NFPA 1500™

Standard on Fire Department Occupational Safety, Health, and Wellness Program

2021

NFPA®

IMPORTANT NOTICES AND DISCLAIMERS CONCERNING NFPA® STANDARDS

NFPA® codes, standards, recommended practices, and guides ("NFPA Standards"), of which the document contained herein is one, are developed through a consensus standards development process approved by the American National Standards Institute. This process brings together volunteers representing varied viewpoints and interests to achieve consensus on fire and other safety issues. While the NFPA administers the process and establishes rules to promote fairness in the development of consensus, it does not independently test, evaluate, or verify the accuracy of any information or the soundness of any judgments contained in NFPA Standards.

The NFPA disclaims liability for any personal injury, property, or other damages of any nature whatsoever, whether special, indirect, consequential or compensatory, directly or indirectly resulting from the publication, use of, or reliance on NFPA Standards. The NFPA also makes no guaranty or warranty as to the accuracy or completeness of any information published herein.

In issuing and making NFPA Standards available, the NFPA is not undertaking to render professional or other services for or on behalf of any person or entity. Nor is the NFPA undertaking to perform any duty owed by any person or entity to someone else. Anyone using this document should rely on his or her own independent judgment or, as appropriate, seek the advice of a competent professional in determining the exercise of reasonable care in any given circumstances.

The NFPA has no power, nor does it undertake, to police or enforce compliance with the contents of NFPA Standards. Nor does the NFPA list, certify, test, or inspect products, designs, or installations for compliance with this document. Any certification or other statement of compliance with the requirements of this document shall not be attributable to the NFPA and is solely the responsibility of the certifier or maker of the statement.

REVISION SYMBOLS IDENTIFYING CHANGES FROM THE PREVIOUS EDITION

Text revisions are shaded. A Δ before a section number indicates that words within that section were deleted and a Δ to the left of a table or figure number indicates a revision to an existing table or figure. When a chapter was heavily revised, the entire chapter is marked throughout with the Δ symbol. Where one or more sections were deleted, a • is placed between the remaining sections. Chapters, annexes, sections, figures, and tables that are new are indicated with an *N*.

Note that these indicators are a guide. Rearrangement of sections may not be captured in the markup, but users can view complete revision details in the First and Second Draft Reports located in the archived revision information section of each code at www.nfpa.org/docinfo. Any subsequent changes from the NFPA Technical Meeting, Tentative Interim Amendments, and Errata are also located there.

ALERT: THIS STANDARD HAS BEEN MODIFIED BY A TIA OR ERRATA

Users of NFPA codes, standards, recommended practices, and guides ("NFPA Standards") should be aware that NFPA Standards may be amended from time to time through the issuance of a Tentative Interim Amendment (TIA) or corrected by Errata. An official NFPA Standard at any point in time consists of the current edition of the document together with any TIAs and Errata then in effect.

To determine whether an NFPA Standard has been amended through the issuance of TIAs or corrected by Errata, go to www.nfpa.org/docinfo to choose from the list of NFPA Standards or use the search feature to select the NFPA Standard number (e.g., NFPA 13). The document information page provides up-to-date document-specific information as well as postings of all existing TIAs and Errata. It also includes the option to register for an "Alert" feature to receive an automatic email notification when new updates and other information are posted regarding the document.

ADDITIONAL IMPORTANT NOTICES AND DISCLAIMERS CONCERNING NFPA® STANDARDS

Updating of NFPA Standards

Users of NFPA codes, standards, recommended practices, and guides ("NFPA Standards") should be aware that these documents may be superseded at any time by the issuance of a new edition, may be amended with the issuance of Tentative Interim Amendments (TIAs), or be corrected by Errata. It is intended that through regular revisions and amendments, participants in the NFPA standards development process consider the then-current and available information on incidents, materials, technologies, innovations, and methods as these develop over time and that NFPA Standards reflect this consideration. Therefore, any previous edition of this document no longer represents the current NFPA Standard on the subject matter addressed. NFPA encourages the use of the most current edition of any NFPA Standard [as it may be amended by TIA(s) or Errata] to take advantage of current experience and understanding. An official NFPA Standard at any point in time consists of the current edition of the document, including any issued TIAs and Errata then in effect.

To determine whether an NFPA Standard has been amended through the issuance of TIAs or corrected by Errata, visit the "Codes & Standards" section at www.nfpa.org.

Interpretations of NFPA Standards

A statement, written or oral, that is not processed in accordance with Section 6 of the Regulations Governing the Development of NFPA Standards shall not be considered the official position of NFPA or any of its Committees and shall not be considered to be, nor be relied upon as, a Formal Interpretation.

Patents

The NFPA does not take any position with respect to the validity of any patent rights referenced in, related to, or asserted in connection with an NFPA Standard. The users of NFPA Standards bear the sole responsibility for determining the validity of any such patent rights, as well as the risk of infringement of such rights, and the NFPA disclaims liability for the infringement of any patent resulting from the use of or reliance on NFPA Standards.

NFPA adheres to the policy of the American National Standards Institute (ANSI) regarding the inclusion of patents in American National Standards ("the ANSI Patent Policy"), and hereby gives the following notice pursuant to that policy:

NOTICE: The user's attention is called to the possibility that compliance with an NFPA Standard may require use of an invention covered by patent rights. NFPA takes no position as to the validity of any such patent rights or as to whether such patent rights constitute or include essential patent claims under the ANSI Patent Policy. If, in connection with the ANSI Patent Policy, a patent holder has filed a statement of willingness to grant licenses under these rights on reasonable and nondiscriminatory terms and conditions to applicants desiring to obtain such a license, copies of such filed statements can be obtained, on request, from NFPA. For further information, contact the NFPA at the address listed below.

Law and Regulations

Users of NFPA Standards should consult applicable federal, state, and local laws and regulations. NFPA does not, by the publication of its codes, standards, recommended practices, and guides, intend to urge action that is not in compliance with applicable laws, and these documents may not be construed as doing so.

Copyrights

NFPA Standards are copyrighted. They are made available for a wide variety of both public and private uses. These include both use, by reference, in laws and regulations, and use in private self-regulation, standardization, and the promotion of safe practices and methods. By making these documents available for use and adoption by public authorities and private users, the NFPA does not waive any rights in copyright to these documents.

Use of NFPA Standards for regulatory purposes should be accomplished through adoption by reference. The term "adoption by reference" means the citing of title, edition, and publishing information only. Any deletions, additions, and changes desired by the adopting authority should be noted separately in the adopting instrument. In order to assist NFPA in following the uses made of its documents, adopting authorities are requested to notify the NFPA (Attention: Secretary, Standards Council) in writing of such use. For technical assistance and questions concerning adoption of NFPA Standards, contact NFPA at the address below.

For Further Information

All questions or other communications relating to NFPA Standards and all requests for information on NFPA procedures governing its codes and standards development process, including information on the procedures for requesting Formal Interpretations, for proposing Tentative Interim Amendments, and for proposing revisions to NFPA standards during regular revision cycles, should be sent to NFPA headquarters, addressed to the attention of the Secretary, Standards Council, NFPA, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101; email: stds_admin@nfpa.org.

For more information about NFPA, visit the NFPA website at www.nfpa.org. All NFPA codes and standards can be viewed at no cost at www.nfpa.org/docinfo.

NFPA 1500™

Standard on

Fire Department Occupational Safety, Health, and Wellness Program

2021 Edition

This edition of NFPA 1500™, *Standard on Fire Department Occupational Safety, Health, and Wellness Program*, was prepared by the Technical Committee on Fire Service Occupational Safety and Health and acted on by the NFPA membership during the 2020 NFPA Technical Meeting held June 8–29. It was issued by the Standards Council on August 11, 2020, with an effective date of August 31, 2020, and supersedes all previous editions.

This document has been amended by one or more Tentative Interim Amendments (TIAs) and/or Errata. See "Codes & Standards" at www.nfpa.org for more information.

This edition of NFPA 1500 was approved as an American National Standard on August 31, 2020.

Origin and Development of NFPA 1500

The first edition of NFPA 1500 was published in 1987 because there was no consensus standard for an occupational safety and health program for the fire service. Fire service organizations were being increasingly subjected to regulations developed for general industry that did not provide for many of the specific needs and concerns of an organization involved in the delivery of emergency services. Direct line-of-duty deaths were documented and reported, but there was a growing concern with the number of fire fighters who suffered disabling injuries or developed occupational diseases that had debilitating or fatal consequences. Following the first edition, revised editions were published in 1992, 1997, and 2002.

For the 2007 edition, the technical committee, working from data provided from NFPA's Data Analysis and Research Division and NIOSH Fire Fighter Investigation reports, carefully reviewed the entire document, including the associated annex material, and updated many areas to reflect current best practices. Requirements were reorganized in some areas to make the document more user-friendly.

Among the changes made were revising the section on risk management and inserting additional explanation in the annex. A new section on appointment of a health and safety officer was added, and sections that duplicated the responsibilities of the health and safety officer in NFPA 1521, *Standard on Operations and Training for Technical Search and Rescue Incidents*, were removed.

Chapter 5 was reorganized and revised to reflect not only the need of members to have skills and knowledge in performing day-to-day tasks but also the need for ongoing professional development.

In Chapter 6, requirements and annex material were added to support improved vehicle response operations with an emphasis on safe arrival at the scene.

Requirements for providing and using protective ensembles appropriate for technical rescue operations and chemical and biological terrorism incidents that went into the 2002 edition as a TIA were updated and incorporated, as were other requirements for personal protective ensembles.

New sections on traffic incidents, establishing control zones, and fitness for duty evaluations were added.

For the 2013 edition, the committee updated many of the references and referenced materials to ensure consistency between this document and other projects. Some of those other projects had to do with personal protective equipment (PPE), fire department apparatus, and respiratory protection. The committee included new requirements for the training, use, and limitations of PPE. The committee also developed new requirements to include not only the ensemble but also ensemble elements, which meant anything added to the ensemble as part of the requirements. The cleaning and care of PPE as well as station/work uniforms was also addressed with new or updated

requirements. For fire department apparatus, the committee brought the related requirements in this document in line with requirements in the respective projects. Some issues that were addressed were the inclusion of a vehicle data recorder (VDR) and a driver training program and requirements, as well as requirements for the wearing of helmets in an enclosed cab. Another issue was unintentional hose deployments while the fire department apparatus was driving on roadways. The committee developed text to ensure that the fire department took steps to ensure that this would not happen. The committee also looked at the issue of buddy breathing as it relates to self-contained breathing apparatus (SCBA) use, and it developed cleaner text around the use of a buddy breathing system. The committee included new requirements stressing the need for a risk assessment to be conducted at every incident based on the nature of the incident and to also recognize the need for specialized crew members based on that incident. Another important update made in the 2013 edition was the use of the term *mayday* as a requirement when a fire department member finds him- or herself requiring immediate assistance. Lastly, the committee rewrote Chapters 11 and 12, both of which concern fire fighter health and wellness and exposure to atypical stressful events.

For the 2018 edition, the committee made several significant updates, including ruling out the approved use of external riding positions in wildland apparatus from Section 14.4 of NFPA 1906, *Standard for Wildland Fire Apparatus*. The committee also chose to strengthen the language prohibiting riding on any external section of an apparatus and requiring all occupants to be seat belted in vehicles. Also included was a section requiring the provision of appropriately fitted ballistic protection for any department members who respond to and/or are exposed to risks during civil unrest, active shooter incidents, or similar events where there are reasonably foreseen threats. Language requiring unified command for the purpose of managing incidents was revised and strengthened. The committee was reviewing research projects being conducted for the next revisions of the standard, but because these projects were incomplete, revisions were not made to this 2018 edition. Some of those research projects concern PPE, fire department apparatus, and respiratory protection. The committee included new requirements for the training, use, and limitations of PPE. The committee developed new requirements to include not only the ensemble but also ensemble elements, which would include anything that has been added to the ensemble as part of the requirements. The cleaning and care of PPE as well as station/work uniforms was also addressed with new or updated requirements. Lastly, as with the 2013 edition, the committee rewrote Chapters 11 and 12, both of which cover fire fighter health and wellness and exposure to atypical stressful events, an ever-evolving area.

For the 2021 edition, the technical committee has used the latest research and information about cleaning of equipment and personnel to enhance those sections of the standard. In Chapter 14, the term *preliminary exposure reduction* provides requirements that include science-based techniques for fire departments and their members to clean equipment and themselves after an exposure to a routine fire incident. Preliminary exposure reduction is separate from decontamination from a hazardous materials incident. Along those lines, the technical committee added more exposure reporting and tracking requirements for members and departments. It is intended that these requirements will create detailed records for members of when and how long they were exposed to contaminants — records that could assist in future research, medical needs, diagnoses, and more.

Technical Committee on Fire Service Occupational Safety and Health

Randy J. Krause, *Chair*
Port of Seattle Fire Department, WA [E]

Christina M. Baxter, Emergency Response Tips, LLC, VA [SE]

David T. Bernzweig, Columbus (OH) Division of Fire, OH [L]
Rep. Columbus Firefighters Union

Sandy Bogucki, Yale University Emergency Medicine, CT [SE]

James E. Brinkley, International Association of Fire Fighters, DC [L]
Rep. International Association of Fire Fighters

Dennis R. Childress, Orange County Fire Authority, CA [U]
Rep. California State Firefighters Association

David W. Dodson, Response Solutions LLC, CO [SE]
Rep. Fire Department Safety Officers Association

Christopher A. Garrett, City of Owasso, OK [M]
Rep. International Fire Service Training Association

Stanley Haimes, UCF College of Medicine, FL [SE]

Scott D. Kerwood, Hutto Fire Rescue, TX [E]
Rep. International Association of Fire Chiefs

J. Roger Lackore, REV Fire Group, WI [M]
Rep. Fire Apparatus Manufacturers Association

Murrey E. Loflin, National Institute for Occupational Safety and Health, WV [RT]

Joseph McHugh, Fire Department City of New York, NY [U]
Rep. Fire Department City of New York

Steven M. Moffatt, Public Safety Medical, IN [SE]

Paul J. Napoli, Association of Fire Districts of the State of New York, NY [U]
Rep. Association of Fire Districts/State of New York

Robert D. Neamy, Gardnerville, NV [M]
Rep. National Incident Management System Consortium

Christopher W. Norris, Westhampton Fire Department, MA [E]

Charles J. Popp, III, Boston Fire Department, MA [U]

David J. Prezant, Fire Department City of New York, NY [E]
Rep. Fire Department City of New York

Daniel G. Samo, Northwestern Medical Group, IL [SE]

Andrew G. Schwartz, LION Group, Inc., OH [M]

Denise L. Smith, Skidmore College, NY [SE]

Donald F. Stewart, Medocracy Inc./Fairfax County Fire and Rescue, VA [E]

Philip C. Stittleburg, La Farge Fire Department, WI [U]
Rep. National Volunteer Fire Council

Susan Tamme, Tampa Fire Rescue Department, FL [L]
Rep. International Association of Women in Fire and Emergency Services

Fred C. Terryn, US Department of the Air Force, FL [U]

John Tippett, National Fallen Firefighters Foundation, MD [C]

Ronnie Villanueva, Los Angeles Fire Department, CA [U]

Teresa Wann, Santa Ana College, CA [SE]

Alternates

Gregg Avery, Los Angeles Fire Department, CA [U]
(Alt. to Ronnie Villanueva)

Kurt Becker, Clayton, Missouri Fire Department, MO [L]
(Alt. to James E. Brinkley)

Brian Carlson, University of Cincinnati, OH [SE]
(Voting Alt.)

Wesley D. Chestnut, Spartan Motors, Inc., MI [M]
(Alt. to J. Roger Lackore)

Bradd K. Clark, Ocala Fire Rescue, FL [M]
(Alt. to Christopher A. Garrett)

Kenneth Desmond, Bath, ME [U]
(Alt. to Philip C. Stittleburg)

Hayley Fudge, LION Group, Inc., OH [M]
(Alt. to Andrew G. Schwartz)

Shawn Oke, Albemarle Fire Department, NC [E]
(Alt. to Scott D. Kerwood)

Jerome E. Ozog, Volunteer Firemen's Insurance Services, Inc., PA [I]
(Voting Alt.)

Paul Parrish, Austin Fire Wellness, TX [SE]
(Alt. to Sandy Bogucki)

Jack E. Reall, Columbus (OH) Division of Fire, OH [L]
(Alt. to David T. Bernzweig)

Mario D. Rueda, San Marino Fire Department, CA [E]
(Voting Alt.)

Jay L. Tarley, National Institute for Occupational Safety and Health, WV [RT]
(Alt. to Murrey E. Loflin)

Eric Valliere, Scottsdale Fire Department, AZ [SE]
(Alt. to David W. Dodson)

Nonvoting

William R. Hamilton, US Department of Labor, DC [E]

Andrew Levinson, US Department of Labor, DC [E]
Rep. Occupational Safety and Health Administration

John Montes, NFPA Staff Liaison

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 safety and incident command in the working environment of the fire service, not including hazardous materials or cross functional events. The committee shall also have responsibility for documents related to medical requirements for firefighters, and the professional qualifications for fire department safety officer. It shall coordinate its work with NFPA technical committees dealing with emergency responder safety and wellness.

Contents

NFPA 1500

Standard on

Fire Department Occupational Safety, Health, and Wellness Program

2021 Edition

IMPORTANT NOTE: This NFPA document is made available for use subject to important notices and legal disclaimers. These notices and disclaimers appear in all publications containing this document and may be found under the heading "Important Notices and Disclaimers Concerning NFPA Standards." They can also be viewed at www.nfpa.org/disclaimers or obtained on request from NFPA.

UPDATES, ALERTS, AND FUTURE EDITIONS: New editions of NFPA codes, standards, recommended practices, and guides (i.e., NFPA Standards) are released on scheduled revision cycles. This edition may be superseded by a later one, or it may be amended outside of its scheduled revision cycle through the issuance of Tentative Interim Amendments (TIAs). An official NFPA Standard at any point in time consists of the current edition of the document, together with all TIAs and Errata in effect. To verify that this document is the current edition or to determine if it has been amended by TIAs or Errata, please consult the National Fire Codes® Subscription Service or the "List of NFPA Codes & Standards" at www.nfpa.org/docinfo. In addition to TIAs and Errata, the document information pages also include the option to sign up for alerts for individual documents and to be involved in the development of the next edition.

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 G.

Chapter 1 Administration

1.1 Scope. This standard shall contain minimum requirements for a fire service–related occupational safety, health, and wellness program.

1.2 Purpose.

1.2.1 The purpose of this standard shall be to specify the minimum requirements for an occupational safety, health, and wellness program for a fire department.

1.2.2 This standard shall specify safety requirements for those members involved in rescue, fire suppression, emergency medical services, hazardous materials operations, special operations, fire investigations, fire inspections, and related activities.

1.2.3* The authority having jurisdiction shall identify which performance objectives of this standard existing programs or policies meet.

1.2.4 Nothing herein shall be intended to restrict any jurisdiction from exceeding these minimum requirements.

1.3 Application.

1.3.1 The requirements of this standard shall be applicable to organizations providing rescue, fire suppression, emergency medical services, hazardous materials mitigation, special operations, fire investigations, fire inspections, and other emergency services, including public, military, private, and industrial fire departments.

1.3.2 This standard shall not apply to industrial fire brigades that might also be known as emergency brigades, emergency response teams, fire teams, plant emergency organizations, or mine emergency response teams.

1.4 Equivalency.

1.4.1* The authority having jurisdiction shall be permitted to approve an equivalent level of qualifications for the requirements specified in Chapter 5 of this standard.

1.4.2 The fire department shall provide technical documentation to demonstrate equivalency.

1.5 Adoption Requirements.

1.5.1* When this standard is adopted by a jurisdiction, the authority having jurisdiction (AHJ) shall set a date or dates for achieving compliance with the requirements of this standard.

1.5.2* The AHJ shall be permitted to establish a phase-in schedule for compliance with specific requirements of this standard.

1.5.3 The fire department shall adopt a risk management plan as specified in Section 4.2 of this standard.

1.5.3.1 This risk management plan shall include a written plan for compliance with this standard.

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.

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

NFPA 10, *Standard for Portable Fire Extinguishers,* 2018 edition.

NFPA 96, *Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations,* 2017 edition.

NFPA *101®, Life Safety Code®,* 2018 edition.

NFPA 472, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents,* 2018 edition.

NFPA 473, *Standard for Competencies for EMS Personnel Responding to Hazardous Materials/Weapons of Mass Destruction Incidents,* 2018 edition.

NFPA 1001, *Standard for Fire Fighter Professional Qualifications,* 2019 edition.

NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications,* 2017 edition.

NFPA 1003, *Standard for Airport Fire Fighter Professional Qualifications,* 2019 edition.

NFPA 1006, *Standard for Technical Rescue Personnel Professional Qualifications,* 2017 edition.

NFPA 1021, *Standard for Fire Officer Professional Qualifications,* 2020 edition.

NFPA 1031, *Standard for Professional Qualifications for Fire Inspector and Plan Examiner,* 2014 edition.

NFPA 1033, *Standard for Professional Qualifications for Fire Investigator,* 2014 edition.

NFPA 1051, *Standard for Wildland Firefighting Personnel Professional Qualifications,* 2020 edition.

NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications,* 2017 edition.

NFPA 1091, *Standard for Traffic Control Incident Management Personnel Professional Qualifications,* 2019 edition.

NFPA 1143, *Standard for Wildland Fire Management,* 2018 edition.

NFPA 1221, *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems,* 2019 edition.

NFPA 1403, *Standard on Live Fire Training Evolutions,* 2018 edition.

NFPA 1404, *Standard for Fire Service Respiratory Protection Training,* 2018 edition.

NFPA 1407, *Standard for Training Fire Service Rapid Intervention Crews,* 2020 edition.

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

NFPA 1521, *Standard for Fire Department Safety Officer Professional Qualifications,* 2020 edition.

NFPA 1561, *Standard on Emergency Services Incident Management System and Command Safety,* 2020 edition.

NFPA 1581, *Standard on Fire Department Infection Control Program,* 2015 edition.

NFPA 1582, *Standard on Comprehensive Occupational Medical Program for Fire Departments,* 2018 edition.

NFPA 1583, *Standard on Health-Related Fitness Programs for Fire Department Members,* 2015 edition.

NFPA 1584, *Standard on the Rehabilitation Process for Members During Emergency Operations and Training Exercises,* 2015 edition.

NFPA 1670, *Standard on Operations and Training for Technical Search and Rescue Incidents,* 2017 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 1720, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer 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 1852, *Standard on Selection, Care, and Maintenance of Open-Circuit Self-Contained Breathing Apparatus (SCBA),* 2019 edition.

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

NFPA 1901, *Standard for Automotive Fire Apparatus,* 2016 edition.

NFPA 1906, *Standard for Wildland Fire Apparatus,* 2016 edition.

NFPA 1911, *Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Emergency Vehicles,* 2017 edition.

NFPA 1912, *Standard for Fire Apparatus Refurbishing,* 2016 edition.

NFPA 1917, *Standard for Automotive Ambulances,* 2019 edition.

NFPA 1925, *Standard on Marine Fire-Fighting Vessels,* 2018 edition.

NFPA 1931, *Standard for Manufacturer's Design of Fire Department Ground Ladders,* 2020 edition.

NFPA 1932, *Standard on Use, Maintenance, and Service Testing of In-Service Fire Department Ground Ladders,* 2020 edition.

NFPA 1936, *Standard on Rescue Tools,* 2020 edition.

NFPA 1951, *Standard on Protective Ensembles for Technical Rescue Incidents,* 2020 edition.

NFPA 1952, *Standard on Surface Water Operations Protective Clothing and Equipment,* 2015 edition.

NFPA 1961, *Standard on Fire Hose,* 2020 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 1964, *Standard for Spray Nozzles and Appliances,* 2018 edition.

NFPA 1971, *Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting,* 2018 edition.

NFPA 1975, *Standard on Emergency Services Work Clothing Elements,* 2019 edition.

NFPA 1977, *Standard on Protective Clothing and Equipment for Wildland Fire Fighting,* 2016 edition.

NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services,* 2019 edition.

NFPA 1982, *Standard on Personal Alert Safety Systems (PASS),* 2018 edition.

NFPA 1983, *Standard on Life Safety Rope and Equipment for Emergency Services,* 2017 edition.

NFPA 1984, *Standard on Respirators for Wildland Fire-Fighting Operations,* 2016 edition.

NFPA 1986, *Standard on Respiratory Protection Equipment for Tactical and Technical Operations,* 2017 edition.

NFPA 1989, *Standard on Breathing Air Quality for Emergency Services Respiratory Protection,* 2019 edition.

NFPA 1991, *Standard on Vapor-Protective Ensembles for Hazardous Materials Emergencies and CBRN Terrorism Incidents,* 2016 edition.

NFPA 1992, *Standard on Liquid Splash–Protective Ensembles and Clothing for Hazardous Materials Emergencies,* 2018 edition.

NFPA 1994, *Standard on Protective Ensembles for First Responders to Hazardous Materials Emergencies and CBRN Terrorism Incidents,* 2018 edition.

NFPA 1999, *Standard on Protective Clothing and Ensembles for Emergency Medical Operations,* 2018 edition.

NFPA 3000™, *Standard for an Active Shooter/Hostile Event Response (ASHER) Program,* 2021 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 Z87.1, *Practice for Occupational and Educational Eye and Face Protection*, 2003.

ANSI Z88.2, *Practices for Respiratory Protection*, 1992.

ANSI 107, *American National Standard for High-Visibility Safety Apparel and Accessories*, 2015.

• *N* **2.3.2 UL Publications.** Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

UL 325, *ANSI/CAN/UL Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems*, 2017.

Δ 2.3.3 US Government Publications. US Government Publishing Office, 732 North Capitol Street, NW, Washington, DC 20401-0001.

Americans with Disabilities Act (ADA), 2008.

Fair Labor Standards Act (FLSA) , 2011.

NIOSH *Standard for Chemical, Biological, Radiological, and Nuclear (CBRN) Open Circuit Self-Contained Breathing Apparatus (SCBA)*, December 2001.

OSHA 3110, *Access to Medical and Exposure Records*, 2001.

Title 29, Code of Federal Regulations, Part 1910.132, "Personal Protective Equipment."

Title 29, Code of Federal Regulations, Part 1910.134, "Respiratory Protection."

Title 29, Code of Federal Regulations, Part 1910.1020, "Toxic and Hazardous Substances."

Title 42, Code of Federal Regulations, Part 84, "Approval of Respiratory Protective Devices."

Δ 2.3.4 Other Publications.

Merriam-Webster's Collegiate Dictionary, 11th edition, Merriam-Webster, Inc., Springfield, MA, 2003.

•

Δ 2.4 References for Extracts in Mandatory Sections.

NFPA 1, *Fire Code*, 2018 edition.

NFPA 472, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, 2018 edition.

NFPA 600, *Standard on Facility Fire Brigades*, 2015 edition.

