reports as determined by the AHJ, so that risks can be identified and categorized, and control measures can be implemented and monitored.

A.4.3.3.2 The ECCP plan should be communicated to the members of the organization and the plan should be integrated into the organizational operation. Any needed modifications should be identified and implemented.

A.4.3.5.2 The ESO's risk management program should be incorporated into the training and education programs and records of the training and education programs should be maintained. The training and education programs should meet the stated operational safety goals and objectives for emergency and nonemergency incidents.

A.4.3.5.3 Based on the material outlined in this standard, and applicable federal, state/provincial, and local laws, codes, and standards, the ESO HSO should audit ESO operations, apparatus, equipment, facilities, training and education programs, SOPs and SOGs, and work practices and procedures annually. The safety audit report and recommendations should be communicated to the AHJ.

A.4.3.6.4 The ESO HSO should ensure a station ECCP considers basic construction plans, drawings, and design guides so that deficiencies can be identified, documented, and reported in accordance with US federal law, Code of Federal Regulations, Centers for Disease Control and Prevention (CDC), Occupational Safety and Health Administration (OSHA), National Institute of Occupational Safety and Health (NIOSH), National Fire Protection Association (NFPA), United States Fire Administration (USFA), and policies and procedures of the AHJ.

A.4.3.8.2 An example of nonemergency activity includes facility activities as outlined in Chapter 5.

A.4.3.8.3 PPE should be used in accordance with manufacturers' PER actions and in accordance with NFPA 1584.

A.4.3.11 According to NIST, "Awareness is not training. The purpose of awareness presentations is simply to focus attention on exposure and contamination control prevention. Awareness presentations are intended to allow individuals to recognize health and safety concerns and respond accordingly." (See also, 3.3.2 Awareness.)

A.4.3.12.2 The following is an example of what might be included in an SOP related to Chapter 7: Organizations shall develop SOPs for field use that reflect the specific operational dynamic decision-making process described in Chapter 7 of NFPA 1585.

A.4.3.13.2 NFORS provides a data set for tracking exposure to products with potential adverse health effects over the course of a career. It is an all-hazards system endorsed by the International Association of Fire Chiefs, the International Association of Fire Fighters, the Firefighter Safety Research Institute of Underwriters Laboratories, and other organizations. The NFORS system provides capabilities beyond the scope of this document but can be useful to suggest components of a minimum data set. The ESO preferring to establish a local system to track exposures to potentially dangerous chemicals can adapt the NFORS data elements specific to fire incidents. Some elements used in the NFORS system include the following:

(1) Employee name
(2) Employee date of birth
(3) Employee gender
(4) Employee race and ethnicity
(5) Employee employment start date
(6) Internal ESO incident or case number where the exposure occurred
(7) Type of fire
(8) Was foam used and, if so, what kind?
(9) Fire conditions encountered by the employee
(10) Activities performed by the employee at the scene
(11) Did the employee participate in rehabilitation, and did he or she clean their hands and remove PPE before ingesting water or food?
(12) Contamination level of PPE after exposure
(13) Contamination of skin and nares after exposure
(14) Was decontamination performed on scene and, if so, what kind?
(15) How was PPE transported back to the emergency services facility (ESF)?
(16) Was decontamination performed at the ESF and, if so, what kind?

These are not all the data elements contained in NFORS and ESOs are encouraged to investigate the system for a more comprehensive understanding of what NFORS has to offer. If the ESO prefers to establish a local system, this is important data to collect for each exposure and employee. The data should be retained for reference and tracking of individual employee health claims.

A.4.6.2 An ongoing risk assessment should be done in accordance with Chapter 5 of NFPA 475.

A.4.7 An ESO's obligation is to minimize the public's and the ESO personnel's exposure to soiled or contaminated PPE. Considerations should be made for PPE component evaluations and integration, and for providing members with redundant PPE to maintain cleanliness throughout a shift or campaign. Preactivity assessments of compatibility, interfaces, cleanliness, and availability of backup PPE should be made. The necessity of wearing appropriate PPE at each assignment on the fireground and areas subject to contamination, the appropriate location and timing of donning PPE, the importance of interface elements, and the importance of wearing PPE throughout the response should all be noted.

The ESO should establish an approach for deciding the handling, cleaning, and disposition of ensemble elements specific to the types of contamination encountered as well as PPE PER actions. Consideration to contaminated doffing techniques appropriate for the type of contamination encountered are also important as well as the need to separate and control PPE after doffing.

The ESO should determine the appropriate level of advanced or specialized cleaning postincident, including the

need to separate PPE components to mitigate cross-contamination in the wash.

Documentation of exposures and cleaning should be kept by the ESO. PPE should be stored in a manner to avoid contamination of emergency facility storage areas and contaminated PPE should be disposed of in accordance with NFPA 1550 and the manufacturer's instructions.

A.5.1 To protect the health and safety of ESO personnel and the public, exposure and contamination control efforts inside the facility must be supported by each individual in the department. For example, efforts to bypass systems meant to maintain air pressure differentials do not just affect one person, they affect and compromise the long-term health of everyone in the facility.

The goal is to keep contaminated personnel, equipment, and apparatus within the facility in an area meant to process the contamination. Emergency responders returning from an incident where they were exposed to fireground contaminants should enter the facility from the contamination control area, follow procedures to leave or process the contaminated items they need to discard in the contamination control area, enter the transition area to remove contamination from their bodies, and put on clean clothing in the transition area before entering the living, administrative, or public area.

These same parameters apply to firefighters working within contaminated areas.