NFPA 921, *Guide for Fire and Explosion Investigations*, 2017 edition.

NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications*, 2017 edition.

NFPA 1006, *Standard for Technical Rescue Personnel Professional Qualifications*, 2017 edition.

NFPA 1404, *Standard for Fire Service Respiratory Protection Training*, 2018 edition.

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

NFPA 1521, *Standard for Fire Department Safety Officer Professional Qualifications*, 2015 edition.

NFPA 1561, *Standard on Emergency Services Incident Management System and Command Safety*, 2014 edition.

NFPA 1582, *Standard on Comprehensive Occupational Medical Program for Fire Departments*, 2018 edition.

NFPA 1600®, Standard on Continuity, Emergency, and Crisis Management, 2019 edition.

NFPA 1670, *Standard on Operations and Training for Technical Search and Rescue Incidents*, 2017 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*, 2016 edition.

NFPA 1901, *Standard for Automotive Fire Apparatus*, 2016 edition.

NFPA 1971, *Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*, 2018 edition.

NFPA 1977, *Standard on Protective Clothing and Equipment for Wildland Fire Fighting*, 2016 edition.

NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services*, 2019 edition.

NFPA 1984, *Standard on Respirators for Wildland Fire-Fighting Operations*, 2016 edition.

NFPA 1991, *Standard on Vapor-Protective Ensembles for Hazardous Materials Emergencies and CBRN Terrorism Incidents*, 2016 edition.

NFPA 1994, *Standard on Protective Ensembles for First Responders to Hazardous Materials Emergencies and CBRN Terrorism Incidents*, 2018 edition.

NFPA 5000®, Building Construction and Safety Code®, 2018 edition.

Chapter 3 Definitions

3.1 General. The definitions contained in this chapter shall apply to the terms used in this standard. 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. *Merriam-Webster's Collegiate Dictionary*, 11th edition, shall be the source for the ordinarily accepted meaning.

3.2 Official NFPA 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 Shall. Indicates a mandatory requirement.

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

3.2.5 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 phrase "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 Advanced Life Support (ALS). See 3.3.68.1.

3.3.2 Aerial Device. An aerial ladder, elevating platform, or water tower that is designed to position personnel, handle materials, provide continuous egress, or discharge water. [**1901,** 2016]

3.3.3* Air Transfer. The process of transferring air from one SCBA cylinder to another SCBA cylinder of the same rated pressure capacity by connecting them together with properly designed fittings and a high-pressure transfer line.

3.3.4* Aircraft Rescue and Fire Fighting. The fire-fighting actions taken to rescue persons and to control or extinguish fire involving or adjacent to aircraft on the ground.

3.3.5 Atmosphere.

3.3.5.1* ***Hazardous Atmosphere.*** Any atmosphere that is oxygen deficient or that contains a toxic or disease-producing contaminant.

3.3.5.2 ***Oxygen-Deficient Atmosphere.*** Air atmospheres containing less than 19.5 percent oxygen by volume at one standard atmosphere pressure.

3.3.6 Basic Life Support (BLS). See 3.3.68.2.

3.3.7 Biological Terrorism Agents. Liquid or particulate agents that can consist of a biologically derived toxin or pathogen to inflict lethal or incapacitating casualties, generally on a civilian population as a result of a terrorist attack. [**1994,** 2018]

3.3.8* Candidate. A person who has submitted an application to become a member of the fire department.

3.3.9 CBRN. An abbreviation for chemicals, biological agents, and radiological particulate hazards.

3.3.10* Chemical Flash Fire. The ignition of a flammable and ignitible vapor or gas that produces an outward expanding flame front as those vapors or gases burn. This burning and expanding flame front, a fireball, will release both thermal and kinetic energy to the environment. [**1991,** 2016]

3.3.11 Chemical Terrorism Agents. Liquid, solid, gaseous, and vapor chemical warfare agents and toxic industrial chemicals used to inflict lethal or incapacitating casualties, generally on a civilian population as a result of a terrorist attack. [**1994,** 2018]

3.3.12* Clear Text. The use of plain language in radio communications transmissions.

3.3.13 Closed-Circuit SCBA. See 3.3.99.1.

3.3.14 Cold Zone. See 3.3.21.1.

3.3.15 Collapse Zone. See 3.3.21.2.

3.3.16 Communicable Disease. See 3.3.28.1.

3.3.17* 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.

3.3.18* Confined Space. An area large enough and so configured that a member can bodily enter and perform assigned work but which has limited or restricted means for entry and exit and is not designed for continuous human occupancy.

3.3.19* Contaminants. Harmful, irritating, or nuisance material foreign to the normal atmosphere.

N **3.3.20 Contaminated/Contamination.** The presence or the reasonably anticipated presence of contaminants on an item or surface.

3.3.21 Control Zones. The areas at an incident that are designated based upon safety and the degree of hazard.

3.3.21.1 ***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.

3.3.21.2 ***Collapse Zone.*** The area that is exposed to trauma, debris, and/or thrust should a building or part of a building collapse.

•

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

3.3.21.4 ***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. [**1521,** 2015]

3.3.21.5 ***Warm Zone.*** The control zone outside the hot zone where personnel and equipment decontamination and hot zone support takes place.

3.3.22 Crew. A team of two or more fire fighters.

3.3.23* Crew Resource Management (CRM). A program focused on improved situational awareness, sound critical decision-making, effective communication, proper task allocation, and successful teamwork and leadership.

3.3.24* Cryogenic Liquid. A fluid produced or stored at very low temperatures.

3.3.25 Debilitating Illness or Injury. A condition that temporarily or permanently prevents a member of the fire department from engaging in normal duties and activities as a result of illness or injury.

N **3.3.26 Decontamination.** The act of removing or neutralizing contaminants by a mechanical, chemical, thermal, or combined process.

3.3.27 Defensive Operations. See 3.3.76.1.

3.3.28 Disease.

3.3.28.1* ***Communicable Disease.*** A disease that can be transmitted from one person to another.

3.3.28.2 ***Infectious Disease.*** An illness or disease resulting from invasion of a host by disease-producing organisms such as bacteria, viruses, fungi, or parasites.

3.3.29 Drug. Any substance, chemical, over-the-counter medication, or prescribed medication that can affect the performance of the fire fighter.

3.3.30 Emergency Incident. See 3.3.60.1.

3.3.31 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.

3.3.32 Emergency Operations. See 3.3.76.2.

3.3.33 Eye Protection. See 3.3.82, Primary Eye Protection.

3.3.34* Faceshield. A protective device commonly intended to shield the wearer's face, or portions thereof, in addition to the eyes from certain hazards, depending on faceshield type.

3.3.35 Facility. See 3.3.40, Fire Department Facility.

3.3.36 Facility Fire Brigade. An organized group of employees at a facility who are knowledgeable, trained, and skilled in at least basic fire-fighting operations, and whose full-time occupation might or might not be the provision of fire suppression and related activities for their employer. [**600,** 2015]

3.3.37 Fire Apparatus. A vehicle designed to be used under emergency conditions to transport personnel and equipment or to support the suppression of fires and mitigation of other hazardous situations. [**1901,** 2016]

3.3.38 Fire Chief. The highest ranking officer in charge of a fire department.

3.3.39* 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. [**1002,** 2017]

3.3.40* Fire Department Facility. Any building or area owned, operated, occupied, or used by a fire department on a routine basis.

3.3.41 Fire Department Member. See 3.3.70, Member.

3.3.42 Fire Department Physician. A licensed doctor of medicine or osteopathy who has been designated by the fire department to provide professional expertise in the areas of occupational safety and health as they relate to emergency services. [**1582,** 2018]

3.3.43 Fire Fighting.

3.3.43.1* *Proximity Fire Fighting.* Specialized fire-fighting 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. [**1971,** 2018]

3.3.43.2 *Structural Fire Fighting.* The activities of rescue, fire suppression, and property conservation in buildings or other structures, vehicles, rail cars, marine vessels, aircraft, or like properties. [**1710,** 2016]

3.3.43.3 *Wildland Fire Fighting.* 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,** 2016]

3.3.44 Fire Shelter. An item of protective equipment configured as an aluminized tent utilized for protection, by means of reflecting radiant heat, in a fire entrapment situation.

3.3.45* Fire Suppression. The activities involved in controlling and extinguishing fires.

3.3.46* Flame Resistance (Protective Apparel). The property of a material whereby combustion is prevented, terminated, or inhibited following application of a flaming or non-flaming source of ignition, with or without subsequent removal of the ignition source.

3.3.47 Fully Enclosed Personnel Area. A driver or passenger compartment on the fire apparatus that provides total enclosure on all sides, top, and bottom and has positive latching on all access doors. [**1901,** 2016]

3.3.48 Goggle. A protective device intended to fit the face surrounding the eyes in order to shield the eyes from certain hazards, depending on goggle type.

N **3.3.49* 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.

3.3.50* Hazard. Any arrangement of materials that presents the potential for harm. [**921,** 2017]

3.3.51 Hazardous Area. An area of a structure or building that poses a degree of hazard greater than that normal to the general occupancy of the building or structure. [**5000,** 2018]

3.3.52 Hazardous Atmosphere. See 3.3.5.1.

Δ **3.3.53 Hazardous Material.** A substance (solid, liquid, or gas) or energy that when released is capable of creating harm to people, the environment, and property, including weapons of mass destruction (WMD) as defined in 18 US Code, Section 2332a, as well as any other criminal use of hazardous materials, such as illicit labs, environmental crimes, or industrial sabotage. [**472,** 2018]

3.3.54 Hazardous Materials Operations. See 3.3.76.3.

3.3.55 Health and Fitness Coordinator. The person who, under the supervision of the fire department physician, has been designated by the department to coordinate and be responsible for the health and fitness programs of the department.

3.3.56* Health and Safety Officer. The member of the fire department assigned and authorized by the fire chief as the manager of the safety, health, and wellness program.

3.3.57 Health Data Base. A compilation of records and data that relates to the health experience of a group of individuals and is maintained in a manner such that it is retrievable for study and analysis over a period of time.

3.3.58 Hot Zone. See 3.3.21.3.

3.3.59 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. [**1670,** 2017]

3.3.60 Incident.

3.3.60.1 *Emergency Incident.* Any situation to which an emergency services organization responds to deliver emergency services, including rescue, fire suppression, emergency medical care, special operations, law enforcement, and other forms of hazard control and mitigation. [**1561,** 2014]

3.3.60.2 *Rescue Incident.* An emergency incident that primarily involves the rescue of persons subject to physical danger and that can include the provision of emergency medical services.

3.3.60.3 *Traffic Incident.* An emergency road user occurrence, a natural disaster, or other unplanned event that affects or impedes the normal flow of traffic.

3.3.61 Incident Action Plan. The objectives reflecting the overall incident strategy, tactics, risk management, and member safety that are developed by the incident commander. Incident action plans are updated throughout the incident.

3.3.62 Incident Commander (IC). The individual responsible for all incident activities, including the development of strategies and tactics and the ordering and the release of resources. [**472,** 2018]

3.3.63* 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.

3.3.64* Infection Control Program. The fire department's formal policy and implementation of procedures relating to the control of infectious and communicable disease hazards where employees, patients, or the general public could be exposed to blood, body fluids, or other potentially infectious materials in the fire department work environment.

3.3.65 Infectious Disease. See 3.3.28.2.

3.3.66 Interface Component. Any material, part, or subassembly used in the construction of the compliant product that provides limited protection to interface areas.

3.3.67 Life Safety Rope. Rope dedicated solely for the purpose of supporting people during rescue, fire-fighting, other emergency operations, or during training evolutions.

3.3.68 Life Support.

3.3.68.1 ***Advanced Life Support (ALS).*** Emergency medical treatment beyond basic life support level as defined by the medical authority having jurisdiction.

3.3.68.2 ***Basic Life Support (BLS).*** Emergency medical treatment at a level as defined by the medical authority having jurisdiction.

3.3.69* Liquefied Gas. A gas that, under its charged pressure, is partially liquid at 70°F (21°C).

3.3.70* Member. A person involved in performing the duties and responsibilities of a fire department, under the auspices of the organization.

3.3.71 Member Assistance Program (MAP). A generic term used to describe the various methods used in the fire department for the control of alcohol and other substance abuse, stress, and personal problems that adversely affect member performance.

3.3.72 Member Organization. An organization formed to represent the collective and individual rights and interests of the members of the fire department, such as a labor union or fire fighters' association.

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

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

3.3.75 Offensive Operations. See 3.3.76.4.

3.3.76 Operations.

3.3.76.1* ***Defensive Operations.*** Actions that are intended to control a fire by limiting its spread to a defined area, avoiding the commitment of personnel and equipment to dangerous areas.

3.3.76.2 ***Emergency Operations.*** Activities of the fire department relating to rescue, fire suppression, emergency medical care, and special operations, including response to the scene of the incident and all functions performed at the scene.

3.3.76.3 ***Hazardous Materials Operations.*** All activities performed at the scene of a hazardous materials incident that expose fire department members to the dangers of hazardous materials.

3.3.76.4 ***Offensive Operations.*** Actions generally performed in the interior of involved structures that involve a direct attack on a fire to directly control and extinguish the fire.

3.3.76.5* ***Special Operations.*** Those emergency incidents to which the fire department responds that require specific and advanced training and specialized tools and equipment.

3.3.77 Oxygen-Deficient Atmosphere. See 3.3.5.2.

3.3.78* Particulates. Solid matter that is dispersed in air as a mixture.

N **3.3.79 Peer Supporter.** Trained members of the fire service who talk with other peers about behavioral health concerns and connect members with helpful services.

3.3.80 Personnel Accountability System. A system that readily identifies both the location and function of all members operating at an incident scene.

N **3.3.81* Power-Assisted Patient Cot.** An elevated patient conveyance device on which the primary patient is transported, also known as a transporter, gurney, stretcher, and carrier, engineered and manufactured with an automated and powered lifting system that is integrated with an ambulance mounted self-loading system.

3.3.82 Primary Eye Protection. A protective device specifically intended to shield the eyes from certain hazards while permitting vision. *(See also 3.3.34, Faceshield; 3.3.48, Goggle; and 3.3.102, Spectacles.)*

3.3.83 Procedure. An organizational directive issued by the authority having jurisdiction or by the department that establishes a specific policy that must be followed. [**1561,** 2014]

3.3.84* Protective Ensemble. Multiple elements of compliant protective clothing and equipment that when worn together provide protection from some risks, but not all risks, of emergency incident operations.

3.3.85 Proximity Fire Fighting. See 3.3.43.1.

3.3.86 Qualified Person. A person who, by possession of a recognized degree, certificate, professional standing, or skill, and who, by knowledge, training, and experience, has demonstrated the ability to deal with problems related to a particular subject matter, the work, or project. [**1451,** 2018]

3.3.87* Rapid Intervention Crew/Company (RIC). A minimum of two fully equipped personnel on site, in a ready state,

for immediate rescue of disoriented, injured, lost, or trapped rescue personnel. [**1006,** 2017]

3.3.88 Related Activities. Any and all functions that fire department members can be called upon to perform in the execution of their duties.

3.3.89 Rescue. Those activities directed at locating endangered persons at an emergency incident, removing those persons from danger, treating the injured, and providing for transport to an appropriate health care facility. *(See also 3.3.104, Technical Rescue.)*

3.3.90 Rescue Incident. See 3.3.60.2.

3.3.91 Rescue Task Force. A resource comprised of fire department and/or EMS personnel together with law enforcement personnel providing force protection, assigned and deployed in a portion of the scene that does not pose an immediate threat of active violence, but has not been deemed to be free of all possible threats of violence, to provide lifesaving interventions and rapid extraction of victims during an active violence incident.

3.3.92* Respiratory Protection Equipment (RPE). Devices that are designed to protect the respiratory system against exposure to gases, vapors, or particulates. [**1404,** 2018]

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

3.3.94 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. [**1600,** 2019]

Δ **3.3.95 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.

Δ **3.3.96* Safety Officer.** A generic title given to a member within a fire department or emergency service organization who performs the functions of a health and safety officer, an incident safety officer, or who serves as an assistant to a person in either of those positions.

3.3.97 SCBA. Abbreviation for self-contained breathing apparatus. *[See 3.3.99, Self-Contained Breathing Apparatus (SCBA).]* [**1981,** 2019]

3.3.98 Seat Belt. A two-point lap belt, a three-point lap/shoulder belt, or a four-point lap/shoulder harness for vehicle occupants designed to limit their movement in the event of an accident, rapid acceleration, or rapid deceleration by securing individuals safely to a vehicle in a seated position. *(See also 3.3.107, Vehicle Safety Harness.)*

3.3.99 Self-Contained Breathing Apparatus (SCBA). An atmosphere-supplying respirator that supplies a respirable air atmosphere to the user from a breathing air source that is independent of the ambient environment and designed to be carried by the user. [**1981,** 2019]

3.3.99.1 ***Closed-Circuit SCBA.*** A recirculation-type SCBA in which the exhaled gas is rebreathed by the wearer after the carbon dioxide has been removed from the exhalation gas and the oxygen content within the system has been restored from sources such as compressed breathing air, chemical oxygen, and liquid oxygen, or compressed gaseous oxygen. [**1981,** 2019]

3.3.100 Service Test. The regular, periodic inspection and testing of apparatus and equipment, according to an established schedule and guideline, to ensure that they are in safe and functional operating condition.

3.3.101 Special Operations. See 3.3.76.5.

3.3.102* Spectacles. A protective device intended to shield the wearer's eyes from certain hazards depending on the spectacle type.

3.3.103 Structural Fire Fighting. See 3.3.43.2.

• **3.3.104 Technical Search and Rescue.** The application of special knowledge, skills, and equipment to safely resolve unique and/or complex search and rescue situations. [**1670,** 2017]

3.3.105 Traffic Incident. See 3.3.60.3.

3.3.106 Upstream/Downstream Traffic. Traffic that is entering or approaching the incident scene (upstream); traffic that is departing or past the incident (downstream).

3.3.107 Vehicle Safety Harness. A restraint device for vehicle occupants designed to limit their movement in the event of an accident, rapid acceleration, or rapid deceleration by securing individuals safely to a vehicle either in a seated position or tethered to the vehicle. *(See also 3.3.98, Seat Belt.)*

3.3.108 Warm Zone. See 3.3.21.5.

3.3.109 Wildland Fire Fighting. See 3.3.43.3.

3.3.110 Wildland Fire-Fighting Respirator. A respirator that has been certified for providing respiratory protection during wildland fire-fighting operations by NIOSH under 42 CFR 84, "Approval of Respiratory Protective Devices," and certified as compliant with NFPA 1984. [**1984,** 2016]

Chapter 4 Fire Department Administration

4.1 Fire Department Organizational Statement.

4.1.1* The fire department shall prepare and maintain a written statement or policy that establishes the existence of the fire department, the services the fire department is authorized and expected to perform, and the basic organizational structure.

4.1.2* The fire department shall prepare and maintain written policies and standard operating procedures that document the organization structure, membership, roles and responsibilities, expected functions, emergency operations, and training requirements, including the following:

(1) The types of standard evolutions that are expected to be performed and the evolutions that must be performed simultaneously or in sequence for different types of situations
(2) The minimum number of members who are required to perform each function or evolution and the manner in which the function is to be performed in accordance with NFPA 1710 or NFPA 1720
(3) The number and types of apparatus and the number of personnel that will be dispatched to different types of incidents in accordance with NFPA 1710 or NFPA 1720

(4) The procedures that will be employed to initiate and manage operations at the scene of an emergency incident
(5) Post-incident control and mitigation of emergency scene contaminants

4.1.3 The organizational statement and procedures shall be available for inspection by members or their designated representative.

N **4.1.4** The fire department shall evaluate current trends and research to determine if policies and procedures are appropriate at least annually or following a near miss or catastrophic event.

4.1.5* Fire departments shall develop pre-incident plans as determined by the AHJ.

4.1.5.1* Fire departments shall develop a construction or demolition fire safety program(s) as determined by the AHJ.

4.2 Risk Management Plan.

4.2.1* The fire department shall develop and adopt a comprehensive written risk management plan.

Δ **4.2.2** The risk management plan shall at least cover the risks associated with the following:

(1) Administration
(2) Facilities
(3) Training
(4) Vehicle operations, both emergency and non-emergency
(5) Protective clothing and equipment
(6) Operations at emergency incidents *(see Annex C)*
(7)* Non-emergency services or activities
(8) Products of combustion, carcinogens, and other incident-related health hazards
(9) Other related activities

4.2.3* The risk management plan shall include at least the following components *(see Annex D)*:

(1) Risk identification — actual and potential hazards
(2) Risk evaluation — likelihood of occurrence of a given hazard and severity of its consequences
(3) Establishment of priorities for action — the degree of a hazard based upon the frequency and risk of occurrence
(4) Risk control techniques — solutions for elimination or mitigation of potential hazards; implementation of best solution
(5) Risk management monitoring — evaluation of effectiveness of risk control techniques

4.3 Safety and Health Policy.

Δ **4.3.1*** The fire department shall adopt an official written departmental occupational safety, health, and wellness policy that identifies specific goals and objectives for the prevention and elimination of accidents and occupational injuries; exposure to communicable disease; exposure to products of combustion, carcinogens, contaminants, and other incident-related health hazards; illnesses; and fatalities.

4.3.2 It shall be the policy of the fire department to seek and to provide for its members an occupational safety, health, and wellness program that complies with this standard.

4.3.3* The fire department shall evaluate the effectiveness of the occupational safety, health, and wellness program at least once every 3 years or following a catastrophic or near miss event.

4.3.3.1 An audit report of the findings shall be submitted to the fire chief and to the members of the occupational safety and health committee.

4.4 Roles and Responsibilities.

4.4.1 It shall be the responsibility of the fire department to research, develop, implement, and enforce an occupational safety, health, and wellness program that recognizes and reduces the inherent risks involved in the operations of a fire department.

4.4.2 The fire department shall be responsible for compliance with all applicable laws and legal requirements with respect to member safety and health.

4.4.3* The fire department shall establish and enforce rules, regulations, and standard operating procedures to meet the objectives of this standard.

4.4.4 The fire department shall be responsible for developing and implementing an accident investigation procedure.

4.4.5* All accidents, near misses, injuries, fatalities, occupational illnesses, and exposures involving members shall be investigated.

4.4.5.1 All accidents involving fire department vehicles, equipment, or fire department facilities shall be investigated.

4.4.5.2 The fire department shall take the corrective action necessary to avoid repetitive occurrences of accidents and exposure to communicable diseases.

4.4.5.3 Records of such investigations shall be kept in accordance with the applicable provisions of 4.6.1.

4.4.5.4* The fire department shall develop, adopt, and maintain a written policy related to the documentation and dissemination of information related to internal near-miss investigations and provide information to members.

4.4.6 Each individual member of the fire department shall cooperate, participate, and comply with the provisions of the occupational safety, health, and wellness program.

4.4.7 It shall be the right of each member to be protected by an effective occupational safety, health, and wellness program and to participate or be represented in the research, development, implementation, evaluation, and enforcement of the program.

4.4.8 The member organization, where such an organization exists, shall cooperate with the fire department by representing the interests and the welfare of the members in the research, development, implementation, and evaluation of the occupational safety, health, and wellness program.

4.4.8.1 The member organization shall have the right to represent the individual and collective rights of its members in the occupational safety, health, and wellness program.

4.5 Occupational Safety and Health Committee.

4.5.1* An occupational safety and health committee shall be established and shall serve the fire chief in an advisory capacity.

4.5.1.1 The committee shall include the following members:

(1) The designated fire department health and safety officer
(2) Representatives of fire department management

(3) Individual members or representatives of member organizations

4.5.1.2 The committee shall also be permitted to include other persons.

4.5.1.3 Representatives of member organizations shall be selected by their respective organizations, but other committee members shall be appointed to the committee by the fire chief.

4.5.2 The purpose of this committee shall be to conduct research, develop recommendations, and study and review matters pertaining to occupational safety and health within the fire department.

4.5.3* The committee shall hold regularly scheduled meetings and shall be permitted to hold special meetings whenever necessary.

4.5.3.1 Regular meetings shall be held at least once every 6 months.

4.5.3.2 Written minutes of each meeting shall be retained and shall be made available to all members.

4.5.4 Orientation training on best practices for safety committee processes and the duties and responsibilities of members, in addition to specific training on relevant NFPA standards governing the committee's areas of responsibility or specific tasks of individuals serving on the committee, shall be provided to the committee members by the fire department.

4.6 Records.

4.6.1* The fire department shall establish a data collection system and maintain permanent records of all accidents, injuries, illnesses, exposures to infectious agents and communicable diseases, or deaths that are job related.

4.6.1.1 The data collection system shall include the items identified in the national fire service database system.

Δ **4.6.2*** The data collection system shall also maintain overall incident exposure data, as well as individual records of any occupational exposure to known or suspected products of combustion, carcinogens, contaminants, or other incident-related health hazards; toxic products; or infectious or communicable diseases.

4.6.3 The fire department shall ensure that a confidential health record for each member and a health data base are maintained.

4.6.4* The fire department shall maintain training records for each member indicating dates, subjects covered, satisfactory completion, and, if any, certifications achieved.

4.6.5 The fire department shall ensure that inspection, maintenance, repair, and service records are maintained for all vehicles and equipment used for emergency operations and training.

4.7 Appointment of the Health and Safety Officer.

4.7.1 The fire chief shall appoint a designated fire department health and safety officer.

4.7.2 The health and safety officer shall meet the qualifications defined in NFPA 1521.

4.7.3 The fire chief shall ensure that the fire department health and safety officer is given the authority to administer the health and safety program.

4.7.4 The health and safety officer shall perform the functions defined in NFPA 1521.

4.7.5 The fire department health and safety officer shall be responsible for the management of the occupational safety, health, and wellness program.

4.7.6 The fire chief shall make available such additional safety officers and resources as required to fulfill the requirements of the occupational safety, health, and wellness program to meet the requirements of NFPA 1521.

Chapter 5 Training, Education, and Professional Development

5.1 General Requirements.

5.1.1* The fire department shall establish and maintain a training, education, and professional development program with a goal of preventing occupational deaths, injuries, and illnesses.

5.1.2 The fire department shall provide training, education, and professional development for all department members commensurate with the duties and functions that they are expected to perform.

5.1.3 The fire department shall establish training and education programs that provide new members initial training, proficiency opportunities, and a method of skill and knowledge evaluation for duties assigned to the member prior to engaging in emergency operations.

5.1.4* The fire department shall restrict the activities of new members during emergency operations until the member has demonstrated the skills and abilities to complete the tasks expected.

5.1.5 The fire department shall provide all members with training and education on the department's risk management plan.

5.1.6 The fire department shall provide all members with training and education on the department's written procedures.

5.1.7 The fire department shall provide all members with a training, education, and professional development program commensurate with the emergency medical services that are provided by the department.

5.1.8* The fire department shall provide all members with a documented training and education program that covers all assigned personal protective equipment (PPE).