The purpose here is to minimize exposure to contaminants, remove and destroy contaminants, and contain contaminants as best as possible in the contamination control area of the facility. In existing, older, or smaller stations that cannot be physically modified economically, the following guidelines should be referenced:

(1) Highlight the department's obligation to minimize the public's and fire department personnel's exposure to fireground contamination interior and exterior of an emergency services facility.
(2) Select air-handling units and furniture, fixtures, and equipment (FF&E) based on the purpose and use of the contamination control area.
(3) Consider maintenance needs and the design of the contamination control area when selecting air-handling units and FF&E

Areas designated in the facility based on the likelihood of exposure to contamination can also be referred to as red, yellow, or green zones. These zones are not to be confused with operational zones associated with a hazardous material response.

A.5.2.2 Where selecting surface materials, evaluate how the materials can be used, how the materials hold contamination, and how easy the materials can be cleaned or sanitized.

Nonporous materials or finishes and materials or finishes with antimicrobial properties should be used in kitchen and bathroom areas and for all other surfaces that can be exposed to contaminants.

Heating, ventilation, and air conditioning (HVAC) and air pressure system considerations go beyond controlling single systems or utilizing separate systems. For example, if airlock doors can be propped open or their alarms bypassed, the system is not going to protect the health of anyone in the facility. A system should be considered in terms of how it will be used and the consequences if it is bypassed after install.

A.5.2.3 Signs should be clear with simple graphics or messages. Signage should indicate current location and directions to the nearest contamination control area based on the level of contamination.

For contamination control areas, specifically the apparatus bay, signs should indicate what can and cannot be done in the area. For example, the bay is not the place to exercise (diesel engine exhaust is a known carcinogen) or watch television, it is the place to store apparatus and decontaminate PPE, equipment, and apparatus.

For transition areas, signage should note that the person is entering the transition area. People within the facility need to know that they are going from an uncontaminated space (i.e., living, administrative, or public area) to a potentially contaminated space (i.e., transition area); or from a likely contaminated space (i.e., contamination control area) to a potentially contaminated space.

Members working in the facility should be aware and trained on the hazards and risks present. The goal of identification is to ensure that those that are not as familiar with the procedures or the facility (e.g., the general public) are aware when entering an area that could possibly be contaminated.

Signs should reflect the guidance found in ANSI Z535.4, *Product Safety Signs and Labels,* and indicate and communicate hazard information quickly, including the use of safety symbols.

A.5.2.4 Soap and water are best for removing fireground or nonbiological contaminants. It is important to wash for at least 20 seconds with soap.

Contamination is not the same as germs. Over-the-counter antibacterial soaps, while popular, are no more effective at killing germs than regular soap. However, any soap, including antibacterial soap, is key to removing contaminants.

While hand-sanitizing products are useful for infection control *(see NFPA 1581),* they can be counterproductive where addressing fireground contamination. Hand sanitizers, including those that are alcohol based or contain aloe, which do not require water, are acceptable for disinfecting, but are not effective at removing contaminants. Such products can add to the penetration of contaminants.

Centers for Disease Control has up-to-date instruction for hand washing and hand sanitizing. For example, a study conducted by AJ Pickering, J. Davis, and AB Boehm describes the efficacy of alcohol-based hand sanitizer on hands soiled with dirt and cooking oil. The study can be found at: https://pubmed.ncbi.nlm.nih.gov/21976190/. The gist of the study is that alcohol-based hand sanitizer is not recommended when hands are visibly soiled.

Hand sanitizer should never be in the shower and should never be used before showering. Hand sanitizer is designed to be a leave-on product and, while it kills some germs, it does not remove dirt or fireground contamination. When considering contamination control efforts, firefighters should focus on using soap and water to remove contamination from skin. Alcohol-based hand sanitizer can be used to address germs when soap and water is not available but should never be used to address contamination, dirt, or sweat.

A.5.2.5 Eliminating the number of times members touch fixtures reduces the chances of contamination. Members or the public should not have to utilize door hardware, grasp sink faucets, or operate flush valves when touchless options exist. If touchless hardware or fixtures are not available, knee- or foot-operated controls should be used.

Touchless fixtures come with their own issues, which should be considered when making fixture selections. User comfort is important, because if touchless systems are not comfortable for the user, the user will find a way to bypass the touchless system.

A.5.2.6 Carpet and fabric upholstery should be avoided. Fireground contamination is difficult, if not impossible, to remove from soft, porous surfaces. Chairs, couches, or similar furniture should be made of hard, nonporous materials (e.g., metal) or covered with an easily cleanable material (e.g., leather or leather alternatives), where possible.

Products certified to National Sanitation Foundation (NSF) standards should be used, where possible.

Ceiling materials might be porous for acoustical properties in bunk rooms, day rooms, study areas, and similar spaces. Wall surface materials generally out of reach due to height or location might also be porous for acoustical properties.

Where moisture resistance is desirable, such as in kitchens, bathrooms, janitor closets, and so on, nonporous ceiling materials might be used.

A.5.2.7 Where selecting cleaning products, consideration should be given to protecting the health and safety of members by adopting an environmentally preferable purchasing (EPP) program. An EPP is a US EPA program that helps US federal government purchasers access private sector environmental innovations and procure environmentally preferable products.

Products and services that are "environmentally preferable" have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose. This is important as the EPA has developed recommendations for specifications, standards, and ecolabels to help purchasers and end users identify and procure greener (i.e., environmentally preferable) products. In doing so, the program supports efficiency in operations by giving purchasers a convenient and streamlined way to make sense of over 460 environmental performance standards and ecolabels currently in the global marketplace.

A.5.3.1.2 The transition area should function as an air-pressure differential between areas.

A.5.3.2.1 Some examples of red areas include, but are not limited to, personnel decontamination showering facilities, areas used or reserved for decontamination, apparatus bays, disinfecting facilities, disposal facilities, and areas used to store contaminated equipment, PPE, or personal clothing. Areas such as these can present a risk of contamination regardless of whether the area has been cleaned or not.

Contamination control areas are also known as red areas.

A.5.3.2.1.1 Some examples of yellow areas include, but are not limited to, dedicated showers or bathroom facilities, lockers for clean clothes, or areas where hand-washing stations are located. Areas such as these contribute to the reduction or elimination of contaminants before entering the next area.