5.1.8.1 Training shall comply with applicable governing standards and follow the manufacturer's instructions and guidelines to include the following topics:

(1) The organization's overall program for the selection and use of protective ensembles, ensemble elements, and SCBAs
(2) Technical data package (TDP) where applicable
(3) Proper overlap and fit
(4) Proper donning and doffing (including emergency doffing)

(5) Construction features and function
(6) Usage and performance limitations (including physiological effects on user and effects of heat transfer on the protective ensemble)
(7) Recognizing and responding to indications of protective ensemble and SCBA failure
(8) Routine inspection cleaning, maintenance, and retirement
(9) Special incident procedure operation
(10) Proper storage

5.1.8.2 Maintenance of structural and proximity protective ensembles and ensemble elements shall be completed in accordance with NFPA 1851.

5.1.8.3 Maintenance of SCBA shall be completed in accordance with NFPA 1852.

5.1.8.4 Maintenance of protective ensembles for technical rescue incidents shall be completed in accordance with NFPA 1855.

5.1.9 As a duty function, members shall be responsible to maintain proficiency in their skills and knowledge, and to avail themselves of the professional development provided to the members through department training and education programs.

5.1.10 Training programs for all members engaged in emergency operations shall include procedures for the safe exit and accountability of members during rapid evacuation, equipment failure, or other dangerous situations and events.

N **5.1.11** Rapid intervention crew (RIC) and fire-fighter self-rescue training and exercises shall be conducted in accordance with NFPA 1407.

N **5.1.12** Members conducting fire inspections shall be trained in hazard identification, risk mitigation, and PPE selection that is relevant to the hazard.

5.1.13 All members who are likely to be involved in emergency operations shall be trained in the incident management and accountability system used by the fire department.

5.2 Member Qualifications.

5.2.1 All members who engage in structural fire fighting shall meet the requirements of NFPA 1001.

5.2.2* All driver/operators shall meet the requirements of NFPA 1002.

5.2.3 All aircraft rescue fire fighters (ARFF) shall meet the requirements of NFPA 1003.

5.2.4 All fire officers shall meet the requirements of NFPA 1021.

5.2.5 All wildland fire fighters shall meet the requirements of NFPA 1051.

5.2.6* All members responding to hazardous materials incidents shall meet the operations level as required in NFPA 472.

5.2.7 All members who engage in fire investigations shall meet the requirements of NFPA 1033.

5.2.8 All members who engage in fire inspections shall meet the requirements of NFPA 1031.

5.3 Training Requirements.

5.3.1* The fire department shall adopt or develop training and education curriculums that meet the minimum requirements outlined in professional qualification standards covering a member's assigned function.

5.3.2 The fire department shall provide training, education, and professional development programs as required to support the minimum qualifications and certifications expected of its members.

5.3.3 Members shall practice assigned skill sets on a regular basis but not less than annually.

5.3.4 The fire department shall provide specific training to members when written policies, practices, procedures, or guidelines are changed and/or updated.

5.3.5* The respiratory protection training program shall meet the requirements of NFPA 1404.

5.3.6 Members who perform wildland fire fighting shall be trained at least annually in the proper deployment of an approved fire shelter.

5.3.7 All live fire training and exercises shall be conducted in accordance with NFPA 1403.

5.3.8 All training and exercises shall be conducted under the direct supervision of a qualified instructor.

5.3.9* All members who are likely to be involved in emergency medical services shall meet the training requirements of the AHJ.

5.3.10* Members shall be fully trained in the use, limitations, care, and maintenance of the protective ensembles and ensemble elements assigned to them or available for their use.

5.3.11 All members shall meet the training requirements as outlined in NFPA 1561.

5.3.12 All members shall meet the training requirements as outlined in NFPA 1581.

Δ **5.3.13** All members shall be provided initial and ongoing training in the risks associated with workplace exposure to products of combustion, carcinogens, contaminants, and other incident-related health hazards.

5.3.13.1* Members shall be trained to recognize when a workplace exposure has occurred and to know the control methods for personal decontamination, decontamination of protective clothing and equipment, and the risks of cross-contamination.

N **5.3.14** The fire department shall provide all members with training and education on behavioral health issues in the fire service to include the importance of addressing behavioral health problems, including, but not limited to, the impact of stigma associated with behavioral health and how to overcome it, substance use disorder, depression, post-traumatic stress, family and relationship concerns, factors that enhance resilience, suicide prevention, and available resources for behavioral health treatment.

N **5.3.15** The fire department shall provide all members with training and education on safe ground ladder and aerial ladder climbing in accordance with 6.1.10.

5.4 Special Operations Training.

5.4.1 The fire department shall provide specific and advanced training to members who engage in special operations as a technician.

5.4.2 The fire department shall provide specific training to members who are likely to respond to special operations incidents in a support role to special operations technicians.

5.4.3 Members expected to perform hazardous materials mitigation activities shall meet the training requirements of a technician as outlined in NFPA 472 and NFPA 1072.

5.4.4 Members expected to perform technical operations at the technician level as defined in NFPA 1670 shall meet the training requirements specified in NFPA 1006.

5.5 Member Proficiency.

5.5.1 The fire department shall develop a recurring proficiency cycle with the goal of preventing skill degradation and potential for injury and death of members.

5.5.2 The fire department shall develop and maintain a system to monitor and measure training progress and activities of its members.

5.5.3* The fire department shall provide an annual skills check to verify minimum professional qualifications of its members.

5.6 Training Activities.

5.6.1* All training and exercises shall be conducted under the direct supervision of a qualified instructor.

5.6.2* All live fire training and exercises shall be conducted in accordance with NFPA 1403.

5.6.2.1 Emergency medical services shall be provided for live fire training exercises in accordance with Section 4.11 of NFPA 1403.

5.6.3* For non–live fire training exercises, fire departments shall conduct a risk assessment to determine the appropriate emergency medical capabilities to be available at the training site.

Chapter 6 Fire Apparatus, Equipment, and Drivers/Operators

6.1 Fire Department Apparatus.

6.1.1* The fire department shall consider safety and health as primary concerns in the specification, design, construction, acquisition, operation, maintenance, inspection, and repair of all fire department apparatus.

6.1.1.1 If the fire apparatus is equipped with a vehicle data recorder, the AHJ shall develop operating procedures for uploading, monitoring, and reviewing the data.

6.1.2 All new fire apparatus shall be specified and ordered to meet the applicable requirements of NFPA 1901.

Δ **6.1.3** All new wildland fire apparatus shall be specified and ordered to meet the requirements of NFPA 1906.

6.1.4 All new automotive ambulances shall be specified and ordered to meet the requirements of NFPA 1917.

N **6.1.4.1** Fire departments that provide EMS transport shall use a power-assisted patient cot to load patients into an automotive ambulance.

N **6.1.4.2** Power-assisted patient cot or self-loading cot shall be installed, mounted, and retained in accordance with the provisions in NFPA 1917.

6.1.5 All new marine fire-fighting vessels shall be specified and ordered to meet the requirements of NFPA 1925.

6.1.6* Where tools, equipment, or respiratory protection are carried within enclosed seating areas of fire apparatus or the patient compartment of an ambulance, such items shall be secured in accordance with NFPA 1901, NFPA 1906, and NFPA 1917.

6.1.7 When fire apparatus is refurbished, it shall be specified and ordered to meet the applicable requirements of NFPA 1912.

6.1.8 Fire departments that operate their own fixed-wing or rotary aircraft for fire department operations shall provide four-point restraints for all pilots and passengers, not including any EMS patients.

6.1.8.1 Members performing hoist rescue in the passenger area of the aircraft shall be secured by a vehicle safety harness or seat belt system.

6.1.9 All apparatus shall have hose storage areas that are equipped with a positive means to prevent unintentional deployment of the hose from the top, sides, front, and rear of the hose storage area while the apparatus is under way in normal operations.

N **6.1.10** Each person ascending or descending the ladder on the aerial apparatus shall do the following:

(1) Use a ladder belt and tether that meets the requirements of NFPA 1983.
(2) Use the three points of contact climbing method — one hand and two feet or two hands and one foot in contact at all times.
(3) At high ladder angles, ascend or descend by grasping the rungs and not the handrails.

N **6.1.10.1** Each aerial apparatus shall carry correctly sized ladder belts and tethers to accommodate all members authorized to climb the ladder or ride in the platform of the apparatus.

N **6.1.10.2** Persons working on a ladder shall be anchored to a structural feature of the ladder or platform when one of the following occurs:

(1) The device is in motion.
(2) They are not actively entering or exiting the platform.
(3) They are not actively climbing or descending the ladder.

N **6.1.10.3** Personnel ascending or descending aerial or ground ladders with equipment shall have that equipment tethered to themselves in a way that allows them full use of both feet and both hands.

N **6.1.11** Fire departments shall ensure that when operating at emergency incidents, engine exhaust is directed away from members operating at the incident.

6.2 Drivers/Operators of Fire Department Apparatus.

6.2.1* Fire apparatus shall be operated only by members who have successfully completed an approved driver training program commensurate with the type of apparatus the member will operate or by trainee drivers who are under the supervision of a qualified driver.

6.2.1.1 The AHJ shall be responsible for providing driver training instruction that complies with NFPA 1451 to members on the operation of specific fire department–owned pumpers and mobile water supply apparatus that hold greater than 999 gal (3782 L) of on-board water supply.

Δ **6.2.1.2** The AHJ shall establish the maximum speed that the apparatus shall operate at and post that speed on a placard mounted on the dash within view of the driver, stating "Do not exceed max speed of XX mph."

6.2.2* The driver of a fire department vehicle shall be required to possess a valid driver's license for the class of vehicle, as specified by the AHJ.

6.2.2.1 Fire department vehicles shall be operated in compliance with all applicable traffic laws, including special provisions pertaining to emergency vehicles as established by the AHJ, as well as specific rules, regulations, and procedures adopted by the fire department.

6.2.2.2 Pumpers and mobile water supply apparatus that do not have anti-lock brake systems (ABS) and carry over 999 gal (3782 L) of on-board water supply shall be operated in non-emergency mode at all times.

6.2.3* The fire department shall establish specific rules, regulations, and procedures relating to the operation of fire department vehicles in an emergency mode, including guidelines to establish when emergency response is authorized and when emergency response is not authorized.

6.2.4* Drivers of fire apparatus shall be directly responsible for the safe and prudent operation of the vehicles under all conditions.

6.2.4.1 When the driver is under the direct supervision of an officer, that officer shall also assume responsibility for the driver's actions.

6.2.5 Drivers shall not move fire apparatus until all persons on the vehicle are seated and secured with seat belts in approved riding positions, other than as specifically allowed in this chapter.

6.2.6 Drivers of fire apparatus shall obey all traffic control signals and signs and all laws and rules of the road of the jurisdiction for the operation of motor vehicles.

6.2.7* The fire department shall develop standard operating procedures for safely driving fire apparatus during non-emergency travel and emergency response and shall include specific criteria for vehicle speed, crossing intersections, traversing railroad grade crossings, the use of emergency warning devices, and the backing of fire apparatus.

6.2.7.1* Procedures for all responses shall emphasize that the safe arrival of fire apparatus to the incident scene is the first priority.

6.2.8* During emergency response, drivers of fire apparatus shall bring the vehicle to a complete stop under any of the following circumstances:

(1) When directed by a law enforcement officer
(2) At red traffic lights
(3) At stop signs
(4) At negative right-of-way intersections
(5) At blind intersections
(6) When the driver cannot account for all lanes of traffic in an intersection
(7) When other intersection hazards are present
(8) When encountering a stopped school bus with flashing warning lights

6.2.9 Drivers shall proceed through intersections only when the driver can account for all lanes of traffic in the intersection.

6.2.10* Upon arriving at unguarded railroad grade crossings during either emergency response or non-emergency travel, drivers of fire apparatus shall come to a complete stop and ensure that it is safe to proceed before crossing the railroad track(s).

6.2.11 Drivers shall use caution when approaching and crossing any guarded railroad grade crossing.

6.2.12 The fire department shall include information on the potential hazards of retarders, such as engine, transmission, and driveline retarders, in the driver training program and shall develop written procedures pertaining to the use of such retarders.

6.2.13 The fire department shall develop written procedures requiring drivers to discontinue the use of manual brake limiting valves, frequently labeled as a "wet road/dry road" switch, and requiring that the valve/switch remains in the "dry road" position.

6.2.14* Where members are authorized to respond to incidents or to fire stations in private vehicles, the fire department shall establish specific rules, regulations, and procedures relating to the operation of private vehicles in an emergency mode.

6.2.14.1 These rules and regulations shall be at least equal to the provisions regulating the operation of fire department vehicles.

6.2.14.2* These rules and regulations shall also apply to the use of emergency lighting equipment, audible warning devices, or both on private vehicles.

6.2.14.2.1 The rules and regulations shall specify the procedures for use of emergency lighting equipment and audible warning devices and shall be in compliance with the motor vehicle laws of the jurisdiction.

6.2.14.2.2 Emergency lighting equipment and audible warning devices shall not be installed without the fire department's approval.

6.3 Riding in Fire Apparatus.

6.3.1* All persons riding in fire apparatus shall be seated and belted securely by seat belts in approved riding positions at any time the vehicle is in motion other than as allowed in 6.3.4, 6.3.5, and 6.3.6.

6.3.2 Standing or riding on tail steps, sidesteps, running boards, fully enclosed personnel areas, or in any other exposed position shall be specifically prohibited.

6.3.3 Seat belts shall not be released or loosened for any purpose while the vehicle is in motion, including the donning of respiratory protection equipment or protective clothing.

6.3.4* Members actively performing necessary emergency medical care while the vehicle is in motion shall be secured to the vehicle by a seat belt, or by a vehicle safety harness designed for occupant restraint, to the extent consistent with the effective provision of such emergency medical care.

6.3.4.1 All other persons in the vehicle shall be seated and belted in approved riding positions while the vehicle is in motion.

6.3.5* Fire departments permitting hose loading operations while the vehicle is in motion shall develop written standard operating procedures addressing all safety aspects.

6.3.6* Fire departments permitting tiller training, where both the instructor and the trainee are at the tiller position, shall develop written standard operating procedures addressing all safety aspects.

6.3.7* Helmets shall be provided for and used by members riding in open cab apparatus or open tiller seats.

6.3.7.1 Helmets shall not be worn by persons riding in an enclosed cab.

6.3.8* Eye protection shall be provided for members riding in open cab apparatus or open tiller seats.

6.3.9* On existing fire apparatus where there is an insufficient number of seats available for the number of members assigned to or expected to ride on that piece of apparatus, alternate means of transportation that provide seated and belted positions shall be used.

Δ 6.4 Inspection, Maintenance, and Repair of Fire Apparatus.

6.4.1* All fire apparatus shall be inspected, maintained, and tested in accordance with the applicable requirements of NFPA 1911.

6.4.2 Fire pumps on apparatus shall be service tested in accordance with the applicable requirements of NFPA 1911.

6.4.3 All aerial devices shall be inspected and service tested in accordance with the applicable requirements of NFPA 1911.

6.4.4 All fire apparatus shall be cleaned and disinfected in accordance with NFPA 1581.

6.5 Tools and Equipment.

6.5.1 The fire department shall consider safety and health as primary concerns in the specification, design, construction, acquisition, operation, maintenance, inspection, and repair of all tools and equipment.

6.5.2 The hearing conservation objectives of this standard shall be taken into account in the acquisition of new power tools and power equipment.

6.5.3 All new fire department ground ladders shall be specified and ordered to meet the applicable requirements of NFPA 1931.

6.5.4 All new fire hose shall be specified and ordered to meet the applicable requirements of NFPA 1961.

6.5.5 All new fire department spray nozzles shall be specified and ordered to meet the applicable requirements of NFPA 1964.

6.5.6* All equipment carried on fire apparatus or designated for training shall be inspected at least weekly and within 24 hours after any use.

6.5.7 Inventory records shall be maintained for the equipment carried on each vehicle and for equipment designated for training.

6.5.8 All equipment carried on fire apparatus or designated for training shall be tested at least annually in accordance with manufacturers' instructions and applicable standards.

6.5.9 Fire-fighting equipment found to be defective or in unserviceable condition shall be removed from service and repaired or replaced.

6.5.10 All fire department equipment and tools shall be cleaned and disinfected in accordance with NFPA 1581.

6.5.11 All ground ladders shall be inspected and service tested in accordance with the applicable requirements of NFPA 1932.

6.5.12 All fire hose shall be inspected and service tested in accordance with the applicable requirements of NFPA 1962.

6.5.13 All fire extinguishers shall be inspected and tested in accordance with the applicable requirements of NFPA 10.

6.5.14 All fire department powered rescue tools shall meet the requirements of NFPA 1936.

N **6.5.15** All fire hose deployed during fire suppression operations that are exposed to contaminants shall be decontaminated in accordance with NFPA 1962 and the manufacturer's recommendations prior to being returned to service.

Chapter 7 Protective Clothing and Protective Equipment

7.1 General.

7.1.1* The fire department shall provide each member with protective ensembles, ensemble elements, and protective equipment designed to provide protection from hazards to which the member is likely to be exposed and that is suitable for the tasks the member is expected to perform.

7.1.1.1 A risk assessment for the need and, if necessary, selection of protective ensembles, ensemble elements, and protective equipment shall be conducted in accordance with 29 CFR 1910.132, "Personal Protective Equipment."

7.1.1.2 The selection of applicable protective ensembles, ensemble elements, and other protective equipment shall be based on a selection program containing a risk assessment in compliance with 29 CFR 1910.132, "Personal Protective Equipment," and all applicable NFPA standards.

7.1.2 Protective ensembles, ensemble elements, and other protective equipment shall be used whenever the member is exposed or potentially exposed to the hazards for which it is provided.

•

7.1.3 The fire department shall require all members to wear or use all protective ensembles, ensemble elements, and other protective equipment specific to the operation in which members are engaged.

7.1.4 Structural fire-fighting and proximity fire-fighting protective ensembles and ensemble elements shall be cleaned as specified in NFPA 1851.

7.1.4.1 While on duty, members shall not wear personal clothing, accessories, or personal equipment that might not be suitable and appropriate to protect the member from the hazards to which the member could be exposed.

7.1.5* Where station/work uniforms are worn by members, such station/work uniforms shall meet the requirements of NFPA 1975.

7.1.6 The fire department shall provide for the inspection, care, and maintenance of protective ensembles, ensemble elements, and components according to the manufacturer's instructions unless specialized care and maintenance requirements are specified by NFPA standards for specific types of protective ensembles, ensemble elements, or components; in which case the specialized care and maintenance requirements in the applicable NFPA standard shall apply.

7.1.6.1* When the fire department implements a care and maintenance operation, the fire department shall create procedures for advanced inspection, advanced cleaning, sanitization or disinfection, and specialized cleaning of protective ensembles and ensemble elements in accordance with NFPA 1851.

7.1.6.2 Where such cleaning is conducted in fire stations, the fire department shall provide a designated cleaning area that meets the requirements specified in NFPA 1581.

7.1.6.3* Where the organization implements an on-site care and maintenance operation, the organization shall follow applicable governing standards that provide for exposure control and protection of members performing the tasks associated with care and maintenance.

7.1.6.4 Specific roles, responsibilities, and authorities shall be assigned for inspection, care, and maintenance of protective clothing and equipment.

7.1.7 The fire department shall provide training for its protective clothing and equipment program.

7.2 Protective Clothing for Structural Fire Fighting.

7.2.1* Members who engage in or are exposed to the hazards of structural fire fighting shall be provided with and shall use a protective ensemble that shall meet the applicable requirements of NFPA 1971.

N **7.2.1.1*** The member shall be provided with correctly sized and fitted protective clothing in accordance with manufacturer's recommendations.

7.2.2* The protective coat and the protective trousers shall have at least a 2 in. (50 mm) overlap of all layers so there is no gaping of the total thermal protection when the protective garments are worn.

7.2.2.1 The minimum overlap shall be determined by measuring the garments on the wearer, without SCBA, in both of the following positions:

(1) Position A — standing, hands together reaching overhead as high as possible
(2) Position B — standing, hands together reaching overhead, with body bent forward at a 90-degree angle, to the side (either left or right), and to the back

7.2.3 Single-piece protective coveralls shall not be required to have an overlap of all layers, provided there is continuous composite protection.

7.2.4 Gloves.

7.2.4.1 Fire departments that provide protective coats with protective resilient wristlets secured through a thumb opening shall be permitted to provide gloves of the gauntlet type for use with these protective coats.

7.2.4.2* Fire departments that do not provide such wristlets attached to all protective coats shall provide gloves of the wristlet type or other interface component for use with these protective coats.

7.2.5 The fire department shall adopt and maintain a protective clothing and protective equipment program that addresses the selection, care, maintenance, and use of structural fire-fighting protective ensembles, and training in its use.

7.2.5.1 The selection, care, and maintenance of protective ensembles for structural fire fighting shall be as specified in NFPA 1851.

7.2.5.2 Specific roles, responsibilities, and authorities shall be assigned for inspection and maintenance.

7.2.6* The fire department shall develop specific procedures for rapid extrication of a downed fire fighter that involves the use of specific equipment worn by the fire fighter.

7.3 Protective Clothing for Proximity Fire-Fighting Operations.

7.3.1* When determining the need for proximity ensembles, the organization shall perform a risk assessment as required by Chapter 5 of NFPA 1851.

7.3.2 When it is determined proximity protective ensembles and ensemble elements are required, members shall be provided with and shall use proximity fire-fighting protective ensembles and ensemble elements that are compliant with the proximity requirements of NFPA 1971.

7.3.2.1 The minimum overlap shall be determined by measuring the garments on the wearer, without SCBA, in both of the following positions:

(1) Position A — standing, hands together reaching overhead as high as possible
(2) Position B — standing, hands together reaching overhead, with body bent forward at a 90-degree angle, to the side (either left or right), and to the back

7.3.3 Single-piece proximity protective coveralls shall not be required to have an overlap of all layers, provided there is continuous full thermal and radiant heat protection.

7.3.4 Where SCBA is worn over or outside the proximity protective garment, the fire department shall inform the member of the potential high levels of radiant heat that can result in the failure of the SCBA.

7.3.4.1 The fire department shall require additional approved radiant reflective criteria, including but not limited to a protective cover, for the expected proximity fire-fighting exposures when the SCBA is worn over or outside the proximity protective garment.

Δ 7.4* Protective Clothing for Emergency Medical Operations.

7.4.1 The fire department shall develop standard operating procedures outlining the minimum required levels of protection based on a risk assessment of the medical care activities involved.

Δ 7.4.1.1 Members who perform emergency medical care or are otherwise likely to be exposed to blood or other body fluids shall be provided with emergency medical garments, emergency medical eye and face protection devices, emergency medical examination gloves, emergency medical gloves, emergency medical helmets, emergency medical CBRN protective ensembles, and emergency medical footwear that are compliant with NFPA 1999.

***N* 7.4.1.2** Fire department members who are issued and use protective equipment during medical incidents to protect from infectious agents shall be trained in the appropriate donning and doffing procedures in accordance with manufacturer's specifications.

7.4.2* Members shall wear emergency medical examination gloves when providing emergency medical care.

7.4.2.1 Patient care shall not be initiated before the gloves are in place.

7.4.2.2 Emergency medical work gloves shall be permitted to be used in place of emergency medical examination gloves in situations involving physical hazards.

7.4.3 Each member shall use emergency medical garments and emergency medical face protection devices, including particulate filtering masks, prior to any patient care during which large splashes of body fluids can occur, such as childbirth or situations involving spurting blood.

7.4.4 Contaminated emergency medical protective clothing shall be cleaned and disinfected or disposed of as specified in NFPA 1581 and in accordance with the manufacturer's directions.

7.4.4.1 Emergency medical examination gloves and emergency medical footwear covers shall not be reused and shall be disposed of after use.

7.4.4.2 Any item of emergency medical protective clothing that is not designated for "multiple use" shall not be reused and shall be disposed of after use.

***N* 7.5 Protective Clothing and Equipment for Fire Inspections.**

***N* 7.5.1** The fire department shall conduct a risk assessment of all fire inspection activities.

***N* 7.5.2** The fire department shall develop standard operating procedures (SOPs) outlining the minimum required levels of protection.

7.6* Chemical-Protective Clothing for Hazardous Materials Emergency Operations.

***N* 7.6.1** Members who engage in operations during hazardous materials emergencies shall be provided with and shall use chemical protective ensembles that meet the applicable requirements of NFPA 1991, NFPA 1992, or NFPA 1994.

N* 7.6.1.1 A risk assessment for the need, and, if necessary, selection of chemical protective clothing, ensembles, and ensemble elements shall be conducted.

N* 7.6.2 For a given hazardous materials incident, the following approach shall be used:

(1) Perform a site-specific hazard and risk assessment: Identify all primary hazards that can cause potential harm to response personnel while taking into consideration the likelihood and consequences of exposure to the specific hazards.
(2) Determine known threats: If entry into the site is determined to be necessary and the hazards are not identifiable, select NFPA 1991 ensembles with both flash fire escape and liquefied gas options.
(3) Determine flash fire threats:
  (a) If monitoring equipment or circumstances indicate an environment that is greater than 10 percent of the lower explosive limit, the environment is considered a flash fire or explosive risk.
  (b) If skin toxic threats do not exist and there is no threat of an explosion, select protective ensembles certified in accordance with NFPA 1971 or NFPA 2112.
  (c) If skin toxic threats do exist and there is no threat of an explosion, select protective ensembles certified in accordance with NFPA 1991 with optional flash fire protection.
(4) Determine CBRN threats:
  (a) If the agent is radiological/nuclear in nature and is limited to contaminated particles that are of relatively low radiation levels, select ensembles certified in accordance with NFPA 1994 Class 4 or 4R.
  (b) If the agent is chemical, follow the gas/vapor or liquid/particulate guidance.
  (c) If the agent is biological, follow the biological threats guidance
(5) Determine gas/vapor chemical threats:
  (a) If the substance is a liquefied gas and is flammable, choose an NFPA 1991 ensemble with the optional liquefied gas protection and flash fire protection.
  (b) If the substance is a liquefied gas but is not flammable, choose an NFPA 1991 ensemble with the optional liquefied gas protection.
  (c) If the gas or vapor is not skin toxic, choose structural fire-fighting clothing or other flash fire protective clothing that conforms to NFPA 1971 or NFPA 2112, respectively.
  (d) If the substance is flammable vapor at a concentration over 10,000 ppm or 1 percent, choose an NFPA 1991 ensemble that also meets the optional flash fire protection requirements.
  (e) If the substance is vapor at a concentration over 10,000 ppm or 1 percent that is not flammable, choose an NFPA 1991 ensemble.
  (f) If the substance is flammable vapor at a concentration over 350 ppm but at or less than 10,000 ppm or 1 percent, choose either an NFPA 1994 Class 1 ensemble that also meets the optional flash fire protection requirements.