Not all facilities have space or fixtures to place a shower and changing room in a yellow area. In such cases, the responder can exit the red area, enter a private area or room, doff soiled or contaminated clothing, move to a personal shower and drying area, don clean station wear, and then move into the green area. There can be many variations of this procedure as long as the responder moves from dirty (e.g., red area) to progressively cleaner and then to clean before entering the green area. The goal is to keep as much contamination as possible out of the green areas.

A.5.3.2.3.1 Some examples of areas that would be included in a transition area include, but are not limited to, dedicated showers or bathroom facilities, lockers for clean clothes, or areas where hand-washing stations are located. Areas such as these contribute to the reduction or elimination of contaminants before entering the next area.

Yellow areas are also known as transition areas.

A.5.3.2.3.2 There are two ways to enter green areas. If someone is working in the bay but is not contaminated, they do not have to go through a yellow area before they enter a green area. However, someone who is contaminated should go through the yellow area and use the appropriate measures to reduce their contamination before entering the green area in the facility.

A.5.3.2.4.1 Some examples of green areas include, but are not limited to, administrative office space, kitchens, dormitories, bathrooms, and TV rooms. Essentially, any area that is not considered contaminated or that does not contribute to the reduction or elimination of any contaminants should be considered a green area.

Living, administrative, or public areas are also known as the green area.

A.5.3.2.4.2 Because the green areas can be accessed from the outside or a yellow area, 5.3.2.4.2 applies to all areas that lead into the living, administrative, or public areas.

A.5.3.5 Ice machines should not be exposed to residual diesel exhaust and off-gassing of contaminated equipment and PPE.

If ice is added to a beverage or a cooler to keep other items cool, everything the ice touches can be contaminated with contaminants stuck to the ice. Ingesting these contaminants and touching items that are covered in contaminants leads to more contamination, not less.

Ice machines, regardless of how the ice is used, should only be allowed in living, administrative, or public areas.

Bulk water storage is allowed, but measures should be taken to reduce exposure to contaminants. For instance, palletized consumable products (i.e., food, water bottles) should be isolated with shrink wrap or other controls to limit exposure and contamination.

Consideration should be given to adequate storage outside of contamination control or transition areas.

A.5.3.6 Emergency services facilities might be occupied seven days a week in multiple shifts or occupied intermittently in volunteer or on-call facilities. Materials selections should be made with the understanding that materials need to hold up under constant use, cleaning, and decontamination.

The use of nontoxic building materials, system components, and FF&E promotes a healthy environment and protects occupants from additional exposure to hazardous materials and possible off-gassing. For example, low-VOC paints should contain fewer than 0.42 lb/gal (50 g/L) of volatile organic compounds to meet green seal standards for adhesives, sealants, and numerous other products.

Materials on the International Living Future Institute "Red List" of hazardous materials and compounds should be avoided. The "Red List" can be found at: https://living-future.org/declare/declare-about/red-list/.

A.5.4 Every area in a facility should be designated as a contamination control area, transition area, or living, administrative, or public area so that personnel know what activities are allowed and what cleaning and maintenance procedures are necessary in each area.

Each area has its own purpose for minimizing exposure to contamination and should be marked and maintained according to such purpose. Factors to consider for each area include proximity to other areas and procedures to control movement of airborne and physical contamination between areas.

Contamination control efforts inside the facility must be supported by everyone in the facility to be effective. Efforts to bypass systems meant to maintain air pressure differentials affect everyone in the facility and can compromise long-term health.

A.5.5 A contamination control area is also known as the red zone.

A.5.5.4 Visibility and public education are important in the community, and it is unreasonable to expect that only members can have access to areas such as the apparatus bay. For education, maintenance, or other reasons, public access to contamination control areas is necessary. However, if possible, apparatus should be pulled out of the bay onto the apparatus apron for public demonstrations.

Members that work in the facility daily risk cumulative exposure over the long term. The same level of risk does not apply to someone that has limited access for a specific need.

The goal is to limit or reduce the risk of any exposure contaminants. If members are exposed to contaminants, they should clean themselves appropriately as soon as practical.

A.5.5.5 The goal is to minimize contamination brought into the facility. Because of weather, temperature, or space limitations, the level of gross decontamination outside of the facility could vary. Where an outside location is not possible, the ESO should designate a specific area within the facility where gross decontamination can occur.

A.5.6.1 The yellow area is an area, a room, or a series of areas or rooms that personnel move through to travel from the red area to the green areas.

The protocol is to get less and less contaminated through the yellow area so as to enter the green area clean. Members of the public should not enter the yellow area unless they are already in the red area.

The exit from the yellow area to the green area should be to a corridor or a dedicated area, not a room or habitable space.

The design, size, layout, path of travel, type of equipment, and protocols fall under the jurisdiction of the ESO.

Yellow areas can also exist as a detached or an exterior space. Such transition spaces should be considered a separate entity.

Yellow areas can also serve as a direct route from the green area to the red area with no effect on contamination or contamination control. Responders do not need to utilize the cleaning equipment or decontamination protocols for movement from the green area to the red area.

A.5.6.2 Not all facilities have space or fixtures to place a shower and changing room in a transition area. In such cases, the responder can exit the contamination control area, enter a private area or room, doff soiled or contaminated clothing, move to a personal shower and drying area, don clean station wear, and then move into the living, administrative, or public area. There can be many variations of this procedure as long as the responder moves from dirty (i.e., contaminated) to progressively cleaner and then to clean before entering the living, administrative, or public area.

The goal is to keep as much contamination as possible out of the living, administrative, or public areas.

A.5.6.3 Yellow areas are for personnel and clothing decontamination, not for decontamination of equipment or PPE. Chapter 9 contains information related to cleaning equipment. For information on cleaning and decontaminating structural firefighting PPE, refer to NFPA 1851.

Yellow areas are not equipped to clean beyond personnel or clothing. Additional equipment, such as clothes washing and drying machines, personnel lockers, storage cabinets, and so on can be utilized for additional cleaning and decontamination.

Any additional cleaning and decontamination items in the yellow area should be made of nonporous material that is easy to clean and sanitize.

While departments might use ultraviolet (UV) lights to disinfect, UV lights do not affect contamination and can damage PPE materials. UV lights are not useful for controlling contamination from products of combustion. For details on using UV lights against germs to disinfect, see NFPA 1581.

Where a fixed UV disinfecting light is used, it should have controls that prevent its use when unprotected personnel are present. The ESO should follow manufacturer's instructions when using portable UV lights. In no case should a UV light be used for fireground contaminants; it will not have any effect on the contamination and can damage PPE and negatively affect performance capabilities.

A.5.6.3(1) The sink or water station should utilize touchless or knee- or foot-operated controls. Soap should be either cartridge type or a portable unit.

A.5.6.3(2) Boot clearing equipment can be excluded if the ESO has protocols or SOPs in place for removing contaminated footwear and donning clean footwear prior to entering the living, administrative, or public area.

A.5.6.4 Equipment used or stored in a yellow area should be cleaned according to Chapter 9.

A.5.6.5 Yellow areas should have an air pressure differential from higher pressure in the green area to lower pressure in the transition area. The yellow area pressure can be the same as or higher than the red area, as long as it is less than the green area pressure. The amount of pressure differential should be determined by the ESO or facility designer.

A nonporous-material door(s) between the green area and the yellow area should automatically close, have latching hardware, be fully weather-stripped, and have a threshold and view light. There is no need for a door between the yellow area and red as far as air pressure differential is concerned.

This door(s) should remain closed due to the air pressure differential and potential for leaching of contaminants. The door should be on an alarm, separate from any building life safety alarms. The alarm should notify station personnel if the door remains open or fails to properly shut and latch.

Procedures should ban any activity that bypasses the alarm or allows anyone to chock the door open. Such actions can affect the long-term health of anyone who occupies the facility.

If the yellow area serves as an emergency response route to the red area, and, if code allows, the door should swing in the direction of the response.

Yellow areas can be a series of areas or rooms as long as the path from the red area to the green area gets progressively cleaner. In such cases, personnel can exit the red area, enter a private area or room, doff soiled or contaminated clothing, move to a personal shower and drying area, don clean station wear, and then move into the green area. There can be many variations of this procedure as long as the responder moves from dirty (i.e., contaminated) to progressively cleaner and then clean before entering the green area.

A.5.6.6 Depending on the location of the yellow area, air pressure differential might not be needed.

The ESO should consider equipment needs and air pressure differentials according to the features of the yellow area.

If using a remote yellow area, responders should have a clean path of travel from the yellow area into the green area of the facility.

A.5.7 Green areas are also known as the living, administrative, or public areas.

A.5.7.1 Green areas are defined as all areas within the facility that have the lowest level of contaminants. These areas are to remain free from contamination and procedures should be in place that ensure contamination is not transferred from an area that is already contaminated.

Because green areas are free of contamination, ice machines and refrigerators can be installed and used in these areas.

A.5.7.5 To ensure contamination control efforts are effective, HVAC units should be inspected, cleaned, and maintained regularly. Regular cleaning removes contamination and regular maintenance ensures air pressure differentials and filtration are maintained to minimize contamination in the facility.

A.6.1.1 Additional RSVs could include buses, public works vehicles, privately owned vehicles (POVs), and trailers. The AHJ should have a policy to address vehicles other than RSVs.

A.6.2.3 The ESO should consider the following when designing the exterior of an RSV:

(1) Provide a low-pressure hose line on either side of the RSV to conduct PER actions
(2) Designate compartment space for decontamination equipment and supplies
(3) Include compartmentation to separate firefighters from contaminated gear, equipment, and SCBA

A.6.2.5 In the design process, the ESO should also consider the following measures for cleaning RSVs:

(1) Exhaust protection system or an exhaust system with vertical exhaust to minimize exposure to personnel on-scene
(2) Exhaust capture devices on the RSV for on-scene and in-station use
(3) Separate transport for contaminated PPE, tools, and equipment, where possible
(4) Warm water decontamination outlets on both sides of the RSV
(5) High-impact HVAC system filtration for the crew cab to minimize potential inhalation exposure to off-gassing materials
(6) Alternative SCBA storage (e.g., fender compartments) to transport contaminated SCBA back to the station or facility for cleaning
(7) Tough and durable spray-on protective coatings inside the cab for easier spray-outs and cleaning
(8) External transverse compartments across the back of the cab to store SCBAs on a pullout board for easier access
(9) Exterior compartments to store bunker gear
(10) Automated disinfectant dispensers inside the cab

A.6.3.2.1 The clean RSV plan should pay special attention to high-touch areas, such as the following:

(1) Seat belts and buckles
(2) Door handles and grab rails
(3) Compartment handles and latches
(4) Steering wheel
(5) Switches and touch pads
(6) Arm rests and seats
(7) Floors
(8) Medical compartments, equipment, and bags
(9) Pump control panel, handles, levers, and switches
(10) RSV dash buttons and keys
(11) RSV books, boards, and tags

A.6.3.2.4 Contaminated equipment and PPE should be removed prior to handing off the patient to the emergency department.

A.6.3.2.5 Contaminated RSVs and equipment should receive PER actions prior to leaving the scene. See Chapters 7 and 9.

A.6.3.3.1 To keep the cab of the apparatus as clean as possible and to avoid transferring toxins and harmful products back to the station or facility, it is extremely important to perform PER actions prior to leaving the incident scene. Where possible, an additional crew can be assigned to oversee the cleaning process. A garden hose or booster line (i.e., hose reel) should be sufficient for a hose line. The driver/operator should ensure the pressure on the booster line is between 20 and 80 psi. Hydrant pressure is usually sufficient.