(g) If the substance is vapor at a concentration over 350 ppm but at or less than 10,000 ppm or 1 percent that is not flammable, choose an NFPA 1994 Class 1 ensemble.
(h) If the substance is flammable vapor at a concentration over 40 ppm but at or less than 350 ppm, choose an NFPA 1994 Class 2 or 2R ensemble that also meets the optional flash fire protection.
(i) If the substance is vapor at a concentration over 40 ppm but at or less than 350 ppm that is not flammable, choose an NFPA 1994 Class 2 or 2R ensemble.
(j) If the substance is below IDLH conditions and flame hazard exists, choose an NFPA 1994 Class 3 or 3R ensemble that also meets the optional flash fire protection.
(k) If the substance is below IDLH conditions and there is no flame hazard, choose an NFPA 1994 Class 3 or 3R ensemble.

(6) Determine liquid/particulate chemical threats:
(a) If severe liquid splash or repeated/extended exposure liquid hazards exist, choose an NFPA 1992 or NFPA 1994 Class 2 or 2R ensemble.
(b) If low volume or infrequent liquid exposure hazards exist, choose an NFPA 1994 Class 3 or 3R ruggedized ensemble.
(c) If exposure is only expected to be solid particles, choose an NFPA 1994 Class 4 or Class 4R ensemble.

(7) Determine biological threats:
(a) If the primary hazard is from airborne or aerosolized biological substances that are considered dangerous for skin contact, choose an NFPA 1994 Class 4 or Class 4R ensemble.
(b) If the primary hazard is from airborne or aerosolized biological substances that are not transmissible through skin contact, choose an appropriate respirator such as an air-purifying respirator (APR) with P100 filters or a powered air-purifying respirator (PAPR) with HEPA filter.
(c) If the primary hazard is from highly hazardous liquid-borne biological substances, choose either an NFPA 1994 Class 4 or 4R or a single-use or multiple-use NFPA 1999 ensemble.
(d) If the primary hazard is from potentially infectious blood or body fluids, choose protective NFPA 1999 garments, gloves, footwear and face/eyewear to protect those portions of the wearer's body where exposure is expected.
(e) Determine optimal stealth, equipment interoperability, and design/conformity configurations.

(8) Prior to the use of the ensemble, consult the technical data package, manufacturers' instructions, and manufacturers' recommendations as provided to ensure that the ensemble is designed to provide the member protection from the specific hazardous materials emergency.
(9) In many cases, an organization might not have all the different types of ensembles available. When this occurs, a higher performing ensemble should be selected.

•

7.7 Inspection, Maintenance, and Disposal of Chemical-Protective Clothing.

7.7.1 All chemical-protective clothing shall be inspected and maintained as required by the technical data package, manufacturers' instructions, and manufacturers' recommendations.

7.7.2 All chemical-protective clothing that receives an exposure to a chemical or a chemical mixture shall be disposed of if decontamination will not stop the chemical assault on the garment and the protective qualities will be diminished or nullified.

7.7.2.1 Disposal shall be in accordance with applicable state or federal regulations.

Δ **7.8 Protective Clothing and Equipment for Wildland Fire Fighting.**

7.8.1* The fire department shall establish SOPs for the use of wildland protective clothing and equipment.

7.8.2 Members who engage in or are exposed to the hazards of wildland fire-fighting operations shall be provided with and use protective garments and protective equipment that meet the requirements of NFPA 1977.

7.8.3* Members who engage in or are exposed to the hazards of wildland fire-fighting operations shall be provided with a fire shelter, in a crush-resistive case, and wear it in such a way as to allow for rapid deployment.

N **7.8.4*** The fire department shall ensure that personnel engaged in wildland fire-fighting operations have continuous access to potable water.

7.9 Protective Ensembles for Technical Rescue Operations.

7.9.1 The selection, care, and maintenance of protective ensembles for technical rescue operations shall be as specified in NFPA 1855.

7.9.2 Members of special teams whose primary function is search, rescue, recovery, and site stabilization operations for technical rescue incidents other than wilderness or water rescue incidents shall be provided with and shall use a protective ensemble that is certified as compliant with NFPA 1951.

7.9.2.1 Before emergency response personnel are assigned to technical rescue incidents, the incident commander shall perform a risk assessment of the expected hazards to determine the type of protective ensembles and other protective equipment that is needed.

7.9.2.2 Where the risk assessment indicates exposure to physical and thermal hazards are expected, utility technical rescue protective ensembles and ensemble elements shall be used.

7.9.2.3 Where the risk assessment indicates exposure to physical, thermal, liquid, and body fluid-borne pathogen hazards are expected, rescue and recovery technical rescue protective ensembles and ensemble elements shall be used.

7.9.2.4 Where the risk assessment indicates exposure to physical, thermal, liquid, and body fluid-borne pathogen hazards and CBRN agents in vapor, liquid splash, and particulate forms are expected during terrorism incident operations, CBRN technical rescue protective ensemble and ensemble elements requirements shall be used.

7.9.3 The protective coat and protective trousers shall have at least a 2 in. (50 mm) overlap of all layers so there is no gaping of the total thermal and barrier protection when the protective garments are worn.

7.9.3.1 The minimum overlap shall be determined by measuring the garments on the wearer, without respiratory protection, in both of the following conditions:

(1) Position A — standing, hands together reaching overhead as high as possible
(2) Position B — standing, hands together reaching overhead, with the body bent forward at a 90-degree angle, to the side (either left or right), and to the back

7.9.3.2 Single-piece protective coveralls shall not be required to have an overlap of all layers, provided there is continuous composite protection.

7.9.4 Members engaged in technical rescue operations that require respiratory protection shall be provided with and shall use respirators that are certified by NIOSH to 42 CFR 84, "Approval of Respiratory Protective Devices."

7.9.4.1* Where air-purifying respirators (APRs) and powered air-purifying respirators (PAPRs) are selected to provide the respiratory protection, the APRs and PAPRs shall be provided with the chemical or particulate filter elements that provide protection against the specific contaminants based upon the anticipated level of exposure risk associated with different response situations.

7.9.4.2* Where it cannot be determined that an APR or PAPR will provide effective protection against the contaminant, or if the identity of the contaminant is not known, SCBA shall be worn until it can be determined that other respiratory protection can be used.

7.9.4.3 Where SCBA are selected to provide the respiratory protection, the SCBA shall meet the applicable requirements of 7.14.1.

7.9.5 Members who engage in or are exposed to the hazards of search, rescue, recovery, and site stabilization for technical rescue shall be provided with and shall use primary eye protection that meets the requirements of NFPA 1951.

7.9.6 Technical rescue protective clothing and protective equipment shall be used and maintained in accordance with the manufacturer's instructions.

7.9.6.1 The fire department shall establish a maintenance and inspection program for technical rescue protective clothing and equipment.

7.9.6.2 Proper decontamination procedures for all technical rescue protective clothing and equipment shall be followed to prevent contamination of the user or support personnel.

7.10* Protective Clothing and Equipment for Surface Water Operations.

7.10.1 Members of special teams whose primary function is surface water search and rescue operations or other surface water incident operations, including operations in surface water, swift water, tidal water, surf, and ice, shall be provided with and shall use a protective ensemble that is certified as compliant with NFPA 1952.

7.10.2 Surface water operations protective clothing and protective equipment shall be used and maintained in accordance with the manufacturer's instructions.

7.10.3 The fire department shall establish a maintenance and inspection program for surface water operations protective clothing and equipment.

7.10.4 Proper decontamination procedures for all surface water protective clothing and equipment shall be followed to prevent contamination of the user or support personnel.

***N* 7.11 Protective Clothing for Fire Investigators.**

***N* 7.11.1** The fire department shall conduct a risk assessment of all fire investigation activities.

***N* 7.11.2** The fire department shall develop SOPs outlining the minimum required levels of protection based on the timeline and type of activities that are occurring on the fireground.

***N* 7.11.3** When exposed to chemicals or particulates at the fire investigation scene, outer layer garments shall be doffed at the fire investigation scene.

***N* 7.11.4** Outer layer garments shall be discarded or cleaned in accordance with 7.1.6.

7.12 Respiratory Protection Program.

7.12.1 The fire department shall adopt and maintain a respiratory protection program that addresses the selection, care, maintenance, and use of respiratory protection equipment (RPE), medical surveillance, training in respirator use, and the assurance of air quality.

7.12.1.1* The selection, care, and maintenance of open-circuit SCBA shall be as specified in NFPA 1852.

7.12.1.2 Training in respirator use shall include knowledge of hazards, hazard assessment, selection of RPE based on hazard exposure levels, fit testing of respirators, and respirator inspection.

7.12.2 The fire department shall develop and maintain standard operating procedures that are compliant with this standard and that address the use of respiratory protection.

7.12.3 Members shall be qualified at least annually in the use of RPE that they are authorized to use.

7.12.4* Reserve SCBA shall be provided to maintain the required number in service when maintenance or repairs are being conducted.

7.12.5 A reserve air supply shall be provided by use of reserve cylinders or by an on-scene refill capability, or both.

7.12.6 RPE shall be stored in a ready-for-use condition and shall be protected from damage or exposure to rough handling, excessive heat or cold, moisture, or other elements.

7.12.7* When engaged in any operation where members could encounter atmospheres that are IDLH or potentially IDLH, or where the atmosphere is undefined or hazardous (including overhaul), the fire department shall provide and require all members to use SCBA that has been certified as being compliant with NFPA 1981 or NFPA 1986 (for non-fire-fighting operations).

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

Δ **7.12.9*** Respiratory protection for any entry into the post-fire environment before or after overhaul shall be at least a NIOSH-certified self-contained breathing apparatus for at least the first 2 hours post-extinguishment.

7.13 Breathing Air. Breathing air used to fill SCBA cylinders shall meet the requirements specified in NFPA 1989.

7.14 Respiratory Protection Equipment.

7.14.1 SCBA.

7.14.1.1 All open-circuit SCBA that are purchased new shall be certified as compliant with NFPA 1981 (for fire-fighting operations) or NFPA 1986 (non-fire-fighting operations) and shall also be certified by NIOSH as compliant with NIOSH *Standard for Chemical, Biological, Radiological, and Nuclear (CBRN) Open Circuit Self-Contained Breathing Apparatus (SCBA).*

Δ **7.14.1.2** Open-circuit SCBA shall be removed from fire service use in accordance with NFPA 1852.

7.14.1.3* Closed-circuit SCBA shall be permitted when long-duration SCBA is required.

N **7.14.1.3.1** Closed-circuit SCBAs shall not be permitted for use with NFPA 1991 ensembles.

7.14.1.4 Closed-circuit SCBA shall be NIOSH certified with a minimum rated service life of at least 2 hours and shall operate in the positive-pressure mode only.

7.14.2 Supplied-Air Respirators.

7.14.2.1 Supplied-air respirator units used shall be of the type and manufacture employed by the AHJ.

7.14.2.2 Supplied-air respirators other than SCBA shall not be used in IDLH atmospheres unless equipped with a NIOSH-certified emergency escape air cylinder and a pressure-demand facepiece.

7.14.2.3 Supplied-air respirators, Type C Pressure-Demand Class, shall not be used in IDLH atmospheres unless they meet manufacturers' specifications for that purpose.

7.14.3 Air-Purifying Respirators.

7.14.3.1 Fit-tested air-purifying respirators (APRs) shall be used only in non-IDLH atmospheres for those contaminants that NIOSH certifies them against.

7.14.3.2 The AHJ shall provide NIOSH-certified respirators that protect the user and ensure compliance with all other OSHA requirements.

7.14.3.3* The AHJ shall establish a policy to ensure canisters and cartridges are changed before the end of their service life.

7.14.3.4* Wildland fire-fighting respirators shall be compliant with NFPA 1984.

Δ **7.15 Fit Testing.**

7.15.1* The facepiece seal capability of each member qualified to use RPE shall be verified by quantitative fit testing following procedures set forth in 29 CFR 1910.134, "Respiratory Protection," and ANSI Z88.2, *Practices for Respiratory Protection*, on an annual basis and whenever new types of RPE or facepieces are issued.

7.15.2 The fit of the RPE of each new member shall be tested before the members are permitted to use RPE in a hazardous atmosphere.

7.15.2.1 Only members with a properly fitting facepiece shall be permitted by the fire department to function in a hazardous atmosphere with RPE.

7.15.3 Fit testing of tight-fitting atmosphere-supplying respirators and tight-fitting powered air-purifying respirators shall be accomplished by performing quantitative fit testing in the negative-pressure mode, regardless of the mode of operation (negative or positive pressure) that is used for respiratory protection.

7.15.4 Records of facepiece fitting tests shall include at least the following information:

(1) Name of the member tested
(2) Type of fitting test performed
(3) Specific make and model of facepieces tested
(4) Pass/fail results of the tests

7.15.5* The protection factor produced shall be at least 500 for negative-pressure facepieces for the person to pass the fitting test with that make of full facepiece.

7.15.6* If a satisfactory fit cannot be achieved for an individual with one design of facepiece, the fire department shall work with the manufacturer of the respiratory protection equipment (RPE) to find a facepiece design that fits satisfactorily for that member.

7.16 Using Respiratory Protection.

7.16.1 Respirators shall not be worn when a member has any conditions that prevent a good face seal.

7.16.2 Nothing shall be allowed to enter or pass through the area where the respiratory protection facepiece is designed to seal with the face, regardless of the specific fitting test measurement that can be obtained.

7.16.3* Members who have a beard or facial hair at any point where the facepiece is designed to seal with the face or whose hair could interfere with the operation of the unit shall not be permitted to use respiratory protection at emergency incidents or in hazardous or potentially hazardous atmospheres.

7.16.3.1 These restrictions shall apply regardless of the specific fitting test measurement that can be obtained under test conditions.

7.16.4 When a member must wear spectacles while using full facepiece respiratory protection, the facepiece shall be fitted with spectacles in such a manner that they shall not interfere with the facepiece-to-face seal.

7.16.5* Spectacles with any strap or temple bars that pass through the facepiece-to-face seal area shall be prohibited.

7.16.6* Use of contact lenses shall be permitted during full facepiece respiratory protection use, provided that the member has previously demonstrated successful long-term contact lens use.

7.16.7 Any head covering that passes between the sealing surface of the respiratory protection facepiece and the member's face shall be prohibited.

7.16.8 The respiratory protection facepiece and head harness with straps shall be worn under the protective hoods.

7.16.9 The respiratory protection facepiece and head harness with straps shall be worn under the head protection of any hazardous chemical-protective clothing.

7.16.10 Helmets shall not interfere with the respiratory protection facepiece-to-face seal.

7.17 SCBA Cylinders.

7.17.1* SCBA cylinders made of aluminum alloy 6351-T6 shall be inspected annually, both externally and internally, by a qualified person.

7.17.2 SCBA cylinders shall be hydrostatically tested as required by the manufacturers and applicable governmental agencies.

7.17.3 SCBA cylinders used for structural fire fighting shall have a minimum gas capacity of 59.99 ft^3 (1699 L) of air.

7.17.4 In-service SCBA cylinders shall be stored fully charged.

7.17.5 In-service SCBA cylinders shall be inspected weekly, monthly, and prior to filling, according to NIOSH requirements, CGA standards, and manufacturers' recommendations.

7.17.6* During filling of SCBA cylinders, all personnel and operators shall be protected from catastrophic failure of the cylinder, except as provided in 7.17.8.

7.17.7* Fire departments utilizing rapid filling of SCBA cylinders shall identify those unique emergency situations where rapid filling shall be permitted to occur.

7.17.8 The fire department risk assessment process shall incorporate standard operating procedures to identify those situations in 7.17.7.

7.17.9 Rapid refilling of SCBA while being worn by the user shall only be used under the following conditions:

(1) Manufacturer permitted, NIOSH-approved fill options are used.
(2) The risk assessment process has identified procedures for limiting personnel exposure during the refill process and has provided for adequate equipment inspection and member safety.
(3) An imminent life-threatening situation occurs that requires immediate action to prevent the loss of life or serious injury.
(4) Prior to a life-threatening situation occurring that could require immediate action to prevent the loss of life or serious injury.

7.17.10 An emergency escape breathing support system (EEBSS), also known as buddy breathing, shall be utilized where it is accomplished through the use of a NIOSH-approved connection that does not compromise the system integrity of either of the users giving or receiving air.

7.17.10.1 An EEBSS shall not be initiated if the "donor" cylinder has less than 21.18 ft^3 (600 L) of air remaining.

7.17.11 If a supplied source is not immediately available, transfilling of cylinders shall be done in accordance with the manufacturers' instructions.

7.17.12* Standardized IDLH exiting shall require that an exit strategy will be practiced when the SCBA cylinder reaches a level of 21.18 ft^3 (600 L) or more.

7.18 Personal Alert Safety System (PASS).

7.18.1* PASS devices shall meet the requirements of NFPA 1982.

Δ **7.18.2*** Each member shall be provided with, use, and activate his or her PASS devices in all emergency situations that could jeopardize that person's safety due to atmospheres that could be IDLH, in incidents that could result in entrapment, in structural collapse of any type, or as directed by the incident commander or safety officer.

7.18.3 Each PASS device shall be tested at least weekly and prior to each use and shall be maintained in accordance with the manufacturers' instructions.

7.19 Life Safety Rope and System Components.

7.19.1 All life safety ropes, harnesses, and hardware used by fire departments shall meet the applicable requirements of NFPA 1983.

7.19.2 Rope used to support the weight of members or other persons during rescue, fire fighting, other emergency operations, or training evolutions shall be life safety rope and shall meet the requirements of NFPA 1983.

7.19.2.1 Life safety rope used for any other purpose shall be removed from service and destroyed.

7.19.3* Life safety rope used for rescue at fires or other emergency incidents or for training shall be permitted to be reused if inspected before and after each such use in accordance with the manufacturers' instructions and provided that the following criteria are met:

(1) The rope has not been visually damaged by exposure to heat, direct flame impingement, chemical exposure, or abrasion.
(2) The rope has not been subjected to any impact load.
(3) The rope has not been exposed to chemical liquids, solids, gases, mists, or vapors of any material known to deteriorate rope.

7.19.3.1 If the rope used for rescue at fires or other emergency incidents or for training does not meet the criteria set forth in 7.19.3(1), 7.19.3(2), or 7.19.3(3) or fails the visual inspection, it shall be destroyed.

7.19.3.2 If there is any question regarding the serviceability of the rope after consideration of the criteria listed in 7.19.3, the rope shall be taken out of service.

7.19.4 Rope inspection shall be conducted by qualified inspectors in accordance with rope inspection procedures established and recommended by the rope manufacturer to assure rope is appropriate for reuse.

7.19.5 Records shall be maintained to document the use of each life safety rope used at fires and other emergency incidents or for training.

7.20 Face and Eye Protection.

7.20.1 Primary eye protection appropriate for a given specific hazard shall be provided for and used by members exposed to that specific hazard.

7.20.1.1* Primary eye protection shall meet the requirements of ANSI Z87.1, *Practice for Occupational and Educational Eye and Face Protection.*

7.20.1.2 Face protection shall be in addition to primary eye protection unless SCBA is being used.

7.20.1.3 The helmet faceshield alone shall not be considered and shall not be used as primary eye protection.

7.20.2 The full facepiece of SCBA shall constitute face and eye protection when worn.

7.20.2.1 SCBA that has a facepiece-mounted regulator that when disconnected provides a direct path for flying objects to strike the face or eyes shall have the regulator attached in order to be considered face and eye protection.

7.20.3 When operating in the hazardous area at an emergency scene without the full facepiece of respiratory protection being worn, members shall wear primary eye protection that is designed to protect the member's eyes from the expected hazards.

7.21 Hearing Protection.

7.21.1* Hearing protection shall be provided for and used by all members operating or riding on fire apparatus when subject to noise in excess of 90 dBA.

7.21.2* Hearing protection shall be provided for and used by all members when exposed to noise in excess of 90 dBA caused by power tools or equipment, other than in situations where the use of such protective equipment would create an additional hazard to the user.

7.21.3* The fire department shall engage in a hearing conservation program to identify and reduce or eliminate potentially harmful sources of noise in the work environment.

Δ **7.22 Ballistic Protective Equipment.** In accordance with the requirements of NFPA 3000, the fire department shall provide ballistic protective equipment to personnel exposed to ballistic risks, or other hostile threats, consistent with expected duties.

7.23 New and Existing Protective Clothing and Protective Equipment.

7.23.1 All new protective clothing and protective equipment shall meet the requirements of the current edition of the respective NFPA standard for that protective clothing or protective equipment.

7.23.2 Existing protective clothing and protective equipment shall have been in compliance with the edition of the respective NFPA standard that was current when the protective clothing or protective equipment was manufactured.

7.23.3 Protective ensembles for structural fire fighting and protective ensembles for proximity fire fighting shall be retired in accordance with NFPA 1851.

7.23.4 Open circuit SCBA for emergency services shall be retired in accordance with NFPA 1852.

7.23.5 The fire department shall establish a program for retirement and disposal of all protective clothing and equipment.

7.23.6 Unless otherwise subject to retirement requirements by an applicable NFPA standard(s), the fire department shall use the retirement criteria provided by the manufacturer.

Chapter 8 Emergency Operations

8.1 Incident Management.

8.1.1* Emergency operations and other situations that pose similar hazards, including but not limited to training exercises, shall be conducted in a manner that recognizes hazards and prevents accidents and injuries.

8.1.2 An incident management system that meets the requirements of NFPA 1561 shall be established with written standard operating procedures applying to all members involved in emergency operations.

8.1.3 The incident management system shall be utilized at all emergency incidents.

8.1.4 The incident management system shall be applied to drills, exercises, and other situations that involve hazards similar to those encountered at actual emergency incidents and to simulated incidents that are conducted for training and familiarization purposes.

8.1.5* At an emergency incident, the incident commander shall be responsible for the overall management of the incident and the safety of all members involved at the scene.

8.1.6 As incidents escalate in size and complexity, the incident commander shall divide the incident into divisions or groups and assign a safety officer to assess the incident scene for hazards or potential hazards.

8.1.7* At an emergency incident, the incident commander shall establish an organization with sufficient supervisory personnel to control the position and function of all members operating at the scene and to ensure that safety requirements are satisfied.

8.1.8* At an emergency incident, the incident commander shall have the responsibility for the following:

(1) Arrive on scene before assuming command
(2) Assume and confirm command of an incident and take an effective command position
(3) Perform situation evaluation that includes risk assessment
(4) Initiate, maintain, and control incident communications
(5) Develop an overall strategy and an incident action plan and assign companies and members consistent with the standard operating procedures
(6) Initiate and maintain a tactical worksheet or system, which maintains resource and personnel accountability and functions as the initial incident plan
(7) Assign or assume responsibility of the safety officer in accordance with NFPA 1561
(8) Develop an effective incident organization by managing resources, maintaining an effective span of control, and maintaining direct supervision over the entire incident, and designate supervisors in charge of specific areas or functions
(9) Review, evaluate, and revise the incident action plan as required
(10) Continue, transfer, and terminate command

(11) On incidents under the command authority of the fire department, provide for liaison and coordination with all other cooperating agencies
(12) On incidents where other agencies have jurisdiction, implement a plan that designates one incident commander or that provides for unified command
(13) Determine the need for, and appoint a safety officer in accordance with NFPA 1561, 5.9.6

8.1.8.1 Interagency coordination shall meet the requirements of NFPA 1561.

N **8.1.9** The responsibilities of a safety officer, which shall apply to any incident, include the following:

(1) Communicate to the incident commander changing incident conditions, activities, operations, hazards, and unacceptable risk-taking circumstances that warrant a change in the incident action plan.
(2) Exercise emergency authority to stop, alter, or suspend activities that are judged to present an imminent threat to responder safety.
(3) Establish emergency incident hazard control zones, including collapse zones, based on current and changing fire conditions, building construction/structural factors, hazardous energy integrity, and incident operational effectiveness.
(4) Communicate emergency incident hazard control zones to the incident commander and responders in accordance with Section 8.7.
(5) Ensure that members operating in IDLH environments have adequate means of rapid egress.
(6) Ensure that personnel safety systems have been established including required PPE levels, "mayday" rapid intervention crew(s), and a personal accountability system that is in accordance with NFPA 1561, Section 8.5.
(7) Monitor radio traffic so that barriers to effective communications are corrected.
(8) Ensure that effective responder rehabilitation efforts have been established in accordance with NFPA 1584.
(9) Communicate to the incident commander the need for assistant safety officers.
(10) Develop preventive measures for incident commander consideration to further reduce responder exposure to hazards.
(11) Ensure that contaminated personnel, tools, hose, equipment, and PPE are processed in accordance with contamination-reduction SOPs prior to being returned to service.
(12) Begin investigation procedures for accidents that have occurred within the incident area.
(13) Document safety officer actions, interventions, and post-incident follow-up needs.

8.2 Communications.

8.2.1 The fire department shall establish and ensure the maintenance of a fire dispatch and incident communications system that meets the requirements of NFPA 1561 and NFPA 1221.

8.2.2 While operating in a hot or warm zone, all personnel shall be equipped with a portable radio provided by the fire department.

8.2.3* The fire department standard operating procedures shall provide direction in the use of clear text radio messages for emergency incidents.

8.2.3.1 The standard operating procedures shall use "emergency traffic" as a designator to clear the radio traffic for an emergency affecting the incident.

8.2.3.2 This "emergency traffic" shall be permitted to be declared by any member who becomes aware of an emergency affecting the incident.

8.2.4* When a member has declared "emergency traffic," that person shall use clear text to identify the type of emergency, change in conditions, or tactical operations.

8.2.4.1 The member who has declared the "emergency traffic" shall conclude the "emergency traffic" message by transmitting "all clear, resume radio traffic" to end the emergency situation or to re-open the radio channels to communication after announcing the emergency message.

8.2.4.2 The standard operating procedures shall use "mayday" as a designator to identify when a member is in a life-threatening situation and in need of immediate assistance.

8.2.4.3 This "mayday" shall be permitted to be declared by any member who is in or who becomes aware of a member who is in a life-threatening situation and in need of immediate assistance.

8.2.4.4 The incident commander shall conclude the "mayday" by transmitting "Mayday cleared, resume normal radio traffic."

8.2.5* The fire department communications center shall start an incident clock when the first arriving unit is on-scene of a working structure fire or hazardous materials incident, or when other conditions appear to be time sensitive or dangerous.

8.2.5.1* The dispatch center shall notify the incident commander at every 10-minute increment with the time that resources have been on the incident until the fire is knocked down or the incident becomes static.

8.2.5.2 The incident commander shall be permitted to cancel the incident clock notification through the fire department communications center based on the incident conditions.

8.3 Crew Resource Management (CRM) During Emergency Operations.

8.3.1* The incident commander shall integrate Crew Resource Management (CRM) into the regular functions of incident command.

8.4 Risk Management During Emergency Operations.

8.4.1* The incident commander shall integrate risk management into the regular functions of incident command.

8.4.2 The incident commander shall determine the life safety profile of the incident and apply the most appropriate level of risk to first responders consistent with the principles in 8.4.2.1.