A.6.4.1.1 Procedures for designating a contaminated RSV should be developed by evaluating the following risk factors:

(1) Occupant areas that provide shelter for exposed personnel from the elements, such as rain, snow, sleet, hail, dust, extreme heat, or extreme cold
(2) Exposed personnel sheltering inside a contaminated area or exposed to contaminates at the incident
(3) Time of exposure while returning from a response before personnel leave the interior of a contaminated area
(4) Other means of shelter for exposed personnel if procedures include doffing contaminated PPE and donning clean PPE or clothing outside the shelter of the RSV area
(5) Time an RSV is contaminated verses time it spends running decontaminated on nonexposure calls or tasks

A.6.4.2 ESO procedures should consider the following to ensure that contaminated personnel and equipment do not enter the cab of RSVs:

(1) Limit or minimize exposure by conducting PER actions prior to reentry
(2) Bag contaminated equipment in accordance with NFPA 1550
(3) Store contaminated equipment outside the crew area
(4) Clean equipment prior to storing it inside the crew area
(5) Include procedures to transport exposed equipment

A.6.4.3.1 If conditions permit, any RSV staged in the warm or hot zone or otherwise exposed to contamination should undergo the PER process before leaving the scene.

A.6.5.1.3 The documentation system should identify any RSV exposed to known or suspected products of combustion, fireground contaminants, or other incident-related health hazards.

The record of contamination should include the following:

(1) Type of RSV contaminated
(2) Time, date, and type of contamination
(3) Cause of contamination
(4) Location on the RSV where contamination occurred
(5) Time and date the RSV was decontaminated in accordance with NFPA 1581
(6) Signature of approval for return to service

The record of contamination exposure should become part of the RSV's permanent record and should be maintained by the owning ESO for the life of the RSV.

A copy of an RSV's record of contamination should be available upon request.

A.7.2.1 An ongoing risk assessment is the process of continually observing and analyzing risks and hazards in a changing or high-risk environment. This should be done in accordance with Chapter 5 of NFPA 475.

A.7.2.2 The incident commander (IC) should integrate a risk assessment for contamination hazards into the risk management strategy in accordance with A.10.4.2.1 of NFPA 1550.

A.7.2.3 Hazardous atmospheres requiring SCBA can be found in, but are not limited to, the following operations: structural firefighting, aircraft firefighting, shipboard firefighting, overhaul, confined space rescue, and any incident involving hazardous materials. [**1550:**A.9.11.7]

A.7.3.1 One of the first priorities during an incident is to establish hazard control zones throughout the site. These zones are administrative areas based on the hazards, situation, and the risk to personnel and the community. These operational areas are meant to protect the response personnel, minimize exposure of unprotected personnel, and prevent accidental spread of contamination. The zone designation is meant to be dynamic in nature and therefore must continually be reevaluated throughout the response. The commonly used nomenclature for hazard control zones includes *hot*, *warm*, and *cold zones*; however, the terms *inner* and *outer cordons* are also used in many areas. In most cases, the hazard control zones will shrink over the course of an incident response. An ongoing dynamic risk assessment should be used to ensure that the location, shape, and overall size of the control zones reflect the situation.

A.7.3.6 The size of hazard control zones often change throughout an incident due to the dynamic nature of the risk assessment. Hazard control zones tend to become smaller as the incident winds down.

A.7.3.8.1 The hot zone is the area presenting the greatest risks of contamination to members.

A.7.3.9.1 The chance of cross-contamination to contaminants is ever present in the warm zone. The warm zone should be considered the portion of the emergency scene where the contaminants could have been transported by the firefighters as they leave the hot zone with contamination.

PPE should still be worn by members while in the warm zone. In many respects, the risk of contamination in the warm zone is the same as in the hot zone. Until contaminants have been removed from the PPE or the contaminated PPE removed from members, the precautions used in the hot zone should continue to be used in the warm zone.

A.7.3.10 The cold zone is also known as the "clean zone." The cold zone represents the on-scene area where there are minimal risks for human injury or exposure. Contamination exposure has been mitigated in this area and no further control measures are necessary to protect against contamination.

Cold zone activities include, but are not limited to, member rehabilitation, incident debriefing, media interactions, patient treatment, public exclusion area, law enforcement vehicle and personnel actions.

A.7.4.1 This positioning might not be practical during initial operations; however, RSVs should be repositioned as time and conditions allow to minimize contamination.

A.7.4.4 Where RSVs are exposed to potentially contaminated environments, the presumption should be that the RSVs have been contaminated. Some examples of contaminated environments include, but are not limited to, the following:

(1) Interior operations where any amount of smoke is present for any duration of time. The smell of products of combustion indicates a potential exposure.
(2) Exterior operations, such as vehicle fires, brush fires, or trash or dumpster fires.

ESO members should be cognizant that exposure to products of combustion does not require visible smoke; inhalation and absorption of low doses of microscopic contaminants in the part per million (ppm) range are potentially carcinogenic.

A.7.4.5 The marking of formal isolation or control zones might not occur at every emergency incident; however, all members should be aware that isolation or control zones still

exist. Research has shown modern day fires produce harmful toxins, which can include substances such as polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), carbon monoxide (CO), hydrogen cyanide (HCN), and numerous other gases, chemicals, and toxins. It is important to remember that many of these toxins are colorless and odorless gasses. To limit the amount of exposure and the subsequent decontamination, RSV placement and approach should be considered during any emergency incident. Members can greatly reduce the amount of exposure by performing a fire attack from an upwind position, where possible, and utilizing the reach of the hose stream. RSVs and the following members can, and likely will, be exposed during all operations in proximity to products of combustion:

(1) Driver/operator performing pumping operations at the apparatus panel
(2) ICs where the command post is exposed
(3) Safety officers
(4) Undeployed rapid intervention crews and on-deck crews
(5) Responders assigned to an exterior exposure assignment
(6) Any member affected by a zone change due to significant wind shift, scene dynamics, or complications.

A.7.4.6 The IC must take smoke production and any associated contaminants' potential impact on operating members, equipment, civilians, and the environment into account when conducting a fireground size-up. Special consideration can be given where known hazardous materials are allowed to burn under controlled conditions. RSVs should be positioned outside the hot zone in an effort to limit contamination whenever possible. Cab windows and other openings should be closed to limit contamination of the crew cab. Smoke and contaminant exposure to the apparatus and equipment should be avoided wherever possible. Apparatus and equipment that have been severely contaminated with smoke and contaminants should receive a gross on-scene decontamination prior to leaving the scene.

To limit the amount of exposure and the subsequent decontamination, RSV placement and approach should be considered during any emergency incident.

Members can greatly reduce the amount of exposure by staging RSVs in an upwind position and performing a fire attack from an upwind position, where possible, and utilizing the reach of the hose stream.

A.7.4.10 RSVs should not be placed directly into an area where the RSV would be subject to contamination unless the RSV is participating in direct life-saving operations and such operations are authorized by the IC.

A.7.4.11 Special consideration should be provided to any member who arrives in their POV when dealing with their PPE and associated equipment. All members should go through the PER process, and their equipment identified and packaged in such a way that no contamination is expected in their POV. All ESOs should have a SOPs and SOGs that address conditions for prevention of exposure to personal areas.

The Swedish Civil Contingencies Agency introduced a multifactorial system to manage firefighter exposure to unknown chemical substances. The system is called the Skellefteå Model and is implemented through three factors: tools, routines and workflows, and knowledge and insight. Of particular interest is the routine and workflows component. This includes the transportation of PPE to and from incident scenes, routines on scene, storing equipment after incidents, handling potentially contaminated equipment at the ESF, and methods of decontamination of equipment and personnel. ESOs wishing to establish comprehensive contamination control procedures are advised to look to the Skellefteå Model as an example of a comprehensive, evidence-based, and proven system.

The Swedish Civil Contingencies Agency has provided a comprehensive guide to Skellefteå Model implementation. It is available in English as a PDF at: www.msb.se/en under the Publications tab.

A.7.4.14 Dust inside RSVs has been found to be contaminated. RSV windows left open during a working fire can result in smoke transport through the cab, which can deposit on surfaces. Wearing contaminated PPE back to the fire station transfers contaminants to apparatus seats, resulting in exposure to the next member who sits there due to cross-contamination. Storing and transporting contaminated PPE within the apparatus cab, particularly with closed windows, can lead to an increase in the concentration of compounds off-gassing from PPE.

A.7.5.1 The IC should assign an exposure reduction officer (ERO) to oversee on-scene PER efforts.

A.7.6.4.1 Pathways for exposure to fireground contaminants include inhalation, ingestion, and dermal absorption. Selecting PPE to protect against each of these pathways is critical to achieve as high a level of protection as possible. Full turnout gear and SCBA should be donned where operating in the hot zone. Members operating in the warm and cold zone can be exposed to smoke and fireground contamination through changes in wind or off-gassing equipment. SCBA provides the highest level of airway protection, but a lower level of protection might be appropriate given a risk analysis of fireground operations.

Protection from fireground contaminants must be balanced with the need to allow a range of motion and field of vision to complete the fireground assignment, as well as risks from ambient dangers such as heat or cold stress, and slip, trip, and fall risks.

A.7.6.4.2 Where possible, clean structural firefighting PPE should be donned in the ESF prior to boarding an RSV. If an emergency incident necessitates the donning of HazMat PPE or wildland PPE after arrival on the scene, structural firefighting PPE should be removed, and clean HazMat or wildland PPE should be donned in the cold zone of the incident operation.

If an ESO has chosen a clean cab concept and policy that does not allow PPE inside the RSV cab, donning can occur on-scene. However, it is incumbent upon the RSV engineer and the company officer to stage the RSV in a location that allows enough space and light to don all PPE safely and ensure positive overlap of interface elements.

A.7.6.4.4 Reductions in protection, particularly inhalation exposure protection, must be carefully considered. Typical fire service multi-gas meters are not responsive to many of the contaminates found on the fireground. SCBA should be maintained through overhaul wherever possible, even if additional personnel are needed at the scene or firefighters need to rest and rehab prior to completing overhaul.

A.7.6.4.12 The choice between dry or wet mitigation depends on the resources available to the ESO and the conditions on-scene. Studies have shown that wet mitigation techniques are more effective at removing surface contamination as compared to dry mitigation techniques.

Wet mitigation techniques remove a significant amount of products of combustion, whereas dry mitigation techniques only remove a portion of this contamination. Techniques involving blowing air onto ensembles or ensemble elements, such as with a leaf blower, are not effective and can redistribute contaminates at the scene and create inhalation hazards for unprotected members, and therefore should be avoided. See Fent, Kenneth W., et al., "Contamination of firefighter personal protective equipment and skin and the effectiveness of decontamination procedures."

If used, dry mitigation techniques should be performed by brushing debris from the exterior of ensembles and ensemble elements with a soft bristle brush prior to removal. Results are best by starting at the top of the ensemble and working downward.

Wet mitigation techniques should be performed by gently rinsing the exterior of ensembles and ensemble elements using low-pressure and low-volume-flow water. A mild detergent can be used to aid wet mitigation, followed by gentle rinsing. Heavy scrubbing or spraying with high-pressure water jets, such as a power washer, should be avoided.