8.4.2.1* The concept of risk management shall be utilized on the basis of the following principles:

(1) Activities that present a significant risk to the safety of members shall be limited to situations where there is a potential to save endangered lives.
(2) Activities that are routinely employed to protect property shall be recognized as inherent risks to the safety of members, and actions shall be taken to reduce or avoid these risks.

(3) No risk to the safety of members shall be acceptable when there is no possibility to save lives or property.
(4) In situations where the risk to fire department members is excessive, activities shall be limited to defensive operations.

8.4.3* The incident commander shall evaluate the risk to members with respect to the purpose and potential results of their actions in each situation.

8.4.4 Risk management principles shall be routinely employed by supervisory personnel at all levels of the incident management system to define the limits of acceptable and unacceptable positions and functions for all members at the incident scene.

8.4.5* At significant incidents and special operations incidents, the incident commander shall assign a safety officer who has the expertise to evaluate hazards and provide direction with respect to the overall safety of personnel.

8.4.6 At terrorist incidents or other incidents involving potential CBRN exposure, the incident commander shall assess the risk to members and ensure that protective equipment appropriate for the risk is available for and used by members.

8.4.7* Fire departments shall conduct a risk assessment to determine the need to provide appropriate chemical antidote kits for members in the event of a CBRN incident.

8.5 Personnel Accountability During Emergency Operations.

8.5.1* The fire department shall establish written standard operating procedures for a personnel accountability system that is in accordance with NFPA 1561.

8.5.2 The fire department shall consider local conditions and characteristics in establishing the requirements of the personnel accountability system.

8.5.3 It shall be the responsibility of all members operating at an emergency incident to actively participate in the personnel accountability system.

8.5.4 The incident commander shall maintain an awareness of the location and function of all companies or crews at the scene of the incident.

8.5.5 Officers assigned the responsibility for a specific division or group at an incident shall directly supervise and account for the companies and/or crews operating in their specific area of responsibility.

8.5.6 Company officers shall maintain an ongoing awareness of the location and condition of all company members.

8.5.7 Where assigned as a company, members shall be responsible to remain under the supervision of their assigned company officer.

8.5.8 Members shall be responsible for following personnel accountability system procedures.

8.5.9 The personnel accountability system shall be used at all incidents.

8.5.10* The fire department shall develop, implement, and utilize the system components required to make the personnel accountability system effective.

8.5.11* The standard operating procedures shall provide the use of additional accountability officers based on the size, complexity, or needs of the incident.

8.5.12 The incident commander and members who are assigned a supervisory responsibility for a division or group that involves multiple companies or crews under their command shall have assigned a member(s) to facilitate the ongoing tracking and accountability of assigned companies and crews.

Δ 8.6 Members Operating at Emergency Incidents.

8.6.1 The fire department shall provide an adequate number of personnel to safely conduct emergency scene operations.

8.6.1.1 Career fire departments shall meet the requirements of 5.2.4 of NFPA 1710.

8.6.1.2 Volunteer fire departments shall meet the requirements of Section 4.3 of NFPA 1720.

8.6.1.3* Operations shall be limited to those that can be safely performed by the personnel available at the scene.

8.6.2 No member or members shall commence or perform any fire-fighting function or evolution that is not within the established safety criteria of the organizational statement as specified in 4.1.1.

8.6.3 When inexperienced members are working at an incident, direct supervision shall be provided by more experienced officers or members.

8.6.3.1 The requirement of 8.6.3 shall not reduce the training requirements contained in 5.1.3 and 5.1.4.

8.6.4* Members operating in hazardous areas at emergency incidents shall operate in crews of two or more.

8.6.5* Crew members operating in hazardous areas shall be in communication with each other through visual, audible, or physical means or safety guide rope, in order to coordinate their activities.

8.6.6 Crew members shall be in proximity to each other to provide assistance in case of emergency.

8.6.7 In accordance with the requirements of 8.8.2, at least two members shall be present outside the hazardous area available for assistance or rescue at emergency operations where members are operating inside a hazardous area.

8.6.8* At aircraft rescue fire-fighting incidents, the initial IDLH shall be identified as the area from wingtip to wingtip for the specific aircraft.

8.6.8.1 After size-up, the incident commander shall adjust the IDLH designation as the situation dictates, to meet operational needs.

8.6.8.2 Aircraft rescue fire-fighting operations inside the area identified as the IDLH shall be in accordance with 8.6.4.

Δ 8.6.9* When members are operating at a structure fire or performing special operations, the highest available level of emergency medical care shall be standing by at the scene with medical equipment and transportation capabilities.

8.6.9.1 Basic life support (BLS) shall be the minimum level of emergency medical care.

8.6.10 Emergency medical care and medical monitoring at hazardous materials incidents shall be provided by or supervised by personnel who meet the minimum requirements of NFPA 473.

8.6.11 At all emergency operations, except as required in 8.6.9 and 8.6.10, the incident commander shall evaluate the risk to the members operating at the scene and, if necessary, request that at least BLS personnel and patient transportation be available.

8.6.12 When members are operating from aerial devices, they shall be secured to the aerial device with a system in compliance with NFPA 1983.

8.6.13 The incident commander shall ensure that personnel working in an IDLH atmosphere or hazardous area use applicable protective clothing and SCBA for risks that could be encountered.

8.6.13.1 Members performing overhaul operations shall wear applicable protective clothing and a supplied-air respirator.

8.6.13.2 When overhaul is not actively taking place, fire investigators or other members who enter the fire area following extinguishment shall wear protective clothing and a supplied-air respirator or an appropriate air-purifying respirator for respiratory hazards that could be encountered.

8.6.14* Members involved in water rescue shall be issued and wear personal flotation devices that meet US Coast Guard requirements.

8.6.15 Fire departments shall develop a standard operating procedure for operating near hazardous energy sources.

8.6.15.1* Procedures shall be developed for isolating personnel from the energized conductor.

8.6.15.2 All fire fighters shall be made aware of the increased danger involving downed power lines when working, especially in limited visibility.

8.6.15.3 Fire department personnel shall not be permitted to move or cut electrical meters.

8.6.15.4 Fire fighters shall locate and isolate downed electrical wires and wait for utility company personnel to disconnect the power to those wires.

8.6.15.4.1 In cases of known immediate life-threatening situations, properly trained and equipped personnel shall be permitted to mitigate the hazard.

8.6.15.5* Fire fighters shall keep a minimum safe distance from an overhead or downed power line until the line is de-energized and always function under the premise that a line is hot.

8.6.15.6 The incident commander shall convey and continually re-evaluate strategic decisions related to fireground electrical hazards to all personnel on the scene.

8.6.15.7 All fire fighters shall be made aware of the hazards of applying a solid-stream water application around energized electrical conductors.

8.6.15.8 All fire fighters shall be repeatedly trained in safety-related practices for working around electrical energy.

8.6.15.9 Fire departments shall develop a standard operating procedure for operating near rooftop photovoltaic (PV) generators.

8.6.15.9.1* Procedures shall be developed for isolating personnel from the energized equipment.

8.6.15.9.2 All fire fighters shall be made aware of the increased danger involving rooftop PV equipment when working, especially in limited visibility.

8.6.15.9.3 Fire department personnel shall notify the incident commander of any PV electrical generators on the premises.

8.6.15.9.4 In cases of known immediate life-threatening situations, properly trained and equipped personnel shall be permitted to mitigate the hazard.

8.6.15.9.5* Fire fighters shall keep a minimum distance from PV electrical generators until the system is de-energized and shall always function under the premise that the array is hot.

8.6.15.9.6 The incident commander shall convey to all personnel on the scene and continually re-evaluate strategic decisions related to fireground electrical hazards involving PV systems.

8.6.15.9.7 All fire fighters shall be made aware of the hazards of applying a solid-stream water application around energized PV systems.

8.6.15.9.8 All fire fighters shall be repeatedly trained in safety-related practices for working around PV systems.

N **8.6.16** Fire departments shall develop an SOP for operations during a wildland fire in accordance with NFPA 1143.

8.7 Emergency Incident Hazard Control Zones.

8.7.1 Emergency incident hazard control zones shall be established at every emergency incident to identify the level of risk to emergency responders and the appropriate level of PPE.

N **8.7.1.1** Hazard control zones shall be utilized for the purpose of emergency incident contamination control.

8.7.2 The perimeters of the emergency incident hazard control zones shall be designated by the incident commander.

8.7.3 If the perimeters change during the course of the incident, these changes shall be communicated to all members on the scene.

8.7.4* Emergency incident hazard control zones shall be as follows:

(1) Designated as no-entry, hot, warm, and cold (similar to hazardous materials incidents)
(2) Marked with the applicable colored hazard tape, signage, or other appropriate means wherever possible
(3) Communicated to all personnel attending the incident prior to being assigned to a hazard zone

Δ **8.7.4.1*** Hot zone (red tape) is the area that presents the greatest risk of injury and contamination exposure to members and will often be classified as an IDLH atmosphere; therefore all members shall wear all of the PPE appropriate for the risks that might be encountered while in the hot zone.

8.7.4.1.1* All members operating within the hot zone shall have an assigned task.

8.7.4.2* Warm zone (yellow tape) shall serve as a limited access area for members directly aiding or in support of operations in the hot zone where significant risk of human injury can still exist.

N **8.7.4.2.1*** The warm zone shall serve as a limited access area where preliminary exposure reduction strategies are employed and the threat of cross contamination persists.

8.7.4.3 Cold zone (green tape) shall establish the public exclusion or clean zone where there are minimal risks for human injury or exposure, or both, in this zone.

N **8.7.4.3.1** The cold zone shall be established outside the area where contamination is being mitigated.

8.7.4.4 No-entry zone (red/white chevron tape) is the area at an incident scene that no person(s) shall be permitted to enter due to imminent hazard(s), dangerous conditions, or the need to protect evidence.

8.7.4.4.1* Where a no-entry zone is designated, no personnel shall enter regardless of PPE.

8.7.4.4.2* Where red/white chevron tape is not readily available, no-entry zones shall be marked using three horizontal strands of yellow barrier tape, spaced 18 to 24 in. (460 to 610 mm) apart and securely fixed to stationary supports.

8.7.4.4.3* No-entry zones shall be illuminated to enhance nighttime visibility.

8.7.4.4.4 Where the threat of a building collapse exists, a collapse zone shall be established.

8.7.4.4.4.1 A collapse zone shall be a No-Entry Zone.

8.7.4.4.4.2* Collapse zones shall be established around the perimeter of the building at a distance that is equal to a minimum of 1.5 times the height of the building.

8.7.5 The incident commander shall ensure that the designation of the correct protective clothing and equipment is commensurate with the hazard in the zone the member will be operating in.

8.7.6 All officers and members shall ensure the correct use of PPE within that zone.

8.7.7 The process of utilizing emergency incident hazard control zones shall continue until the incident hazards have been mitigated or the incident is over.

Δ **8.8 Rapid Intervention for Rescue of Members.**

8.8.1 The fire department shall provide personnel for the rescue of members operating at emergency incidents.

8.8.1.1 Personnel assigned to perform the function of the initial rapid intervention crew (IRIC) or the rapid intervention crew (RIC) shall be trained on the requirements of NFPA 1407.

8.8.2* In the initial stages of an incident where only one crew is operating in the hazardous area at a working structural fire, a minimum of four individuals shall be required, consisting of two members working as a crew in the hazardous area and two standby members present outside this hazardous area available for assistance or rescue at emergency operations where entry into the danger area is required.

8.8.2.1 The "initial stages" of an incident shall encompass the tasks undertaken by the first arriving company with only one crew assigned or operating in the hazardous area.

8.8.2.2 The standby members shall be responsible for maintaining a constant awareness of the number and identity of members operating in the hazardous area, their location and function, and time of entry.

8.8.2.3 The standby members shall remain in radio, visual, voice, or signal line communication with the crew.

8.8.2.4* One standby member shall be permitted to perform other duties outside of the hazardous area, such as apparatus operator, incident commander, or technician or aide, provided constant communication is maintained between the standby member and the members of the crew.

8.8.2.5 The assignment of any personnel, including the incident commander, the safety officer, or operators of fire apparatus, shall not be permitted as standby personnel if by abandoning their critical task(s) to assist or, if necessary, perform rescue, they clearly jeopardize the safety and health of any fire fighter working at the incident.

8.8.2.5.1 No one shall be permitted to serve as a standby member of the fire-fighting crew when the other activities in which the fire fighter is engaged inhibit the fire fighter's ability to assist in or perform rescue, if necessary, or are of such importance that they cannot be abandoned without placing other fire fighters in danger.

8.8.2.6 The standby member shall be provided with full protective clothing, protective equipment, and SCBA appropriate for the risk that might be encountered.

8.8.2.6.1 The full protective clothing, protective equipment, and SCBA shall be immediately accessible for use by the outside crew if the need for rescue activities inside the hazardous area occurs.

8.8.2.7 The standby members shall don full protective clothing, protective equipment, and SCBA prior to entering the hazardous area.

8.8.2.8 When only a single crew is operating in the hazardous area in the initial stages of the incident, this standby member shall be permitted to assist with, or if necessary perform, rescue for members of his or her crew, provided that abandoning his or her task does not jeopardize the safety or health of the crew.

8.8.2.9 Once a second crew is assigned or operating in the hazardous area, the incident shall no longer be considered in the "initial stage," and at least one rapid intervention crew shall be deployed that complies with the requirements of 8.8.2.

8.8.2.10 Initial attack operations shall be organized to ensure that if, on arrival at the emergency scene, initial attack personnel find an imminent life-threatening situation where immediate action could prevent the loss of life or serious injury, such action shall be permitted with less than four personnel.

8.8.2.10.1 No exception as permitted in 8.8.2.10 shall be allowed when there is no possibility to save lives.

8.8.2.10.2 Any such actions taken in accordance with 8.8.2.10 shall be thoroughly investigated by the fire department with a written report submitted to the fire chief.

8.8.3 As the incident expands in size or complexity, which includes an incident commander's requests for additional resources beyond a fire department's initial attack assignment, the dedicated rapid intervention crew (RIC) shall on arrival of these additional resources be either one of the following:

(1) On-scene members designated and dedicated as an RIC
(2) On-scene crew/company or crews/companies located for rapid deployment and dedicated as RICs

8.8.3.1 During fire fighter rescue operations each crew/company shall remain intact.

8.8.4 An RIC shall consist of at least two members and shall be available for immediate rescue of a member or a crew.

8.8.4.1 Each RIC shall be fully equipped with protective clothing, protective equipment, SCBA, and any specialized rescue equipment that could be needed given the specifics of the operation under way.

8.8.5 At incidents where any SCBA being used is equipped with an RIC universal air connection (UAC), the RIC shall have the specialized rescue equipment necessary to complete the RIC UAC connection to a supplied air source.

8.8.5.1 Where applicable, the breathing air source and any hoses and connections shall meet the requirements of NFPA 1981 and be NIOSH certified to 42 CFR 84, "Approval of Respiratory Protective Devices."

8.8.5.2 The breathing air source shall have no less than 42.37 ft^3 (1200 L) of breathing air before entering the hazard area.

8.8.6 The composition and structure of a RIC shall be permitted to be flexible based on the type of incident and the size and complexity of operations.

8.8.7* The incident commander shall evaluate the situation and the risks to operating crews and shall provide one or more RICs commensurate with the needs of the situation.

8.8.8 In the early stages of an incident, which includes the deployment of a fire department's initial attack assignment, the RIC shall be in compliance with 8.2.5.1 and 8.8.2.5 and be either one of the following:

(1) On-scene members designated and dedicated as an RIC
(2) On-scene members performing other functions but ready to redeploy to perform RIC functions

8.8.9 The assignment of any personnel shall not be permitted as members of the RIC if abandoning their critical task(s) to perform rescue clearly jeopardizes the safety and health of any member operating at the incident.

8.8.10 During fire fighter rescue operations each crew/company shall remain intact.

8.8.11 At least one dedicated RIC shall be standing by with equipment to provide for the rescue of members that are performing special operations or for members that are in positions that present an immediate danger of injury in the event of equipment failure or collapse.

8.9 Rehabilitation During Emergency Operations.

8.9.1* Personnel shall undergo rehabilitation in accordance with NFPA 1584.

8.9.1.1* Personnel shall not be permitted to use more than two SCBA cylinders before they are sent to rehabilitation operations.

N **8.9.2** Gross decontamination of PPE shall be performed prior to demobilization.

N **8.9.3** The rehabilitation process shall include on-scene personal hygiene immediately following the removal of PPE.

8.10 Scenes of Violence, Civil Unrest, or Terrorism.

8.10.1* Fire department members shall not become involved in any activities at the scene of domestic disturbance, civil unrest, an active shooter, or similar situations where there is ongoing violence, without the confirmed presence of law enforcement personnel who have deemed the scene secure.

8.10.2 Under no circumstances shall fire department equipment or personnel be used for crowd control or dispersion purposes.

8.10.3* The fire department shall develop and maintain, in conjunction with the local law enforcement agency/agencies, written standard operating procedures that establish a standardized approach to the safety of members, and that shall govern the roles and responsibilities at incidents that involve violence, active shooters, unrest, or civil disturbance.

8.10.3.1* Standard operating procedures shall include at a minimum the following objectives:

(1) In accordance with NIMS guidance, the establishment by fire departments and law enforcement of a single command post (CP) and operate using unified command (UC)
(2) Training with local law enforcement agencies that occurs at least annually
(3) Use of common communications and clear text terminology
(4) Consideration of secondary devices at the main scene and secondary scenes in close proximity to the main scene
(5) For events including incendiary or explosive devices, consideration of fire hazards secondary to the initial blast

8.10.4 The fire department shall be responsible for developing an interagency agreement with its law enforcement agency counterpart to provide protection for fire department members at situations that involve violence.

8.10.5* The fire department shall develop a standard communication method that indicates that an incident crew is faced with a life-and-death situation requiring immediate law enforcement intervention.

8.10.6 Such violent situations shall be considered essentially a law enforcement event, and the fire department shall coordinate with the law enforcement incident commander throughout the incident.

8.10.7 The fire department incident commander shall identify and react to situations that do involve or are likely to involve violence.

8.10.8 In such violent situations, the fire department incident commander shall communicate directly with the law enforcement incident commander to ensure the safety of fire department members.

8.10.9 In such violent situations, the fire department incident commander shall stage all fire department resources in a safe area until the law enforcement agency has secured the scene.

8.10.10 When violence occurs after emergency operations have been initiated, the fire department incident commander shall either secure immediate law enforcement agency protection or shall withdraw all fire department members to a safe staging area.

Δ **8.10.11** At civil disturbances or similar incidents where protective equipment generally considered as law enforcement–related is in use, that protective equipment shall be utilized by members who are trained and qualified to use such equipment.

8.10.12 Fire department companies or crews that provide support to law enforcement agency special weapons and tactics (SWAT) operations shall receive special training.

8.10.12.1 Special standard operating procedures shall be developed that describe the training and safety of these fire department crews for such operations.

8.10.12.2 These activities shall be considered as special operations for the purpose of this standard.

8.11 Post-Incident Analysis.

8.11.1 The fire department shall establish requirements and standard operating procedures for a standardized post-incident analysis of significant incidents or those that involve serious injury or death to a fire fighter.

Δ **8.11.2** The fire department safety officer shall be involved in the post-incident analysis as defined in NFPA 1521.

8.11.3 The analysis shall conduct a basic review of the conditions present, the actions taken, and the effect of the conditions and actions on the safety and health of members.

8.11.4 The analysis shall identify any action necessary to change or update any safety, health, and wellness program elements to improve the welfare of members.

8.11.5 The analysis process shall include a standardized action plan for such necessary changes.

8.11.5.1 The action plan shall include the change needed and the responsibilities, dates, and details of such actions.

Chapter 9 Traffic Incident Management

9.1 Reserved.

9.2 Emergency Operations at Traffic Incidents. Each department shall establish, implement, and enforce standard operating procedures (SOPs) regarding emergency operations involving traffic.

9.2.1 Each department shall provide training on roadway hazards and safety for all personnel.

9.2.2 Each department shall communicate, collaborate, and coordinate with other response agencies when developing SOPs, planning, and training for incident response.

9.3 Placement of Apparatus and Warning Devices. Apparatus and warning devices shall be placed to provide a safe work zone as well as early warning to the motoring public with specific consideration to be given to topography and weather conditions (uphill/upwind) and to protect fire fighters from traffic.

9.4* Use of Apparatus as a Blocking Device. First-arriving apparatus shall be placed in a blocking position order to protect the scene and create a safe work zone from oncoming traffic.

9.4.1* Placement of blocking apparatus upstream/downstream shall be dependent upon traffic conditions and incident hazards.

9.4.2* When a temporary TIMA has been established, the apparatus in the blocking position shall reduce warning lighting.

9.4.3 All additional responding vehicles, when arriving on the scene, shall be positioned downstream from the blocking vehicle with warning lighting reduced, unless their function requires placement before the temporary control zone.

Δ **9.4.3.1** Ambulances shall be positioned in a location to allow patient loading away from traffic.

9.4.4 The blocking apparatus shall establish a buffer between it and the work area.

9.4.5* The following warning devices shall be used to warn oncoming traffic of the emergency operations and the hazards to member(s) operating at the incident:

(1) A minimum of 5 (five) 28 in. or greater (710 mm or greater) fluorescent orange traffic cones with double reflective markings that are compliant with the *MUTCD*
(2) Retroreflective warning signs compliant with the *MUTCD*

Δ **9.4.6** Warning devices shall be placed and utilized with considerations given to visual obstruction such as hills, curves, blind spots, or unusual localized weather conditions such as fog or rain.

9.4.7 Members shall position themselves and any victims in a safe area.

9.4.8 Members shall park or stage unneeded fire apparatus and personal vehicles off the roadway or downstream of the incident work area.

9.4.9* When member assignments place them in potential conflict with motor vehicle traffic, they shall wear a high-visibility garment that meets ANSI 107, *American National Standard for High-Visibility Apparel and Accessories*, unless exposed to fire, heat, flame, or hazardous materials where NFPA-compliant turnout gear is more appropriate.

9.4.10* Personnel assigned to traffic control shall receive training that is commensurate with their duties and in accordance with NFPA 1091.

Chapter 10 Facility Safety

Δ **10.1 Safety Standards.**

10.1.1* All fire department facilities shall comply with all legally applicable health, safety, building, and fire code requirements.

10.1.2 Fire departments shall provide facilities for disinfecting, cleaning, and storage in accordance with NFPA 1581.

10.1.3* All fire stations and fire department facilities shall comply with NFPA *101*.

10.1.3.1 Approved smoke detectors shall be installed outside every sleeping area in the immediate vicinity of the bedrooms and on all levels of the station, including basements.

10.1.3.2 In buildings other than those protected throughout by an approved, supervised automatic sprinkler system installed in accordance with 30.3.5 of NFPA *101* approved smoke detectors shall be installed in every sleeping room.

10.1.3.3 When smoke detectors activate, the general evacuation alarm signal shall operate throughout the entire building.

10.1.3.4 All existing and new fire department facilities shall have carbon monoxide detectors installed in locations in sleeping and living areas, such that any source of carbon monoxide would be detected before endangering the members.

10.1.3.5 Areas not subject to occupancy by persons who are hearing impaired shall not be required to comply with the provisions for visible signals.

N **10.1.3.6** Cooking equipment in fire department buildings shall comply with NFPA 96.

10.1.4 New buildings housing emergency fire, rescue, or ambulance services shall be protected throughout by approved supervised automatic sprinkler systems. [**1:**13:3.2.3]

10.1.5* The fire department shall prevent exposure to fire fighters and contamination of living and sleeping areas from exhaust emissions through the use of direct or source capture systems.

10.1.6 No component of the protective ensemble shall be allowed in sleeping and living areas.

10.1.7 All fire department facilities shall be designated smoke free and tobacco free, which includes electronic delivery systems known as e-cigarettes, e-cigars, e-hookahs, and e-pipes.

10.1.8* Stations utilizing poles to provide rapid access to lower floors shall ensure that the area around the pole hole is secured by means of a cover, enclosure, or other means to prevent someone from accidentally falling through the pole hole.

N **10.1.9** Fire station apparatus bay doors shall comply with the safety features, meant to prevent entrapment and injury, detailed in Section 31 of UL 325, *ANSI/CAN/UL Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems.*

10.2 Inspections.

10.2.1 All fire department facilities shall be inspected at least annually to provide for compliance with Section 10.1. *(See Annex F.)*

10.2.2 Inspections shall be documented and recorded.

10.2.3 All fire department facilities shall be inspected at least monthly to identify and provide correction of any safety or health hazards.

N **10.2.4** A copy of all required health and safety inspection reports shall be provided to the fire department health and safety officer.

10.3* Maintenance and Repairs. The fire department shall have an established system to maintain all facilities and to provide prompt correction of any safety or health hazard or code violation.

N **10.4 Station Alerting.**

N **10.4.1** The fire station alerting system shall incorporate the following features:

(1)* Progressive alerting tones
(2) Pre-announcement of a call such as initial soft voice messaging
(3) Where lighting is automatically activated by the alerting system, graduated fire station interior lighting to allow the eyes to adjust in the sleeping quarters, or be focused solely on pathways
(4)* Zoned alerting if the station has more than one company housed in the facility

N **10.5 Contamination Control Inside Facilities.**

N **10.5.1** All fire stations shall have zones designated indicating the likelihood of contamination exposure.

N **10.5.2** Contamination control zones shall be designated as follows:

(1) Red — Spaces likely to be exposed to contaminants or carcinogens (hot zone)
(2) Yellow — Transition area between contaminated area and clean area (warm zone)
(3) Green — Clean areas such as living, kitchen, dormitory, and so forth (cold/clean zone)

N **10.5.2.1*** Each zone shall have an isolated HVAC system.

N **10.5.2.2** The green zone shall be higher pressure than areas leading into it.

N **10.5.2.3** The transition area (yellow) shall include restroom and shower facilities.

N **10.5.3** The decontamination of contaminated PPE, contaminated clothing, and contaminated equipment shall take place in the red zone.

N **10.5.4** PPE and fire-fighting equipment that is stored in a firehouse 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 or UV light.

N **10.5.4.1** All protective clothing ensembles and ensemble elements shall be stored in accordance with NFPA 1851.

N **10.5.4.2** Wet, soiled, or contaminated protective clothing and equipment shall not be permitted in areas designated for clean storage.

N **10.5.5*** Ice machines shall not be located in red or yellow zones.

Chapter 11 Medical and Physical Requirements

11.1 Medical Requirements.

11.1.1 Fire department candidates shall meet the medical requirements specified in NFPA 1582, Chapter 6.

N **11.1.2** Members of a fire department shall be evaluated as specified in NFPA 1582, Chapter 7 and meet the medical requirements specified in NFPA 1582, Chapter 9.

11.1.3 Medical evaluations shall take into account the risks and the functions associated with the individual's duties and responsibilities.