There are several means by which wet mitigation techniques can be carried out. One method is to use a reducer from the apparatus pump panel to supply a small hose line, such as a forestry hose or a garden hose with an adjustable nozzle, at low pressure and low volume. Caution should be used when using ordinary fire hoses and nozzles for this technique where the lowest possible flow rate is used. Most departments have a booster line or trash line that is usually ¾ in. (19 mm) or 1 in. (25 mm) in diameter that can be applied at a low pressure [less than 30 psi (207 kPa)]. Portable decontamination showers that conform to ANSI/ISEA 113, *American National Standard for Fixed and Portable Decontamination Shower Units,* can also be used and can assist where weather, modesty, or other issues arise.

Wet mitigation should start at the top of the user's ensemble and move downward. Where necessary, a soft bristle brush can be used to gently scrub the ensemble or ensemble elements during the wet mitigation process. The important aspects of the wet mitigation technique are that the spray be light, not soak through the clothing, and be able to be applied over the entire member, as the goal is to remove surface contamination. Wet mitigation techniques cannot remove interior layer soiling or contamination.

It is further recommended that a mild detergent be used as an aid in wet mitigation where the surfactant in the detergent is helpful for removing exterior soils. Where a mild detergent is used, it should be followed by gentle rinsing of the ensemble or ensemble elements.

Organizations performing wet mitigation should apply procedures that take the runoff of any contaminated rinse water into consideration to minimize the spread of contamination to the environment.

If used in combination, dry mitigation should precede wet mitigation.

PER procedures should require members being decontaminated to remain in full PPE with face piece donned and breathing air on. Members performing decontamination should be in PPE appropriate to the ongoing risk assessment.

During PER actions, the use of a brush or any other abrasive cleaning devices on radiant reflective outer shells and other such components of protective ensembles and ensemble elements should not be permitted.

A.7.7 Fire scenes, by their nature, are dangerous places. Fire investigators have an obligation to themselves and others, such as other investigators, equipment operators, laborers, property owners, and attorneys, who could be endangered at fire scenes during the investigation process. Section 7.7 provides investigators with an overview and some basic recommendations concerning fireground contamination control. Investigators should refer to NFPA 921 for further information. The fireground atmosphere encountered by fire and explosion investigators as part of their normal work routine changes rapidly with time, might contain a combination of multiple respiratory hazards, and can be immediately dangerous to life and health (IDLH). The inhalation of harmful dusts, toxic gases, and vapors at fire and explosion scenes is a common hazard to investigators who typically arrive to initiate their investigation after fire suppression and overhaul operations are completed.

A.7.7.1 The hazards to fire investigators are not just through aspiration and absorption but also through ingestion, so it is essential that eating and drinking occur away from the incident scene after contaminated gear is removed and face and hands are washed with soap and water or, at a minimum, a wet wipe if soap and water are not available.

A.7.7.2 Decontamination efforts can be reduced through the use of outer disposable garments such as coveralls and latex booties over footwear.

A.7.7.3 If fire investigators opt to wash their clothing at home, contaminated clothing should not be washed with other "clean" clothing to avoid the potential for cross-contamination. Fire investigators should also consider using a commercial, specialty laundry service to clean potentially contaminated clothing. Such services offer the best options for removing potentially harmful contaminants from clothing.

A.7.7.4 The basic PER process should be implemented in accordance with this standard and any specific manufacturer's recommendations for equipment, such as respirators.

A.7.7.5 Additional guidance concerning respirators and the responsibilities of the employer and employee are contained in 29 CFR 1910.134 and NFPA 1550, NFPA 1404, NFPA 1852, and NFPA 1981.

A.7.7.8 Specific consideration should be made to clean the paws of K-9 dogs.

A.7.8 No smoke is good smoke. This includes smoke from pallets and hay, which are commonly used in any of the structures defined in NFPA 1403.

Live fire training exercises conducted in a structure designed for and utilizing propane props do not need to meet the requirements of Chapter 7.

Contamination control procedures should be practiced during training as they would be utilized during fireground

operations, incorporating repetition to instill muscle memory so that members use them on a regular basis.

A.8.1 Chapter 8 establishes contamination control practices for PPE in terms of 11 specific elements individually addressed in Section 8. Chapter 8 primarily addresses contamination control as related to structural firefighting. Most of the information is related to existing requirements in NFPA 1550, NFPA 1584, and NFPA 1852. Chapter 8 does not address contamination control requirements related to PPE exposure to infectious agents *(see NFPA 1581)*, wildland firefighting *(see NFPA 1877)*, special operations *(see NFPA 1855)*, and hazardous materials and biological agents *(see NFPA 1891)*. The 11 specific elements in Chapter 8 include the following:

(1) Description of the organizational framework for the contamination control program to meet the requirements of this standard, including the identification of the members with overall responsibility and accountability, program goals, key metrics, resources, budget, project management processes and tools, and other related plan elements
(2) Highlight of department obligations to minimize public and member exposure to soiled or contaminated PPE
(3) Considerations for PPE component evaluations and integration, and for providing members with redundant PPE to maintain cleanliness throughout a shift or campaign
(4) Preactivity assessments of compatibility, interfaces, cleanliness, and availability of backups
(5) Necessity of wearing appropriate PPE at each job assignment on the fireground, location and timing of donning PPE, importance of interface elements, and wearing appropriate PPE throughout the response
(6) Approach for deciding the handling, cleaning, and disposition of ensemble elements specific to the types of contamination encountered as well as PPE PER practices
(7) Contaminated doffing techniques appropriate for the type of contamination encountered as well as the need to separate and control PPE after doffing
(8) Decision tree to determine the appropriate level of advanced or specialized cleaning postincident, including the need to appropriately separate PPE components to mitigate cross-contamination in the wash
(9) Storage of PPE to avoid contamination of ESO storage areas
(10) Documentation of exposures and cleaning by department quartermaster or firefighter
(11) Disposal of contaminated PPE in accordance with NFPA 1550 and manufacturer's instructions

A.8.3.4 Some limited exceptions to 8.3.4 can be permitted for specific types of responses. For example, wildland firefighters deployed in remote areas might need to use public laundromats where precautions are followed in accordance with Chapter 7 of NFPA 1877.