•

11.1.4 Fire departments that operate their own fixed wing or rotary aircraft shall require fire department pilots who perform fire-fighting operations from the air to maintain a commercial Class 1 medical examination in conformance with Federal Aviation Agency (FAA) regulations for commercial pilots.

11.1.5* Members who are under the influence of alcohol or drugs shall not participate in any fire department operations or other duties.

11.2 Physical Performance Requirements.

11.2.1* The fire department shall develop physical performance requirements for candidates and members who engage in emergency operations.

11.2.2 Candidates shall be qualified as meeting the physical performance requirements established by the fire department prior to entering into a training program to become a fire fighter.

11.2.3 Members who engage in emergency operations shall be annually qualified as meeting the physical performance requirements established by the fire department.

11.2.4 Members who do not meet the required level of physical performance shall not be permitted to engage in emergency operations.

11.2.5 Members who are unable to meet the physical performance requirements shall enter a physical performance rehabilitation program to facilitate progress in attaining a level of performance commensurate with the individual's assigned duties and responsibilities.

11.3 Health and Fitness.

11.3.1 The fire department shall establish and provide a health and fitness program that meets the requirements of NFPA 1583 to enable members to develop and maintain a level of fitness that allows them to safely perform their assigned functions.

11.3.2 The maintenance of fitness levels specified in the program shall be based on fitness standards determined by the fire department physician that reflect the individual's assigned functions and activities and that are intended to reduce the probability and severity of occupational injuries and illnesses.

11.3.3 The fire department health and fitness coordinator shall administer all aspects of the physical fitness and health enhancement program.

11.3.4 The health and fitness coordinator shall act as a direct liaison between the fire department physician and the fire department in accordance with NFPA 1582.

11.4 Confidential Health Data Base.

11.4.1* The fire department shall ensure that a confidential, permanent health file is established and maintained on each individual member.

Δ **11.4.1.1** The individual health file shall be separate from the personal/human resources file and shall be maintained in accordance with the *Americans with Disabilities Act (ADA)*, the *Fair Labor Standards Act (FLSA)*, and 29 CFR 1910.1020, "Toxic and Hazardous Substances."

11.4.2 The individual health file shall record the results of regular medical evaluations, physical performance tests, occupational illnesses or injuries, and any events that expose the individual to known or suspected hazardous materials, toxic products, or contagious diseases.

11.4.3* Health information shall be maintained as a confidential record for each individual member as well as a composite data base for the analysis of factors pertaining to the overall health and fitness of the member group.

11.4.4* If a member dies as a result of occupational injury or illness, autopsy results, if available, shall be recorded in the health data base.

11.5 Infection Control.

11.5.1* The fire department shall actively attempt to identify and limit or prevent the exposure of members to infectious and contagious diseases in the performance of their assigned duties.

11.5.2 The fire department shall operate an infection control program that meets the requirements of NFPA 1581.

11.6 Fire Department Physician.

11.6.1 The fire department shall have an officially designated physician who shall be responsible for guiding, directing, and advising the members with regard to their health and fitness for various duties.

11.6.2 The fire department physician shall provide medical guidance in the management of the occupational safety, health, and wellness program.

11.6.3* The fire department physician shall be a licensed medical doctor or osteopathic physician qualified to provide professional expertise in the areas of occupational safety and health as they relate to emergency services.

11.6.4* The fire department physician shall be readily available for consultation and to provide professional services on an urgent basis.

11.6.4.1 Availability shall be permitted to be accomplished by providing access to a number of qualified physicians.

11.6.5 The fire department shall require that the health and safety officer and the health fitness coordinator maintain a liaison with the fire department physician to ensure that the health maintenance process for the fire department is maintained.

11.7 Fitness for Duty Evaluations.

11.7.1 Fire departments shall establish a process to evaluate the ability of a member to perform essential job functions.

11.7.2 The process to evaluate the fitness of a member to perform essential job functions shall be conducted by a qualified person and confirmed by the fire department physician.

11.7.3 When a member is determined to be unable to perform the essential job functions, the member shall be provided assistance, treatment, or both that is intended to return the member to a condition that will allow him or her to perform the essential job functions.

11.7.4 A member who has been determined to be unable to perform the essential job functions will only be returned to duty when the fire department physician has confirmed that the member can perform the essential job functions.

Chapter 12 Behavioral Health and Wellness Programs

12.1* Behavioral Health Program.

12.1.1* The fire department shall provide access to a behavioral health program for its members and their immediate families.

Δ **12.1.1.1** The behavioral health program shall at a minimum include the capability to provide diagnostic assessment, short-term counseling, crisis intervention, and referral for the following behavioral health and personal problems that could adversely affect the member, as well as fire department work performance:

(1) Substance use disorder
(2) Anxiety
(3) Depression
(4) Suicidality
(5) Potentially traumatic events
(6) Acute stress reactions
(7) Grief
(8) Financial problems
(9) Relationship and/or family problems

N **12.1.1.2** Behavioral health programs that include a peer support component shall ensure that peers are provided with the knowledge and skills to provide support, educate members about behavioral health, serve as a bridge to behavioral health programs and community resources, and build or enhance their peer support programs.

N **12.1.1.3** The fire department shall provide training to all peer support members on the following topics:

(1) Active listening skills
(2) Recognition of mental health and substance abuse problems impacting members
(3) Crisis intervention
(4) How to access referrals to local resources and develop relationships with local behavioral health providers
(5) How to build an effective peer support program

12.1.2* The behavioral health program shall, when clinically indicated, refer members and their immediate families for appropriate clinical and specialty care from providers equipped to deliver evidence-based treatment consistent with current best practices and standards of care.

12.1.2.1 The fire department shall adopt and follow clear written policies regarding alcoholism, substance use disorder, and other behavioral conditions that can adversely affect performance or fitness for duty, or both.

12.1.2.1.1 When fitness for duty is in question, such fitness shall be evaluated and determined in accordance with Section 11.7.

N **12.1.2.2 Confidentiality of Behavioral Health Information.**

N **12.1.2.2.1*** Specific information concerning behavioral health interactions shall be released by the fire department physician only with written permission from the candidate or member, and/or as required by law.

N **12.1.2.2.2** No fire department personnel, other than the behavioral health specialist or appropriate clinical staff, shall have access to a member's records without the express written consent of that member.

N **12.1.2.2.3** Behavioral health records shall include all written and oral communications, notes, and reports arising out of a peer support interaction.

N **12.1.2.2.4** Member records maintained as part of a behavioral health program shall not become part of a member's personnel file.

N **12.1.2.2.5** Member participation in a behavioral health program shall not become part of a member's personnel file.

12.1.2.3* The fire department shall adopt and follow clear, written policies consistent with applicable statutes, regulations, and standards respecting records, confidentiality, data gathering and reporting, and protection and release of privileged information related to its behavioral health program.

12.1.2.3.1 These policies shall identify to whom and under what conditions information can be released and what use, if any, can be made of records for purposes of research, program evaluation, and quality assurance.

12.1.2.3.2 Member records maintained by a behavioral health program shall not become part of a member's personnel file.

12.1.3* The fire department shall provide access to a program to assist members in creating personal resiliency to stress and traumatic exposures.

12.1.4* The fire department shall provide access to a program that supports the enhancement of behavioral health and wellness through leadership development and organizational/group dynamics evaluation and training.

N **12.1.5** Members shall be permitted to utilize accrued leave, including medical leave, or be assigned alternate duty where possible, to access behavioral health services.

N **12.1.6** A member who voluntarily seeks treatment for substance use or behavioral health problems, and who is compliant with the individual treatment and rehabilitation plan established by the behavioral health specialist and/or treating specialist(s), shall not be subject to discipline related to the disclosure.

12.2 Wellness Program.

12.2.1* The wellness program shall provide prevention strategies and health promotion activities related to identified risk factors for fire fighter health and safety.

12.2.2* The wellness program shall, wherever possible, employ prevention strategies and programs supported by peer-reviewed, published research for which published empirical research supports their safety and efficacy.

N **12.2.3** The fire department shall develop a policy on the use of tobacco products for all members.

12.2.3.1 The fire department shall provide a smoking/tobacco use cessation program to incumbent tobacco users that is nonpunitive and operates with short-term and long-term goals.

N **12.2.3.2** The fire department shall develop a policy that candidates be tobacco-free upon appointment and throughout their length of service to the department.

N **12.2.3.3** Members shall not use tobacco products inside the worksite, within or on fire department apparatus, or inside training facilities.

N **12.2.3.4*** The fire department shall develop and implement SOP/Gs to provide strategies to manage the effects of acute and chronic sleep and circadian rhythm disruption that lead to sleep deprivation, fatigue, and other adverse health effects.

Δ Chapter 13 Occupational Exposure to Potentially Traumatic Events

13.1* General.

13.1.1 The fire department physician shall maintain medical oversight of all clinical aspects of the program.

Δ **13.1.1.1** The fire department shall maintain a relationship with an appropriately licensed behavioral health specialist as defined by the occupational safety and health program in NFPA 1582.

13.1.1.2* The behavioral health specialist shall have knowledge and experience working with the fire department culture and traumatic exposure.

13.1.2* The fire department shall adopt and utilize a written policy outlining its protocols to address occupational exposure to potentially traumatic events.

13.1.3 The fire department shall clearly outline assistance and intervention available to affected members.

13.1.3.1 Participation in clinically related interventions shall be voluntary and at the member's election.

13.1.3.2* Where specialty treatment is indicated, referral shall be made to licensed specialists who are certified and competent to provide specialized evidence-based treatment.

Δ Chapter 14 Exposure to Contaminants

Δ **14.1* Training.** The AHJ shall provide training on the hazards associated with exposure to contaminants.

Δ **14.1.1** Training on the hazards associated with exposure to contaminants shall include the following:

(1) Awareness
(2) Prevention
(3) Mitigation
(4) Risk factors

Δ **14.2 Prevention and Mitigation.** The AHJ shall provide standard operation procedures (SOPs) related to the prevention and mitigation of fire-fighter exposure to contaminants.

N **14.3 Risk of Exposure to Contaminants.** An incident area where the risk of exposure to contaminants exists shall be treated as a hot zone as defined by Section 8.7.

14.4 Cleaning and Maintenance.

14.4.1 The AHJ shall provide for the cleaning and maintenance of protective clothing and equipment.

•

N **14.4.2*** The fire department shall ensure that all contaminated protective clothing and protective equipment are immediately removed from service following the incident and cleaned in accordance with NFPA 1851 prior to returning the protective clothing and protective equipment to service.

N **14.4.3** The fire department shall ensure that all contaminated fire-fighting equipment is immediately removed from service following the incident where it was exposed to the products of combustion, soiled, or contaminated and decontaminated according to manufacturer's instructions.

Δ **14.5 Mitigation of Contaminant Exposure.**

14.5.1 Protective clothing and equipment shall be worn during all phases of fireground operations.

14.5.2 Respiratory protection during overhaul shall consist of a supplied-air respirator.

14.5.2.1 APR Use in the Post-Fire Environment.

14.5.2.1.1* An APR with an appropriate chemical canister shall be permitted only when all of the following conditions are met:

(1) The APR is used 2 hours after extinguishment.
(2) No active overhaul is taking place.
(3) Positive pressure ventilation is in place.
(4) Continuous air monitoring is in place and levels are within the following acceptable short-term occupational exposure limits:
   (a) Hydrogen cyanide (HCN) ≤ 4.7 ppm
   (b) Carbon monoxide (CO) ≤ 35 ppm

14.5.2.1.2* The NIOSH-approved APR with CBRNE canister shall be worn to provide protection against atmospheres containing particulates, acid gases, organic vapors, and formaldehyde.

14.5.2.1.3 A filter changeout schedule shall be established for the environmental hazards present at each incident.

N **14.5.3** The fire department shall ensure that following on-scene operations all contaminated PPE are subjected to preliminary exposure reduction while on the scene in accordance with NFPA 1851.

N **14.5.3.1*** Following preliminary exposure reduction, contaminated PPE shall be taken out of service and isolated and contained in accordance with NFPA 1851 prior to leaving the scene.

N **14.5.3.2** Following on-scene operations, contaminated fire-fighting equipment shall be cleaned in accordance with manufacturer instructions.

N **14.5.4** Fire department personnel engaged in cleaning of soiled or contaminated protective clothing and equipment shall wear at least the following safety equipment to mitigate exposure to dermal and airborne contaminants:

(1) Disposable examination gloves (nitrile or other type)
(2) Coveralls/protective garments
(3) A fit-tested P-100 filtering facepiece

14.6 Incident Contaminant Reduction and Personal Hygiene.

N **14.6.1** The AHJ shall adopt procedures to mitigate on-scene exposure to contaminants for personnel exiting the hot zone.

Δ **14.6.2** The AHJ shall train its members on the doffing and containment of contaminated protective clothing and equipment.

14.6.3 Training on doffing and containment of contaminated protective clothing and equipment shall include prevention of possible cross-contamination.

Δ **14.6.4** The AHJ shall provide SOPs related to the decontamination of fire fighters exposed to contaminants.

Δ **14.6.5** The AHJ shall provide decontamination facilities and equipment for fire fighters exposed to contaminants.

Δ **14.6.6*** Fire-fighter personal hygiene following exposure to contaminants shall include the following:

(1) Wiping skin areas near the interfaces of protective clothing and equipment with a wet wipe immediately after doffing
(2) Taking a soap-and-water shower
(3) Changing into a clean uniform after a shower

N **14.6.7** Any clothing worn beneath contaminated PPE shall be cleaned in accordance with NFPA 1581.

N **14.6.8** When personnel respond to an incident in their personal vehicle, the fire department shall ensure that the member is decontaminated.

14.7 Exposure Reporting Requirements.

14.7.1 Following a possible exposure to toxic substances or harmful biological, chemical, or physical agents, the appropriate exposure report(s) shall be completed.

14.7.1.1 Members that experience symptoms associated with occupational exposure to toxic substances or harmful biological, chemical, or physical agents shall request medical evaluation and report the exposure to their supervisor for appropriate exposure report documentation.

•

14.7.2* **Incident Exposure Report.** An incident exposure report shall be utilized to document the possible exposure to toxic substances or harmful biological, chemical, or physical agents during an incident or response.

N **14.7.2.1** The incident exposure report shall be completed as part of an electronic incident reporting system, where responding members are linked with the incident response record.

N **14.7.3 Personal Exposure Report.** A personal exposure report shall be utilized by the member to document an exposure or an injury-related exposure to toxic substances or harmful biological, chemical, or physical agents.

N **14.7.3.1*** A personal exposure report shall be completed by the member following an exposure to toxic substances or harmful biological, chemical, or physical agents during a training exercise or an incident or response.

N **14.7.3.2** Following a training event, or other non-incident-related exposure, where toxic substances or harmful biological, chemical, or physical agents are present, a personal exposure report shall be completed by the member.

N **14.8 Exposure Report Retention and Access.**

N **14.8.1** Exposure reports shall be retained by the fire department for 30 years *(see OSHA 3110, Access to Medical and Exposure Records).*

N **14.8.2** The fire department shall provide members access to their exposure records.

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.1.2.3 It is possible that an existing program or policy can satisfy the requirements of this standard; if so, it can be adopted in whole or in part in order to comply with this standard. Examples of such existing programs and policies can be a mandatory SCBA rule, seat belt rule, corporate safety program, or municipal member assistance program (MAP). The achievement of these objectives is intended to help prevent accidents, injuries, and exposures and to reduce the severity of those accidents, injuries, and exposures that do occur. They will also help to prevent exposure to hazardous materials and contagious diseases and to reduce the probability of occupational fatalities, illnesses, and disabilities affecting fire service personnel.

A.1.4.1 In no case should the equivalency afford less competency of members or safety to members than that which, in the judgment of the authority having jurisdiction, would be provided by compliance with meeting the requirements of Chapter 5.

A.1.5.1 The specific determination of the authority having jurisdiction depends on the mechanism under which this standard is adopted and enforced. Where the standard is adopted voluntarily by a particular fire department for its own use, the authority having jurisdiction should be the fire chief or the political entity that is responsible for the operation of the fire department. Where the standard is legally adopted and enforced by a body having regulatory authority over a fire department, such as the federal, state, or local government or a political subdivision, this body is responsible for making those determinations as the authority having jurisdiction. The plan should take into account the services the fire department is required to provide, the financial resources available to the fire department, the availability of personnel, the availability of trainers, and such other factors as will affect the fire department's ability to achieve compliance.

A.1.5.2 For a fire department to evaluate its compliance with this standard, it must develop some type of logical process. The worksheet in Annex B (Figure B.2) illustrates one way that an action plan can be developed to determine code compliance.

This standard is intended to be implemented in a logical sequence, based upon a balanced evaluation of economic as well as public safety and personnel safety factors. The compliance schedule request ensures that risk is objectively assessed and reasonable priorities set toward reaching compliance. Interim compensatory measures are intended to ensure that safety action is being addressed until full compliance is reached and formally adopted into the fire department organization's policies and procedures. This can include, but is not limited to, increased inspections, testing, temporary suspension or restriction of use of specific equipment, specialized training, and administrative controls.

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, 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 documents in a broad manner, since 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.3.3.3 Air Transfer. Air is allowed to flow from the cylinder with a higher pressure to the cylinder with a lower pressure until the pressure equalizes, at which time the transfer line is disconnected between the two cylinders.

A.3.3.4 Aircraft Rescue and Fire Fighting. Such rescue and fire-fighting actions are performed both inside and outside of the aircraft.

A.3.3.5.1 Hazardous Atmosphere. A hazardous atmosphere can be immediately dangerous to life and health.

A.3.3.8 Candidate. In an employment context, the Americans with Disabilities Act (discussed in further detail in Annex B of NFPA 1582) requires that any medical examination to be conducted take place after an offer of employment is made and prior to the commencement of duties. Therefore, in the employment context, the definition of *candidate* should be applied so as to be consistent with that requirement. Volunteer fire fighters have been deemed to be "employees" in some states or jurisdictions. Volunteer fire departments should seek legal counsel as to their legal responsibilities in these matters.

A.3.3.10 Chemical Flash Fire. A policy of wearing protective clothing is needed that recognizes the significant threat to fire fighters who can be exposed to flash fires in either structural fire-fighting or hazardous materials environments. It is hoped that fire fighters utilize awareness training on burn injuries caused by the ignition of the environment. There is a distinct difference between chemical flash fires and flashovers occurring in structural fire-fighting environments.

Flashover is a phenomenon that generates temperatures in the range of 1200°F to 1500°F (650°C to 815°C). A chemical flash fire requires an ignition source and a chemical atmosphere that contains a concentration above the lower explosive limit (LEL) of the chemical. Chemical flash fires generate heat from 1000°F to 1900°F (540°C to 1040°C). As a rule, a structural fire flashover is confined to a designated area with walls as a boundary. The size of a chemical flash fire depends on the size of the gas or vapor cloud and, when ignited, the flame front expands outward in the form of a fireball. The resulting effect of the fireball's energy with respect to radiant heat significantly enlarges the hazard areas around the gas released. [**1991,** 2016]

A.3.3.12 Clear Text. Ten codes or agency-specific codes should not be used when using clear text.

A.3.3.17 Company. For fire suppression, jurisdictions exist where the response capability of the initial arriving company is configured with the response of two apparatus. In some jurisdictions, apparatus is not configured with seated and belted positions for four personnel and therefore would respond with an additional vehicle in consort with the initial arriving engine to carry additional personnel. This response would be to ensure that a minimum of four personnel are assigned to and deployed as a company. The intent of this definition and the requirements in the standard is to ensure that these two (or more) pieces of apparatus would always be dispatched and respond together as a single company. Some examples of this include the following:

(1) Engine and tanker/tender that would be responding outside a municipal water district
(2) Multiple-piece company assignment, specified in a fire department's response standard operating procedures, such as an engine company response with a pumper and a hose wagon
(3) Engine with a vehicle personnel carrier
(4) Engine with an ambulance or rescue unit

Company, as used in this standard, is synonymous with company unit, response team, crew, and response group, rather than a synonym for a fire department.

A.3.3.18 Confined Space. Additionally, a confined space is further defined as having one or more of the following characteristics:

(1) The area contains or has a potential to contain a hazardous atmosphere, including an oxygen-deficient atmosphere.
(2) The area contains a material with a potential to engulf a member.
(3) The area has an internal configuration such that a member could be trapped by inwardly converging walls or a floor that slopes downward and tapers to a small cross section.
(4) The area contains any other recognized serious hazard.

N **A.3.3.19 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.

A.3.3.23 Crew Resource Management (CRM). The National Transportation Safety Board implemented a Cockpit Resource Management program in early 1980. This program was a direct result of the unfortunate crash of United Airlines Flight #173 just outside of Portland, Oregon. This crash claimed the lives of 10 people, including the flight crew's second officer. Over the years, the program was recognized as being so effective that it was rewritten as Crew Resource Management (CRM) program to include everyone that has a part in flight operations, from baggage handlers to fuelers to gate agents to pilots.

A.3.3.24 Cryogenic Liquid. Cryogenic liquids include, but are not limited to, helium, nitrogen, and oxygen. [**1991,** 2016]

A.3.3.28.1 Communicable Disease. Also known as contagious disease.

A.3.3.34 Faceshield. Faceshields should be used only in conjunction with spectacles and/or goggles.

A.3.3.39 Fire Department. The term *fire department* can include any public, governmental, private, industrial, or military organization engaging in this type of activity.

A.3.3.40 Fire Department Facility. This does not include locations where a fire department can be summoned to perform emergency operations or other duties, unless such premises are normally under the control of the fire department.

A.3.3.43.1 Proximity Fire Fighting. Specialized thermal protection from exposure to high levels of radiant heat, as well as thermal protection from conductive and convective heat, is necessary for persons involved in such operations due to the scope of these operations and the close distance to the fire at which these operations are conducted, although direct entry into flame is *not* made. These operations usually are exterior operations but could be combined with interior operations. Proximity fire fighting is not structural fire fighting but could be combined with structural fire-fighting operations.

A.3.3.45 Fire Suppression. Fire suppression includes all activities performed at the scene of a fire incident or training exercise that expose fire department members to the dangers of heat, flame, smoke, and other products of combustion, explosion, or structural collapse.

A.3.3.46 Flame Resistance (Protective Apparel). Flame resistance can be an inherent property of the textile material, or it can be imparted by specific treatment.

N **A.3.3.49 Gross Decontamination.** Victims of a hazardous material release that is potentially life threatening due to continued exposure from contamination are initially put through a gross decontamination, which will significantly reduce the amount of additional exposure. This is usually accomplished by mechanical removal of the contaminant or initial rinsing from handheld hose lines, emergency showers, or other nearby sources of water. Responders operating in a contaminated zone in personal protective equipment (PPE) are put through gross decontamination, which will make it safer for them to remove the PPE without exposure and for members assisting them.

A.3.3.50 Hazard. Hazards include the characteristics of facilities, equipment, systems, property, hardware, or other objects and the actions and inactions of people that create such hazards.

A.3.3.56 Health and Safety Officer. This individual can be the incident safety officer, or that can also be a separate function.

A.3.3.63 Incident Management System (IMS). The system is also referred to as an incident command system (ICS).

A.3.3.64 Infection Control Program. This program includes, but is not limited to, implementation of written policies and standard operating procedures regarding exposure follow-up measures, immunizations, members' health screening programs, and educational programs.

A.3.3.69 Liquefied Gas. Examples of liquefied gases include, but are not limited to, ammonia, 1,2-butadiene, chlorine, ethylene oxide, hydrogen chloride, liquefied petroleum gas, and methyl chloride. Testing in NFPA 1991 is only conducted for a limited number of liquefied gases. Users should consult the technical data package to determine which liquefied gases have been tested with the suit's primary materials. [**1991,** 2016]

A.3.3.70 Member. A fire department member can be a full-time or part-time employee or a paid or unpaid volunteer, can occupy any position or rank within the fire department, and can engage in emergency or non-emergency operations.

A.3.3.76.1 Defensive Operations. Defensive operations are generally performed from the exterior of structures and are based on a determination that the risk to personnel exceeds the potential benefits of offensive actions.

A.3.3.76.5 Special Operations. Special operations include water rescue, extrication, hazardous materials, confined space entry, high-angle rescue, aircraft rescue and fire fighting, and other operations requiring specialized training.

A.3.3.78 Particulates. Particulates do not include aerosols or suspended liquid droplets in air. Aerosols are considered liquids.

N **A.3.3.81 Power-Assisted Patient Cot.** This system might or might not require two attendants to operate but uses the powered assistance to reduce the strain and workload placed on attendees when raising and lowering the cot and when loading and unloading the cot from an ambulance.

A.3.3.84 Protective Ensemble. The elements of the protective ensemble are coats, trousers, coveralls, helmets, gloves, footwear, and interface components.

A.3.3.87 Rapid Intervention Crew/Company (RIC). Emergency services personnel respond to many incidents that present a high risk to personnel safety. Departments in compliance with 29 CFR 1910.134, "Respiratory Protection," must have a minimum of two persons on-scene, fully equipped when members are operating in an IDLH or potentially IDLH atmosphere. The primary purpose is the rescue of injured, lost, or trapped fire fighters. Departments utilizing an incident management system in accordance with NFPA 1561 or 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response," along with a personnel accountability system have incorporated the RIC into their management system. Many departments have redefined their response plans to include the dispatch of an additional company (engine, rescue, or truck) to respond to incidents and stand by as the RIC. Incident commanders can assign additional RICs based on the size and complexity of the incident scene. In some departments they can also be known as a rapid intervention team. At wildland incidents this would be addressed through the planning process and contingency planning.

A.3.3.92 Respiratory Protection Equipment (RPE). Examples are filter respirators, chemical cartridge or canister respirators, air-line respirators, powered air-purifying respirators, and self-contained breathing apparatus.

Δ **A.3.3.96 Safety Officer.** The safety officer can have assistants. There are agencies that identify the safety officer as an incident safety officer according to NFPA 1521.

For the purposes of this document, a safety officer is a member of the command staff responsible for monitoring and assessing safety hazards or unsafe situations and for developing measures for ensuring personnel safety.

A.3.3.102 Spectacles. Safety glasses are an example of spectacles.

A.4.1.1 The organizational statement is a very important basis for many of the provisions of this standard. The statement sets forth the legal basis for operating a fire department, the organizational structure of the fire department, number of members, training requirements, expected functions, and authorities and responsibilities of various members or defined positions.

A key point is to clearly set out the specific services the fire department is authorized and expected to perform. Most fire departments are responsible to a governing body. The governing body has the right and should assert its authority to set the specific services and the limits of the services the fire department will provide and has the responsibility to furnish the necessary resources for delivery of the designated services. The fire department should provide its governing body with a specific description of each service with options or alternatives and with an accurate analysis of the costs and resources needed for each service.

Such services could include structural fire fighting, wildland fire fighting, airport/aircraft fire fighting, emergency medical services, hazardous materials response, high-angle rescue, heavy rescue, and others.

Spelling out the specific parameters of services to be provided allows the fire department to plan, staff, equip, train, and deploy members to perform these duties. It also gives the governing body an accounting of the costs of services and allows it to select those services they can afford to provide. Likewise, the governing body should identify services it cannot afford to provide and cannot authorize the fire department to deliver, or it should assign those services to another agency.

The fire department should be no different from any other government agency that has the parameters of its authority and services clearly defined by the governing body.

Legal counsel should be used to assure that any statutory services and responsibilities are being met.

The majority of public fire departments are established under the charter provisions of their governing body or through the adoption of statutes. These acts define the legal basis for operating a fire department, the mission of the organization, the duties that are authorized and expected to be performed, and the authority and responsibilities that are assigned to certain individuals to direct the operations of the fire department.

The documents that officially establish the fire department as an identifiable organization are necessary to determine specific responsibilities and to determine the parties responsible for compliance with the provisions of this standard.

In many cases, these documents could be a part of state laws, a municipal charter, or an annual budget. In such cases, it would be appropriate to make these existing documents part of the organizational statement, if applicable.

In cases other than governmentally operated public fire departments, there is a need to formally establish the existence of the organization through the adoption of a charter, the approval of a constitution or articles of incorporation, or some equivalent official action of an authorized body. A fire department that operates entirely within the private sector, such as an industrial fire department, could legally establish and operate a fire protection organization by the adoption of a corporate policy as described in the organizational statement.

In addition to specifically defining the organization that is expected to comply with this standard, 4.1.1 requires that the organizational structure, membership, expected functions, and training requirements be contained in documents that are accessible for examination. These requirements are intended to reinforce the fact that the fire department is an identifiable organization that operates with known and specific expectations.

Where a fire department functions as a unit of a larger entity, such as one of several municipal departments or a particular unit of a private corporation, the larger organization is often able to provide some of the same elements that are required to be provided by the fire department. This would satisfy the requirements for the fire department to provide those elements.

A.4.1.2 Additional information on fire department organization and operations can be found in Section 7 of the NFPA *Fire Protection Handbook* and in Chapter 4 of *Managing Fire and Rescue Services*, published by the International City/County Management Association.

A.4.1.5 They should be done in accordance with NFPA 1620 to provide assistance to responding personnel in effectively managing emergencies for the protection of occupants, responding personnel, property, and the environment.

A.4.1.5.1 They should be done in accordance with NFPA 241.

A.4.2.1 The risk management plan should consider all fire department operations, the duties and responsibilities of members (uniform and civilian), and policies and procedures. The risk management plan should include goals and objectives to ensure that the risks associated with the daily operations of the fire department are identified and effectively managed.

For additional guidance on the development of a risk management plan, see NFPA 1250.

N **A.4.2.2(7)** These could include fire inspections of new construction, fire inspections of existing buildings, pre-fire planning activities, public education, mass gatherings, planned events, and community risk reduction activities. As an example, conducting fire inspections on a new construction job site has a specific set of risk exposures that should be incorporated into a risk management plan with appropriate risk mitigation practices including training and PPE.

A.4.2.3 The entire risk management decision-making process can be summarized as follows:

(1) Identify or recognize
(2) Evaluate
(3) Establish priorities for action
(4) Act and control
(5) Monitor and re-evaluate

Discussions about frequency and risk arise in the evaluation phase. What are the real or potential risks in terms of frequency and severity to fire department members? How will the organization develop effective control measures to ensure a safe work environment for all members?

Since no two fire departments are alike, there is no standard scale to measure and evaluate frequency and risk. Some fire departments will have a greater or lesser degree of tolerance

for risk than others. The intent of the risk management process is for a fire department to develop a standard level of safety. This standard level of safety defines the parameters of the acceptable degree of risk for which members perform their job functions.

By definition, frequency is how often something does, or might, happen. Risk is a measure of the consequences if an undesirable event occurs. There are many factors that enter into the risk discussion, including cost, time lost from work, loss of use of resources, inability to deliver services, and fewer services available. Each risk will have its own set of factors that will dictate how the fire department will try to determine how severe the consequences might be.

This scale is used to establish the degree of priority. Priority of the risk is in direct relation to inherent risks that have had a harmful effect on the department and its members.

A primary purpose of the risk management plan is to focus efforts on incidents that might not occur very often (low frequency) but that could have severe consequences associated with them (high risk). The reason for the focus on low frequency/high risk incidents is that since they do not occur on a frequent basis, responders might not be as prepared to deal with them, and the outcomes can be harmful or detrimental to fire fighters. Examples of low frequency/high risk events could include high rise fires, technical rescues, multi-alarm fires, or mass casualty incidents.

There are two factors that will ensure that a low frequency/high risk event will be successful. The first factor is an aggressive training program. Every day is a training day. With an aggressive training program, this will ensure the successful outcome of an incident. The second factor is rapid prime decision making. Personnel, through training and continuous retraining, have the necessary knowledge, skills, and abilities (KSA) to ensure the successful outcome of a low frequency/high risk incident.

Figure A.4.2.3 illustrates the relationship between frequency and risk, and emphasizes the importance of addressing low frequency/high risk incidents.

A.4.3.1 The following is an example of a safety policy statement:

It is the policy of the fire department to provide and to operate with the highest possible levels of safety and health for all members. The prevention and reduction of accidents, injuries, and occupational illnesses are goals of the fire department and shall be primary considerations at all times. This concern for safety and health applies to all members of the fire department and to any other persons who could be involved in fire department activities.

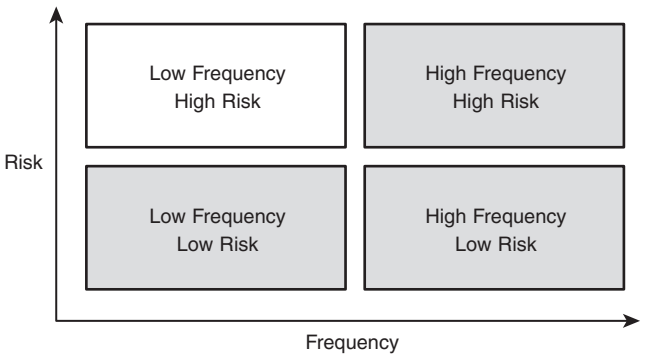


FIGURE A.4.2.3 Risk and Frequency Graph.

A.4.3.3 Experience has shown that there is often a significant difference between a written occupational safety, health, and wellness program and the actual program that has been implemented. Periodic evaluations are one method the fire chief can use to measure how the program is being conducted. This evaluation should be conducted by a qualified individual from outside of the fire department, because outside evaluators provide a different perspective, which can be constructive. Outside evaluators could include municipal risk managers, safety directors, consultants, insurance carrier representatives, fire chiefs, safety officers, or others having knowledge of fire department operations and occupational safety, health, and wellness program implementation.

A.4.4.3 The responsibility for establishing and enforcing safety rules and regulations rests with the management of the fire department. Enforcement implies that appropriate action, including disciplinary measures if necessary, will be taken to ensure compliance. A standard approach to enforcement should address both sanctions and rewards. All fire department members should recognize and support the need for a standard regulatory approach to safety and health. In addition to the management responsibilities, an effective safety program requires commitment and support from all members and member organizations.

A.4.4.5 The importance of investigating accidents to personnel, equipment, or vehicles in relation to the prevention of reoccurring accidents is time-proven. However, the occurrence of an accident is, fortunately, relatively rare considering the amount of action carried out by fire service members. Relying solely on accident data to prescribe safety procedures is analogous with closing the birdcage after the bird has escaped.

Compared to the actual number of accidents reported, a host of incidents known as near-misses occur. The philosophy of investigating near-miss incidents deserves merit. There are countless "almost-accidents" that occur every day.

In an effort to truly prevent more accidents, and to effectively manage the safety of the personnel, near-miss incidents should be documented and quantified to truly determine the exposures to risk that people, equipment, and vehicles are exposed to each day. These incident investigations begin with a culture that readily accepts near-miss incident reports without penalty or ridicule. A system should also be in place to investigate the near-miss incident to determine the causal factors involved. Examples can include human error, lack of education or training, lack of familiarity with or operation of equipment, or equipment malfunctions or design shortcomings.

Managing the infinite possibilities of near-miss incidents and accidents is laborious and seems overwhelming. Attention to the risks measured in the workplace and investigation into the potential incidents and accidents is, arguably, the beginning of an effective safety process.

See also A.4.4.3.

A.4.4.5.4 The National Fire Fighter Near-Miss Reporting System is a voluntary, confidential, non-punitive, and secure reporting system with the goal of improving fire fighter safety.

Submitted reports are available at www.firefighternearmiss.com and should be reviewed by members.

A.4.5.1 One of the most important provisions for improving the safety and health of the fire service is through an official organizational structure that has the support of the members and the fire department management. Without official recognition and support, safety and health committees could be ineffective showpieces, lack authority, or be dominated by particular interests. To avoid such situations, it is recommended that a safety and health committee be composed of equal numbers of fire department management representatives and member representatives. Specific areas of responsibility of the joint safety and health committee should be outlined in detail through written procedures or contractual negotiation.

A.4.5.3 The requirement in 4.5.3.1 for one regularly scheduled meeting every 6 months is intended as a minimum. Committee meetings should be held as often as necessary to deal with the issues confronting the group. The written minutes of each meeting should be distributed and posted in a conspicuous place in each fire station so that all members can be aware of issues under discussion and actions that have been taken.

A.4.6.1 The data collection system for accidents, injuries, illnesses, exposures, and deaths should provide both incident-specific information for future reference and information that can be processed in studies of morbidity, mortality, and causation. The use of standard coding as provided by NFPA 901 will allow compatibility with national and regional reporting systems.

N **A.4.6.2** Fire-fighter exposure data collection systems should include, at a minimum, the data elements and queries found in the DHS/FEMA/AFG funded National Fire Operations Reporting System (NFORS). The data elements and queries included in NFORS were developed by experts from the CDC, NIOSH, OSHA, University of Miami, University of Arizona, and experienced stakeholders in fire-fighter exposure systems from California and Washington State. NFORS data elements and exposure queries cover all aspects of fire-fighter response and provide individual fire fighters with a personal career diary. The list of NFORS data elements and queries can be viewed at www.nfors.com.

A.4.6.4 See NFPA 1401 for further information and guidance.

A.5.1.1 The primary goal of all training, education, and professional development programs is the reduction of occupational injuries, illnesses, and fatalities. As members progress through various job duties and responsibilities, the department should ensure the introduction of the necessary knowledge, skills, and abilities to members who are new in their job titles, as well as ongoing development of existing skills.

These programs should include information to ensure that members are trained prior to performing individual duties, as well as ongoing professional development to ensure competency.

Training programs should include but not be limited to the following:

(1) Community risk reduction (fire prevention, public education, investigation, etc.)
(2) Health and safety
(3) Fire suppression
(4) Emergency medical
(5) Human resources (leadership, supervision, interpersonal dynamics, equal employment opportunity, etc.)
(6) Incident management system
(7) Hazardous materials
(8) Technical rescue
(9) Information systems and computer technology
(10) Position-specific development (fire fighter, company officer, chief officer, telecommunicator, investigator, inspector, driver/operator, etc.)

A.5.1.4 The use of a structured on-the-job training (OJT) program with close supervision can assist fire departments to utilize new members in non-IDLH environments during emergency operations.

A.5.1.8 For maintenance of structural and proximity PPE refer to NFPA 1851. Departments should develop a training schedule that, at minimum, should include training for new fire fighters and for all members when there is a change in equipment.

A.5.2.2 Statistics presented by the National Fire Protection Association (NFPA) and the United States Fire Administration (USFA) indicate an alarming trend in the increased number of fire fighter fatalities and injuries associated with vehicle operations. Fire departments respond with a variety of apparatus, and the members operating this apparatus must have the appropriate knowledge, skills, and abilities to operate this apparatus.

The first step in this process is to properly train and educate members on the various types of apparatus they could be required to operate. NFPA 1451 provides the curriculum for members to develop the necessary knowledge, skills, and abilities to meet the requirements of 5.2.2. The second step is to ensure that the fire department performs an annual proficiency evaluation of all drivers/operators as required by Section 5.5. Also, the training and education should address the standard operating procedures associated with vehicle operations, especially emergency response.

These are necessary components of the department's plan to reduce the risks associated with vehicle operations. This is a systems approach to ensure the safety and health of members and the citizens they serve.

A.5.2.6 In the United States, federal regulations require a minimum amount of training for fire service personnel who respond to hazardous materials incidents. These requirements can be found in 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response" (OSHA), and in 40 CFR 311, "Worker Protection" (EPA). These regulations affect all fire departments in the United States whether full-time career, part-time, combination career and volunteer, or fully volunteer. These regulations apply in all states and not just in those states with federally approved state OSHA programs.

In the US federal regulations, First Responder Operations Level is defined as follows:

"First responders at the operations level are individuals who respond to releases or potential releases of hazardous substances as part of the initial response to the site for the purpose of protecting nearby persons, property, or the environment from the effects of the release. They are trained to respond in a defensive fashion without actually trying to stop the release. Their function is to contain the release from a safe distance, keep it from spreading, and prevent exposure. First responders

at the operational level shall have received at least 8 hours of training or have had sufficient experience to objectively demonstrate competency in the following areas in addition to those listed in the awareness level and the employer shall so certify:

(1) Knowledge of the basic hazard and risk assessment techniques
(2) Knowing how to properly select and use proper personal protective equipment provided to the First Responder Operations Level
(3) An understanding of basic hazardous materials terms
(4) Knowing how to perform basic control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available with their unit
(5) Knowing how to implement basic decontamination procedures
(6) An understanding of the relevant standard operating procedures and termination procedures"

The First Responder Operations Level in both the US federal regulations and NFPA 472 is similar. Whereas the US federal regulations (29 CFR 1910.120 or 40 CFR 311) govern the fire service in every state in the United States, the minimum level of training for all fire fighters must be the First Responder Operations Level.

A.5.3.1 In order to ensure compliance with the minimum requirements of NFPA 1001 fire department training programs should be accredited by a training organization such as a state fire training agency. In addition, NFPA 1405 provides recommended guidelines for those members who respond to marine vessel fires.

A.5.3.5 The essence of any successful respiratory protection training program is the establishment of written operational policies and the reinforcement of those policies through comprehensive training.

The AHJ should ensure that each member demonstrates knowledge of at least the following:

(1) Why respiratory protection equipment (RPE) is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator
(2) What the limitations and capabilities of the RPE are
(3) How to use the RPE effectively in emergency situations, including situations in which the RPE malfunctions
(4) How to inspect, put on and remove, use, and check the seals of the facepiece
(5) What the procedures are for maintenance and storage of the respiratory protection equipment
(6) How to recognize medical signs and symptoms that can limit or prevent the effective use of RPE
(7) The requirements of Section 7.12

A.5.3.9 Members can be trained and/or certified at the local, state, or national level in basic life support (BLS) or advanced life support (ALS). Jurisdictions can require specialty skills within certain levels.

A.5.3.10 To reduce the risk of an injury or illness members should wear protective ensemble elements that are suitable and appropriate and maintained in a clean and serviceable condition. Members should exercise caution when wearing personal clothing, accessories, or personal equipment items that these items do not adversely affect the performance of the protective ensemble or ensemble element. It is recommended that clothing meeting the requirements of NFPA 1975 be worn whenever possible. Clothing that can melt, drip, burn, shrink, transmit heat, or ignite should not be worn. For care and maintenance of structural and proximity PPE, refer to NFPA 1851.

To avoid the possibility of injury or burns, members should wear clothing made of material that will provide the best protective levels available. It is recommended that Nomex or other fire-resistant clothing be worn whenever possible. Clothing that can melt, drip, burn, shrink, transmit heat, or ignite should not be worn.

A.5.3.13.1 The AHJ should ensure that each member of the fire department is trained on and understands the decontamination process and associated risks of cross-contamination. The root of this training depends on the establishment of key policies and procedures related to occupational hazards and the best practices to prevent exposure to cancer via absorption, inhalation, and ingestion. Members need to be trained in the proper transportation and storage of PPE and the prohibition of these contaminated items from personal living spaces and vehicles, as it relates to cancer. Key questions necessary to determine the knowledge and skills required for the assessment include the following:

(1) What should I do first?
(2) How do I protect myself?
(3) How do I identify the hazards?
(4) How do I prepare for the decontamination process? What are the goals and objectives?
(5) How do I put the process into action?
(6) How do I conduct the operation?
(7) How do I evaluate program effectiveness? How clean is "clean"?
(8) What do I do with evaluation results?
(9) What documentation is required to be completed?
(10) How long do I need to keep the documentation?

A.5.5.3 An annual skills check should address the professional qualification specific to a member's assignment and duty expectation. As an example, a fire fighter is checked for skills required by NFPA 1001. A driver/operator would be checked for skills required by NFPA 1002.

A.5.6.1 Fire departments can utilize instructors who are not necessarily trained and/or certified to the requirements of NFPA 1041. However, in using these instructors they should ensure that they are familiar with the fire department, its organization, and its operations and, in addition, are qualified in that particular area of expertise.

A.5.6.2 Several accidents have occurred where smoke bombs or other smoke-generating devices that produce a toxic atmosphere have been used for training exercises. Where training exercises are intended to simulate emergency conditions, smoke-generating devices that do not create a hazard are required.

A.5.6.3 Hands-on training can present significant risks to personnel. A risk assessment should consider the potential for injury to members and actions that can be taken to mitigate those risks. Training scenarios might pose several risks, including, but not limited to, the following:

(1) Musculoskeletal injuries (e.g., strains and sprains)
(2) Falls
(3) Overexertion, which might lead to heat-related illnesses

(4) Cardiac events

The emergency medical capabilities that should be considered include, but are not limited to, the following:

(1) The provision of pre-placed equipment and supplies (e.g., defibrillators, backboards, emergency kits)
(2) The availability of EMS staffing
(3) The availability of transport capabilities

A.6.1.1 It is recommended that only apparatus that were designed and manufactured to meet the 1991 or later editions of the NFPA fire apparatus standards or that have been refurbished in accordance with NFPA 1912 to meet the 1991 or later editions of the NFPA fire apparatus standards be permitted to operate in first-line service. This will ensure that, while the apparatus might not totally comply with the current edition of the automotive fire apparatus standards, many of the improvements and upgrades required by the standards since 1991 are available for the fire fighters who use the apparatus.

It is recommended that an apparatus manufactured prior to 1991 that is less than 25 years old, that has been properly maintained, and that is still in serviceable condition be placed in reserve status and upgraded to incorporate as many features of the post-1991 fire apparatus as possible. Apparatus not manufactured to NFPA fire apparatus standards or that is over 25 years old should be replaced.

See Annex D of NFPA 1901 for more complete guidelines for first-line and reserve fire apparatus.

A.6.1.6 The means of holding the item in place or the compartment should be designed to minimize injury to persons in the enclosed area of the fire apparatus or patient compartment of an ambulance. Loose equipment during the event of a crash, a rapid deceleration, or a rapid acceleration can be the cause of serious injury or the crash of the apparatus.

A.6.2.1 NFPA 1451 can be used to meet the requirements of an "approved driver training program."

A.6.2.2 The determination of driver's license requirements is a function of a particular authority in each location. This agency can be a state or provincial Department of Transportation or an equivalent agency. Other authorities, such as military branches, have the authority to issue permits to operate their vehicles. It is a responsibility of the fire department to determine the requirements that apply in each situation and for each class of vehicle.

A.6.2.3 Policies should be enacted to limit unnecessary and inappropriate emergency response, as a means of reducing the risk of accidents involving emergency vehicles.

A.6.2.4 The driver of any vehicle has legal responsibility for its safe and prudent operation at all times. While the driver is responsible for the operation of the vehicle, the officer is responsible for the actions of the driver.

A.6.2.7 The development, implementation, and periodic review of standard operating procedures for driving any fire department vehicle is an important element in clearly identifying the fire department's policy on what is expected of drivers. Safe arrival is of prime importance. Standard operating procedures should include a "challenge and response" dialogue between the vehicle driver on an emergency response and the officer or other member in the driver compartment. The "challenge and response" dialogue should be instituted to determine the driver's intentions when approaching any perceived or identified hazard on the response route, to remind the driver of the presence of the hazard and the planned procedures for managing the hazard, and to ensure that the driver is coping with stressors encountered during the response and not focusing only on arriving at the site of the emergency.

The specific inclusion of railroad grade crossing is based upon recommendations made by the National Transportation Safety Board (NTSB) to NFPA following the 1989 investigation of a collision between a fire department pumper and a passenger train. The NTSB report states that "planning how to safely traverse grade crossings encountered en route is a necessary part of any fire company's response plan."

NTSB recommends that the following be considered when developing the plans:

If it is not practical to plan an emergency response route that avoids grade crossings, selection of crossings that are equipped with automatic warning devices is preferable to selection of those that are not. All planning should include identification of the location at the crossing from which a driver or other observer assigned to the apparatus can see the maximum available distance down the track(s) on both sides.

At crossings over a single straight track with no nearby obstructions, briefly stopping or slowing the apparatus to allow a proper scan both left and right can be sufficient. If the tracks are curved, vision is obstructed, or the crossing has more than one set of tracks where the presence of one train could hide the approach of another, sight distance can be optimized by having one or more members cross the tracks on foot and look for approaching trains.

Fire fighter fatality studies describe 10 incidents that occurred from 1984 to 2004 in which fire fighters were killed during the backing of fire apparatus. This is a significant issue that the fire service must address in terms of standard operating procedures, training programs, and implementation.

When fire apparatus is in the backing mode, standard operating procedures need to dictate that members assigned to back apparatus be in communication with the driver/operator. This can be accomplished by using the radio system, intercom system, or other means. Standard operating procedures should dictate that the apparatus not be moved until verbal and visual contact is made with the driver/operator and the backer. Also, standard operating procedures must dictate that the backer be in the line of sight with the driver/operator via the apparatus mirrors on either side of the apparatus. The intent is to ensure that the backing of fire apparatus is accomplished in a safe and effective manner.

A.6.2.7.1 Many incidents require the non-emergency response of fire apparatus. Each fire department must identify incidents that do not require the use of warning lights and sirens. Examples of non-emergency incidents can include lockouts, carbon monoxide detectors sounding, a fire reported out, assist law enforcement, backfills or move-ups, and other incidents as determined by the AHJ. The intent is to reduce the risk to fire department members and the citizens of the community from unnecessary harm. The response can always be upgraded to emergency response if the situation warrants based upon additional information.

Fire department water tankers (tenders) provide a mobile water supply to support fire fighting and other fire department

operations. They are generally used in rural areas without fire hydrant coverage but can also be found in the fleets of many suburban and urban fire departments.

Although their number as a percent of the overall apparatus fleets is small, estimated at just 2 percent, they are involved in a disproportionate number of crashes that are fatal to fire fighters and others. A study of fire fighter fatalities from 1990 through 2000 found that fire tankers were the second most common vehicle type involved in crashes that killed fire fighters. Tankers/tenders were second only to personal vehicles in the number of fatal crashes.

The United States Fire Administration (USFA) produced a report entitled *Safe Operation of Fire Tankers* in 2003. The report (FA-248) is available free from the USFA in print and can be downloaded from the USFA web site at www.usfa.fema.gov. The report provides comprehensive information on the safe construction, use, and operation of fire department tankers/tenders. The report deals with fire apparatus with water tank sizes of 1000 gal (3800 L) or more. The recommendations contained in the report, therefore, can apply to any piece of fire apparatus with a large water tank.

Attention to a small number of operational recommendations can make the operation of fire tankers/tenders safer for fire fighters and those that share the road with this type of apparatus.

The following recommendations should become part of standard operating procedures for departments operating tankers (tenders):

(1) Fire fighters should always wear seat belts when driving or as the passenger in any vehicle, including tankers/tenders. The fire fighter's best chance for survival is to remain with the vehicle during a crash and to be protected by the structure of the vehicle. During the period from 1990 to 2001, 82 percent of the fire fighters killed in tanker/tender crashes were not wearing seat belts.

(2) If the right-hand wheels of the apparatus leave the paved surface of the roadway for any reason, the apparatus should be slowed before attempting to return all wheels to the roadway. In 66 percent of the fatal tanker/tender crashes from 1990 to 2001, the right wheels of the apparatus left the roadway. If the vehicle is returned to the roadway surface at speed, the apparatus can veer violently to the left. Drivers then often overcompensate by steering to the right, and the apparatus either begins to roll or leaves the roadway and crashes. Slowing the vehicle prior to returning to the roadway will minimize the chances of such an event.

(3) *Slow down.* Speed was cited as a factor in 55 percent of fatal crashes of fire department tankers/tenders from 1990 to 2001. The weight of the water and the weight of the apparatus combine to make fire department tankers/tenders very heavy vehicles. They cannot stop quickly, and their handling characteristics are unlike other fire apparatus. The USFA *Safe Operation of Fire Tankers* report recommends that tankers/tenders never be operated over the posted speed limit and that they be controlled to speeds at or less than the cautionary speeds listed on yellow signs on curves.

(4) Make sure that the apparatus is up to the task. Fuel or milk tankers converted to fire department water tankers usually do not have the brake capacity or tank baffles that are needed to transport water — fuel and milk are lighter than water. The total weight of a tanker/tender should not exceed the rated capacity of the vehicle's braking system. In addition to weight concerns, tankers/tenders must be maintained in a ready state. Their mechanical systems must be checked and maintained on a regular basis.

(5) Ensure that drivers/operators have the necessary knowledge, skills, and abilities to specifically drive and operate tankers/tenders. Tankers/tenders do not operate or have the same driving characteristics as other fire apparatus. Drivers should be specifically trained on each vehicle, and untrained drivers should not be allowed to operate tankers/tenders.

(6) Drive with the tank completely full or completely empty. Even with proper baffling, a semi-full water tank will allow water to move more freely. This water movement can create control problems for the apparatus operator. If the full tank of water is not used, dump the rest of the load in a safe place and drive the tanker/tender empty until the entire tank can be filled.

A.6.2.8 Accidents at intersections contribute to both civilian and fire fighter deaths and injuries while fire department vehicles are responding to or returning from an emergency incident. Coming to a complete stop when there are any intersection hazards and proceeding only when the driver can do so safely will reduce accidents and the risk of injury or death. It is recommended that intersection control devices be installed that allow emergency vehicles to control traffic lights at intersections.

A.6.2.10 Vehicle accidents at railroad crossings have resulted in a number of deaths and injuries to fire department members. A study by NTSB concluded that a train's warning horn becomes an ineffective device for warning large vehicles or trucks unless the vehicle driver stops, idles the engine, turns off all radios, fans, wipers, and other noise-producing equipment in the cab, lowers the window, and listens for a train's horn before entering a grade crossing.