A.8.4.1.1 As part of the hazard and risk assessment, the ESO should assess the extent to which members might be exposed to products of combustion and other hazardous material at an incident scene to account for specific PPE needs, such as thermal and physical fireground hazard protection, functional and ergonomic performance, and contamination control. Contamination control factors include both minimizing exposure to fireground and emergency scene contaminants and how PPE can be cleaned and decontaminated.

NFPA 1550 identifies contamination control as an exposure risk to firefighters and other response personnel.

A.8.4.1.2 Contamination control procedures for PPE used in different incidents are shown in Table A.8.4.1.2(a).

The applicability of specific requirements in this Chapter 8 depends on the type of PPE as shown in Table A.8.4.1.2(b).

A.8.4.4 ESOs should identify the amount of PPE components with consideration to sizes needed and typical fire call volume appropriate for the given station or department.

A.8.5.1.1 It is recommended that members pair off and observe each other kneeling, squatting, raising arms overhead and out to the side, and lifting each leg high as a form of dynamic fit test. Specific attention should be paid to areas around the SCBA facepiece, hood, helmet, coat, between coat sleeves and gloves, between pant legs and footwear, and between coat and pants, as well as any closures, particularly the front coat closure.

A.8.5.3 The ESO should develop contingency plans to have backup PPE available, such as a second set of PPE, or spare or rental gear in the event that PPE becomes contaminated and removed from service for cleaning and decontamination.

If a member does not have access to in-service PPE, the member is also out of service.

A.8.11 In NFORS, the first and second sets of gear are in the system to identify gear that has been exposed. This type of documentation is one of the benefits of tracking gear in NFORS.

A.8.12.1 The ESO should reference all available resources to determine the best options for minimizing contamination.

Table A.8.4.1.2(a) Contamination Control Procedures for PPE by Incident

Type of Incident	Reusable PPE with Barrier	Reusable PPE w/o Barrier	Disposable	Special Considerations
Structural firefighting	Sections 8.4–8.12	—	—	—
Wildland firefighting	—	Section 8.13	—	Section 8.13
Fire investigation	Section 8.14	Section 8.14	Section 8.14	Section 8.14
EMS	—	Section 8.15	—	Section 8.15
Law enforcement	—	Section 8.16	—	Section 8.16
Technical rescue	Section 8.17	Section 8.17	—	Section 8.17

Table A.8.4.1.2(b) Applicability of Specific Requirements to PPE for Contamination Control

Section	Reusable PPE with Barrier	Reusable PPE w/o Barrier	Disposable
8.5 Preresponse Activities for PPE	X	X	X
8.6 On-Scene Activities	X	X	X
8.7 Immediate Postincident Analysis and Disposition Activities	X		
8.8 Doffing of PPE	X	X	X
8.9 Determination of Postincident Cleaning and Inspection	X	X	
8.10 Storage	X	X	
8.11 Documentation	X	X	X
8.12 Disposal	X	X	X

A.8.14 NFPA 1877 includes a decision tool for wildland firefighting PPE similar to those decision tools found in NFPA 1851.

Most wildland firefighting PPE does not have a moisture barrier, so PER actions might need to be modified or forgone in the field.

Contaminated doffing methods need to be developed specifically for wildland PPE and should consider the need to clean hands, neck, and face prior to doffing PPE, and donning nitrile gloves before removing layers of PPE.

Special consideration should be given to wildland members who might be in the field for multiple days wearing the same PPE, oftentimes up to 14 days. Because it is unlikely for members to carry 14 sets of PPE, the PPE will likely have to be cleaned in the field.

It might be possible to clean PPE at a facility located within the field command staging area. Remote camps might have limited access to cleaning facilities, and therefore must wait to clean PPE.

In such cases, the decision tree *[see Figure 7.1.1.2(a) of NFPA 1851]* should be carefully reviewed, particularly where contaminated PPE that cannot be cleaned, decontaminated, disinfected, or sanitized must be condemned, retired, or disposed.

Storage requirements outlined in Chapter 9 of NFPA 1877 focus on storing clean, dry PPE outside of direct or indirect sunlight in well-ventilated areas and outside of airtight containers.

Planning and preparation are needed to maintain such conditions for PPE transported to, from, and during deployment.

Appendix B of NFPA 1877 contains sample inspection forms.

A.8.15 Wherever PPE is worn to provide protection from a hazardous environment, the fire investigator should be trained in the donning, doffing, limitations, use, and decontamination of such equipment to ensure that it is worn and functioning as intended.

Fire investigators should be aware of the need for APR or SCBA use in the post-fire environment outlined in NFPA 1550. Additional guidance can be found in Chapter 13 of NFPA 921.

A.8.16 Additional considerations might include differentiating between reusable and disposable PPE, and practicing contaminated doffing and isolation on-scene.

A.8.18 Technical rescue ESOs should have backup sets of clean technical rescue PPE for all members.

Only dry PER actions should be conducted on single-layer technical rescue PPE. A modified PER procedure should be developed because technical rescue PPE does not have a moisture barrier.

Changes in contaminated doffing procedures designed for structural firefighting PPE can be adapted for technical rescue PPE.

A.8.19 The ESO should reference established procedures for the anticipated exposures of the canine, including equipment worn to prevent cross contamination.

A.9.3 The Swedish Civil Contingencies Agency introduced a multifactorial system to manage firefighter exposure to unknown chemical substances. The system is called the Skellefteå Model and is implemented through three factors: tools, routines and workflows, and knowledge and insight. Of particular interest is the routine and workflows component. This includes the transportation of PPE to and from incident scenes, routines on scene, storing equipment after incidents, handling potentially contaminated equipment at the ESF, and methods of decontamination of equipment and personnel. ESOs wishing to establish comprehensive contamination control procedures are advised to look to the Skellefteå Model as an example of a comprehensive, evidence-based, and proven system.

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