A.6.2.14 When members respond to incidents or to the fire station in their own vehicles, the operation of these vehicles is governed by all applicable traffic laws and codes as enacted by the AHJ. All members should be held strictly accountable for compliance with the applicable traffic laws and regulations as well as fire department rules, regulations, and procedures relating to emergency response. Where traffic laws and regulations allow for private vehicles to be operated as emergency vehicles, the fire department should only allow members who have met the requirements to drive fire department vehicles in an emergency mode to drive privately owned vehicles in an emergency mode.

A.6.2.14.2 For more information, see FA-220, *Firefighter Fatality Retrospective Study*, Federal Emergency Management Agency, United States Fire Administration, April 2002.

A.6.3.1 It is intended that the requirements of Section 6.3 apply to all situations when persons or members are riding on fire apparatus other than for the specific variances in 6.3.5 and 6.3.6. Included in the "seated and belted" requirement are any times the fire apparatus is traveling to, participating in, or returning from any funeral, parade, or public relations/education event. Fire fighters cannot be allowed to ride on the outside of apparatus in order to fight wildland fires. The Risk Management Committee (RMC) of the National Wildfire Coordinating Group (NWCG) represents the US Forest Service,

Bureau of Land Management, Bureau of Indian Affairs, US Fish and Wildlife Service, National Park Service, National Association of State Foresters, Intertribal Timber Council, International Association of Fire Chiefs, and the US Fire Administration. Their position is that the practice of fire fighters riding on the outside of vehicles and fighting wildland fires from these positions is very dangerous, and they strongly recommend this not be allowed. One issue is the exposure to personnel in unprotected positions. Persons have been killed while performing this operation. Also, the vehicle driver's vision is impaired. The second issue is that this is not an effective way to extinguish the fire, as it can allow the vehicle to pass over or by areas not completely extinguished. Fire can then flare up underneath or behind the vehicle and could cut off escape routes. The RMC and the NWCG strongly recommend that two fire fighters, each with a hose line, walk ahead and aside of the vehicle's path, both fire fighters on the same side of the vehicle (not one on each side), in clear view of the driver, with the vehicle being driven in uninvolved terrain. This allows the fire fighters to operate in an unhurried manner, with a clear view of fire conditions and the success of the extinguishment. Areas not extinguished should not be bypassed unless follow-up crews are operating behind the lead unit and there is no danger to escape routes or to personnel.

A.6.3.4 There are instances in which members need to provide emergency medical care while the vehicle is in motion. In some situations, the provision of such medical care would not allow the members to remain seated and secured to the vehicle. Such situations, while they occur infrequently, could include performing chest compressions during cardiopulmonary resuscitation (CPR). If a vehicle accident were to occur while an unsecured member was performing necessary emergency medical care, there would be substantial risk of injury to the member.

A.6.3.5 The following recommendations will assist the user in implementing 6.3.5:

(1) Hose loading procedures should be specified in a written standard operating procedure that includes at least the safety conditions listed in A.6.3.5(2) through A.6.3.5(7). All members involved in the hose loading should have been trained in these procedures.
(2) There should be a member, other than those members loading hose, assigned as a safety observer. The safety observer should have an unobstructed view of the hose loading operation and be in visual and voice contact with the apparatus operator.
(3) Non–fire department vehicular traffic should be excluded from the area or should be under the control of authorized traffic control persons.
(4) The fire apparatus can be driven only in a forward direction at a speed of 5 mph (8 km/hr) or less.
(5) No members should be allowed to stand on the tailstep, sidesteps, running boards, or any other location on the apparatus while the apparatus is in motion.
(6) Members should be permitted to be in the hose bed but should not stand while the apparatus is in motion.
(7) Prior to the beginning of each hose loading operation, the situation should be evaluated to ensure compliance with all the provisions of the written procedures. If the written procedures cannot be complied with, or if there is any question as to the safety of the operation for the specific situation, then the hose should not be loaded on moving fire apparatus.

A.6.3.6 The following recommendations will assist the user in meeting the requirements of the standard:

(1) Tiller training procedures should be specified in a written standard operating procedure that includes at least the safety conditions listed in A.6.3.6(2) through A.6.3.6(6). All members involved in tiller training should have been trained in these procedures.
(2) The aerial apparatus should be equipped with seating positions for both the tiller instructor and the tiller trainee. Both seating positions should be equipped with seat belts for each individual. The tiller instructor should be permitted to take a position alongside the tiller trainee.
(3) The tiller instructor's seat should be permitted to be detachable. Where the instructor's seat is detachable, the detachable seat assembly should be structurally sufficient to support and secure the instructor. The detachable seat assembly should be attached and positioned in a safe manner immediately adjacent to the regular tiller seat. The detachable seat assembly should be equipped with a seat belt or vehicle safety harness. The detachable seat assembly should be attached and used only for training purposes.
(4) Both the tiller instructor and the tiller trainee should be seated and belted.
(5) The instructor and trainee should wear and use both helmet and eye protection if not seated in an enclosed area.
(6) In the event the aerial apparatus is needed for an emergency response during a tiller training session, the training session should be terminated, and all members should be seated and belted in the approved riding positions. There should be only one person at the tiller position. During the emergency response, the apparatus should be operated by a qualified driver/operator.

A.6.3.7 Helmets should be worn by all members in riding positions in an open cab that does not provide the protection of an enclosed cab.

A.6.3.8 Primary eye or face protection, or both, should be issued to members who might ride in either exposed positions in open cab apparatus or open tiller seats. Fire department standard operating procedures should outline the safety issues associated with wearing eye protection while driving.

A.6.3.9 Such alternate means of transportation could include, but not be limited to, other fire apparatus, automobiles, and/or other personnel carriers.

A.6.4.1 The purpose of this paragraph is to ensure that all vehicles are inspected on a regular basis and checked for the proper operation of all safety features. This inspection should include tires, brakes, warning lights and devices, headlights and clearance lights, windshield wipers, and mirrors. The apparatus should be started, and the operation of pumps and other equipment should be verified. Fluid levels should also be checked regularly.

Where apparatus is in regular daily use, these checks should be performed on a daily basis. Apparatus stored in unattended stations that might not be used for extended periods should be checked weekly. Any time such a vehicle is used, it should be checked before being placed back in service. The 24-hour reference provides for situations in which a vehicle can be used within the period preceding a scheduled inspection, although

any deficiencies noted in use should be corrected without delay.

The safety equipment carried on fire department vehicles should be inspected in conjunction with the inspection of the vehicle.

A.6.5.6 See A.6.4.1.

A.7.1.1 The provision and use of protective ensemble, ensemble elements, and protective equipment should include safety shoes, gloves, goggles, safety glasses, and any other items appropriate to the members' activities. This applies to all activities members are expected to perform, including non-emergency activities. The applicable regulations pertaining to industrial worker safety should be consulted to determine the need for protective equipment in non-emergency activities. For proper PPE selection, risk assessment as specified in NFPA 1851 should be conducted.

•

A.7.1.5 Because it is impossible to ensure that every member — whether a volunteer, call, or off-duty career member — will respond to an incident in a station/work uniform or will change into station/work uniform clothing before donning protective garments, it is very important that members understand the hazards of some fabrics that more easily melt, drip, burn, shrink, or transmit heat rapidly and cause burns to the wearer.

Clothing made from 100 percent natural fibers or blends that are principally natural fibers should be selected over other fabrics that have poor thermal stability or that ignite easily.

The very fact that members are fire fighters indicates that all clothing that they wear should be inherently flame resistant to give a degree of safety if unanticipated happenings occur that expose the clothing to flame, flash, sparks, or hot substances.

A.7.1.6.1 Examples of the proper type of safety equipment should include safety data sheets (SDS for information on recommended PPE), eye protection (safety glasses and goggles), disposable nitrile or other types of gloves, fluid-resistant coveralls or waterproof apron, P100 filtering facepiece, sharps containers, and eyewash station.

A.7.1.6.3 Fire departments need to be especially diligent in the handling of protective ensembles and ensemble elements that are or are suspected of being exposed to blood and body fluids. Fire departments are encouraged to review the criteria specified in NFPA 1581 and 29 CFR 1910.1030, "Bloodborne Pathogen Standard."

A.7.2.1 The fire department should consider providing each member with two complete sets of structural fire-fighting protective clothing that meet the requirements of NFPA 1971 whenever possible. It is not reasonable to expect that a fire department would have enough stock protective clothing available to all members in the event that the protective clothing became soiled, wet, or contaminated during daily activities. Fire fighters provided with two complete sets of structural fire-fighting protective clothing can change easily into proper-fitting garments and will not be unnecessarily exposed or expose the public to contaminants. Structural protective clothing that is cleaned and properly and completely dried before the next use will last longer and provide greater protection than soiled or damp garments.

N **A.7.2.1.1** Manufacturers offer different protective garments with different patterns and styling. Therefore, one manufacturer's garment of a given size might not correspond to a different manufacturer's garment of the same size. Even when garments are provided based on fire-fighter measurements, fire departments and individual firefighters should conduct a dynamic fit test, which evaluates the degree of fit of the protective clothing on the firefighter and in particular acts as a check on whether the clothing fits correctly and is neither too tight nor too loose.

A dynamic fit test involves the individual firefighter donning his or her clothing and performing a series of movements to determine whether the clothing provides ease of movement without restriction and does not encumber the firefighter from being excessively loose. Suggested movements include the following:

(1) Reaching overhead and side to side
(2) Bending forward and side to side
(3) Squatting and reaching overhead and side to side
(4) Crawling and duck walking
(5) Climbing a ladder
(6) Glove dexterity

In performing this assessment, it is important for the firefighter and an observer knowledgeable in correct fit to identify any restrictions or encumbrance from the clothing item being assessed. This assessment is also best performed with the firefighter wearing his or her other protective clothing items, such as a helmet, a hood, gloves, and footwear, to further ensure that proper coverage is maintained in interface areas during each movement.

If the clothing does not properly fit, the department or individual firefighter should report any fit problems to the manufacturer or provider of the protective clothing to determine whether a different size or clothing modifications will improve fit.

A.7.2.2 Properly fitting protective clothing is important for the safety of the fire fighter. It is important to understand that all protective clothing should be correctly sized to allow for freedom of movement. Protective garments that are too small or too large and protective trouser legs that are too long or too short are safety hazards and should be avoided. Protective coat sleeves should be of sufficient length and design to protect the coat/glove interface area when reaching overhead or to the side. For proper fitting of a fire fighter, the protective clothing manufacturer should be contacted to provide sizing instructions.

A.7.2.4.2 Some protective coats, particularly those certified as part of a protective ensemble with the CBRN option, can include different interface components instead of wristlets to provide increased integrity against penetration of CBRN terrorism agents.

A.7.2.6 A drag rescue device (DRD) has been required as part of protective coats and protective coveralls. However, this feature is not present in all garments and the ability to extract fire fighters can be undertaken by other means through the use of other equipment and procedures. The specific procedures selected by the fire department should take into consideration the equipment provided to the fire fighter, including any elements certified to NFPA 1971, and ensure that any handholds or other means for rapid extrication of the fire fighter stay in place on the fire fighter when deployed.

A.7.3.1 The technical committee's intent is that members utilize the appropriate protective clothing designed specifically

for the type of emergency incident or fire-fighting activities for which the member is regularly engaged.

A.7.4 Fire department personnel involved in emergency medical operations should be protected against potential medical hazards. These hazards include exposure to blood or other body fluids contaminated with infectious agents such as hepatitis and human immunodeficiency viruses. The purpose of emergency medical protective clothing is to shield individuals from these medical hazards and conversely to protect patients from potential hazards from the emergency responder. Emergency medical gloves are to be used for all patient care. Emergency medical garments and face protection devices are to be used for any situation where the potential for contact with blood or other body fluids is high.

NFPA 1999 covers garments, gloves, and face protection devices that are designed to prevent exposure to blood or other body fluids for those individuals engaged in emergency medical patient care and similar operations. NFPA 1999 specifies a series of requirements for each type of protective clothing. Garments can be full-body clothing or clothing items such as coveralls, aprons, or sleeve protectors. For the intended areas of body protection, the garment must allow no penetration of virus, offer "liquidtight" integrity, and have limited physical durability and hazard resistance. Gloves must allow no penetration of virus, offer "liquidtight" integrity, and meet other requirements for tear resistance, puncture resistance, heat aging, alcohol resistance, sizing, and dexterity. Face protection devices can be masks, hoods, visors, safety glasses, or goggles. Any combination of items can be used to provide protection to the wearer's face, principally the eyes, nose, and mouth. For the intended areas of face protection, these devices must allow no penetration of virus, offer "liquidtight" integrity, and provide adequate visibility for those portions of the device covering the wearer's eyes.

A.7.4.2 In order to avoid all potential exposure to infectious diseases, it is important that all members use medical gloves when providing patient care. All members who could come in contact with the patient should use medical gloves.

A.7.6 See Annex E, Selection of Hazardous Materials and CBRN Protective Ensembles.

•

N **A.7.6.1.1** This should be done in accordance with NFPA 475, Chapter 5, Risk Assessment.

N **A.7.6.2** Table A.7.6.2 provides a hierarchy of protection for each of the major categories of protection.

A.7.8.1 Fire departments that provide both wildland and structural fire-fighting services should establish guidelines for members on which ensemble to wear for a given fire-fighting or other emergency incident.

A.7.8.3 Fire shelters are no longer addressed in NFPA 1977. Specifications for fire shelters are provided in USDA Forest Service Specification 5100-606, *Shelter Fire*.

N **A.7.8.4** Wildfires can last hours, days, or weeks, depending on their severity. As a result, fire fighters can be required to work long shifts (i.e., 12 to 24 hours or more) over consecutive days or weeks, while performing a range of physically demanding tasks. Many of these tasks involve the presence of a live fire in wildfire suppression/urban interface fire-fighting, and some are performed away from the fire such as during preparation for, or "mopping up" after, a fire event. In addition to the physical demand imposed by fire-fighting, fire fighters frequently perform their duties under a range of extreme environmental conditions.

Given this combination of long hours, extreme environmental conditions, and physically demanding work, it is important for policy makers in the fire service to understand the impact of performing consecutive work shifts in the heat. If fire fighters cannot sustain their work performance over multiple work days, it can have negative implications for the fire suppression effort. Slowed productivity can result in an increase in the time taken to control a wildfire, which could ultimately place fire fighters, civilians, and civilians' property at undue risk. Most importantly, understanding the physiological and subjective responses to such work is important for fire service in preserving the health and safety of their personnel. This is particularly important, since it appears that fire fighters might have a propensity toward baseline dehydration. There is a strong imperative to encourage proper hydration before being on duty at an incident. Fire fighters also need to be able to better assess and maintain a safe hydration level while on duty, particularly during an extended attack or extreme heat days. This is especially important given the relationship between hydration levels, core temperature, and heart rate. As a person becomes dehydrated, their blood becomes thicker and causes the heart to work harder. This can lead to elevated maximum heart rate, core temperatures, and a myriad of other issues that can significantly diminish a fire fighter's health and safety.

We know from studies that one third of fire fighters routinely arrive for duty in some state of dehydration. The following strategies can be used to maintain proper hydration:

(1) Before work — Drink 1 to 2 cups of juice or water. Eat small amounts of salty foods to stimulate thirst.

N **Table A.7.6.2 Major Categories of Protection**

Level	Chemical Vapors	Chemical Liquids	Biological Liquids	Biological Aerosols	Radiological Particles
Highest	NFPA 1991	NFPA 1991	NFPA 1991	NFPA 1991	NFPA 1991
	NFPA 1994 C1	NFPA 1994 C1	NFPA 1994 C1	NFPA 1994 C1	NFPA 1994 C1
	NFPA 1994 C2	NFPA 1994 C2	NFPA 1994 C2	NFPA 1994 C2	NFPA 1994 C2
↑	NFPA 1994 C3	NFPA 1992	NFPA 1992	NFPA 1992	NFPA 1992
		NFPA 1994 C3	NFPA 1999 MU	NFPA 1999 MU	NFPA 1999 MU
			NFPA 1994 C3	NFPA 1994 C3	NFPA 1994 C3
Lowest			NFPA 1999 SU	NFPA 1994 C4	NFPA 1994 C4

(2) During work — Take several fluid breaks per hour, drinking at least 1 quart of fluid during each hour of hard work in the heat. Fire fighters should drink as much as possible during their lunch break. Water is the body's greatest need during work in the heat. Studies show that workers drink more when lightly flavored beverages are available. Providing a portion of fluid replacement with sports drinks will help fire fighters retain fluids and maintain energy and electrolyte levels. The carbohydrate in sports drinks also helps to maintain immune function and mental performance. The sodium in sports drinks reduces urinary water loss.
(3) After work — Continue drinking to replace lost fluid. The amount of thirst does not indicate the amount of fluids needed for rehydration, so fire fighters should drink more than they think they need. Rehydration is enhanced when fluids or foods contain sodium and potassium, electrolytes that replace those lost through sweat. Sodium also stimulates thirst. Including some protein can help muscles recover from hard work.

Fire fighters can burn as many calories as triathletes; therefore, proper nutrition is vital for mental acuity, immune functions, and energy.

Shift food, which is intermittent feeding throughout the day, maintains blood glucose and work output. Proteins such as meat, milk, and beans, and fats in nuts, meat, and dairy are essential to building muscle. In addition, adequate carbohydrate intake is critical to maintain energy and also helps to improve decision making.

According to NFPA 1584, the following products should be avoided:

(1) Caffeine — It acts as a diuretic and causes a loss of fluids.
(2) Energy drinks — They contain high amounts of caffeine and sugar.
(3) Tobacco
(4) Alcohol
(5) Creatine and creatine supplement

A.7.9.4.1 NIOSH provides nine classes of particulate filters (three classes of filter efficiency — 95 percent, 99 percent, and 99.97 percent), each with three categories of resistance to filter efficiency degradation (N, R, and P). Additionally, performance against toxic industrial gases, vapors, and certain CBRN agents are also specified by NIOSH.

A.7.9.4.2 APRs and PAPRs do not supply oxygen. Use should be limited to known contaminants and known exposure levels and used only in adequately ventilated areas. APRs and PAPRs cannot be used when concentrations of contaminants are unknown, or when appropriate exposure limit is not known, or when cartridge or filter service life is unknown.

A.7.10 Fire department personnel involved in surface water operations should be protected against potential hazards. These hazards include exposure to physical, environmental, thermal, and certain common chemical and biological hazards.

NFPA 1952 covers full body suits, helmets, gloves, footwear, and personal flotation devices for those individuals engaged in surface water operations and similar operations. NFPA 1952 specifies a series of requirements for each type of protective clothing. Requirements are established for dry suit environments, wet suit environments, and ice suit environments.

A.7.12.1.1 Selection of respiratory protection devices is an important function, particularly where resources are limited and respirators have to be used for different applications with different equipment. Urban search and rescue (USAR), CBRN, confined space, hazardous materials, and other operations can require different filter elements, SCBA breathing air cylinders, umbilical connections, and features that are easier to ascertain and coordinate with a selection stage.

A.7.12.4 At least one additional reserve SCBA should be available at the incident scene for each 10 SCBA in use, to provide for replacement if a failure occurs.

A.7.12.7 Hazardous atmospheres requiring SCBA can be found in, but are not limited to, the following operations: structural fire fighting, aircraft fire fighting, shipboard fire fighting, overhaul, confined space rescue, and any incident involving hazardous materials.

A.7.12.8 The required use of SCBA means that the user should have the facepiece in place, breathing air from the SCBA only. Wearing SCBA without the facepiece in place does not satisfy this requirement and should be permitted only under conditions in which the immediate safety of the atmosphere is assured. All members working in proximity to areas where SCBA use is required should have SCBA on their backs or immediately available for donning. Areas where the atmosphere can rapidly become hazardous could include rooftop areas during ventilation operations and areas where an explosion or container rupture could be anticipated.

A hazardous atmosphere would be suspected in overhaul areas and above the fire floor in a building. Members working in these areas are required to use their SCBA unless the safety of the atmosphere is established by testing and maintained by effective ventilation. With effective ventilation in operation, facepieces could be removed under direct supervision, but SCBA should continue to be worn or immediately available.

N **A.7.12.9** A NIOSH-approved full-face air-purifying respirator (APR) is permissible when used in compliance with Chapter 14.

A.7.14.1.3 The use of long-duration SCBA should be restricted to operations in tunnels and underground structures, on board ships, and in other situations where the need for this capability is demonstrated. Weight and stress reduction should be an objective in the acquisition of new SCBA and when upgrading currently used SCBA. Weight and other stress factors are major contributions to fire fighter fatigue and injury, and SCBA should be chosen accordingly.

A.7.14.3.3 Because of the cumulative hazards associated with the repeated use of filter canisters and cartridges under emergency response conditions, canisters and cartridges that have been placed in service should be removed, replaced, and discarded after training, regardless of exposure time.

A.7.14.3.4 When an NFPA 1984–compliant respirator is not available, the AHJ should conduct a risk analysis to determine the appropriate NIOSH-approved respirator for use during wildland fire-fighting operations in the environment where it will be used.

A.7.15.1 In quantitative fit testing, the testing machine provides a numerical value of each test exercise and then a computed fit factor that can be used as a benchmark for future fit testing the following year. The test subject must obtain at

least a fit factor of 500 for the person to pass the fit test with the full facepiece. The strip chart that the test machine provides becomes the written record, and a computer-generated record can be done at the same time. There is little judgment required by the operator of the fit test other than to make sure the test subject and the procedures are followed to the letter.

Proper respiratory protection programs include provisions for conducting a respirator fit testing to ensure that the respirator fits the user properly. APRs reduce the user's exposure by varying degrees, depending on the type of respirator used. An effective face-to-facepiece seal is extremely important when using respiratory protection SCBA. Even a minor leakage can allow contaminants to enter the facepiece, even with positive-pressure respiratory protection SCBA. Any outward leakage will increase the rate of air consumption, reducing the time available for use and safe exit. The facepiece should seal tightly against the skin, without penetration or interference by any protective clothing or other equipment. In those instances where members cannot meet the facepiece seal requirement with equipment currently used by the AHJ, individually fitted facepieces should be provided.

Fit testing is a procedure used to evaluate how well a given respirator fits a given person by assessing leakage around the face seal. Without fit testing, persons unknowingly can have poor face seals, allowing contaminants to leak around the mask and be inhaled. Poor face seals are due to certain facial characteristics (facial size, beards, large sideburns, scars, or other facial uniqueness) that prevent direct contact between the skin and the sealing surface of the respirator and result in leakage or inadequate respiratory protection.

Improper use of a respirator or improper fit testing of any respirator can lead to a false sense of security and possibly result in injury or death to the user.

A.7.15.5 A protection factor of at least 10,000 in the positive-pressure mode is recommended for positive-pressure SCBA. The quantitative test can be used to determine which facepieces fit an individual well and thus aids in selecting the facepiece that best conserves the amount of air in the cylinder.

A.7.15.6 WARNING: If a facepiece from one manufacturer is used on a unit from another manufacturer, the NIOSH approval will be voided.

A.7.16.3 The following is an excerpt from 29 CFR 1910.134(g), "Respiratory Protection":

"(g) *Use of respirators.* This paragraph requires employers to establish and implement procedures for the proper use of respirators. These requirements include prohibiting conditions that may result in facepiece seal leakage, preventing employees from removing respirators in hazardous environments, taking actions to ensure continued effective respirator operation throughout the work shift, and establishing procedures for the use of respirators in IDLH atmospheres or in interior structural fire-fighting situations.

(1) *Facepiece seal protection.* (i) The employer shall not permit respirators with tight-fitting facepieces to be worn by employees who have:

(A) Facial hair that comes between the sealing surface of the facepiece and the face or that interferes with valve function; or

(B) Any condition that interferes with the face-to-facepiece seal or valve function."

This prohibition applies to any negative- or positive-pressure personal respiratory protection device of a design relying on the principle of forming a face seal to perform at maximum effectiveness. A beard growing on the face at points where the seal with the respirator is to occur is a condition that has been shown to prevent a good face seal. This is so regardless of what fit test measurement can be obtained. However, if the beard is styled so no hair underlies the points where the SCBA facepiece is designed to seal with the face, then the employer may use the SCBA to protect the employee.

A.7.16.5 These restrictions should apply regardless of the specific fitting test measurement that can be obtained under test conditions.

A.7.16.6 The user should be able to demonstrate the successful use of an SCBA with contact lenses in a nonhazardous training environment before being allowed to use them in an incident. Successful long-term soft contact lens use should be measured by the ability to wear soft contact lenses for at least 6 months without any problems.

A.7.17.1 Given the considerable amount of stored energy inside an SCBA cylinder, cylinders should always be filled using manufacturers' recommendations and following any existing NIOSH, CGA, or other regulatory agency guidelines.

Because of the failure during refilling of 11 cylinders using aluminum alloy 6351-T6, SCBA cylinders made of this alloy should be diligently inspected, both externally and internally, by properly trained inspectors at least annually.

Most of these failed cylinders had not been maintained properly. Some were being used beyond their DOT-defined hydrostatic test period. Some had not been retrofitted with a special neck-ring that the manufacturer had recommended to reduce the possibility of failure.

For additional information, refer to the United States Department of Transportation (DOT) Research and Special Programs Administration (RSPA) Safety Advisory Notice of 1994 (Federal Register Vol. 59, July 26, 1994), DOT Safety Advisory Notice of 1999 (Federal Register Vol. 64, October 18, 1999), and the NIOSH Respirator User Notice of December 7, 1999.

Several of the ruptured cylinders were made using aluminum alloy 6351-T6. This alloy has been identified as being susceptible to sustained load cracking (SLC) in the neck and shoulder area of the cylinder. The NIOSH Respirator User Notice of December 7, 1999, states: "It is important to note that only a small percentage of cylinders made from aluminum alloy 6351-T6 have actually been found to exhibit sustained load cracking. Moreover, out of several million cylinders manufactured from this alloy by several companies, NIOSH and the US Department of Transportation (DOT) are aware of only 12 ruptures within the United States. Eleven of the 12 ruptures occurred during refilling, six of these 12 ruptures involved SCBA cylinders. Forensic analysis has determined that most of these cylinders failed due to SLC failure. However, in some cases, evidence of other factors such as external mechanical damage was also present."

Changes have now been made in materials specification and design of cylinders. Since 1988, manufacturers have been using

aluminum alloy 6061-T6 in the manufacture of all of their cylinders and cylinder liners. Alloy 6061-T6 has become the "standard of the industry" because it is not susceptible to sustained load cracking.

The failed cylinders belong to a relatively small population of a particular type of cylinder, and there has been no occurrence of cylinder failure during filling of any other type of SCBA cylinders. Full-wrapped composite cylinders, which are predominantly being purchased by the fire service at this time, have been used since 1988 without failure during refilling. There is, therefore, reason to believe that these other types of SCBA cylinders can continue to be used in the fire service without risk of failure during filling.

A.7.17.6 To facilitate this, it is recommended that industry develop an inexpensive, lightweight chamber, or other means, to provide protection at the fire scene during routine cylinder filling. There is no current commonly accepted standard or specifications for protective enclosures in which to fill SCBA cylinders. Until such a standard is defined, such equipment should comply with the standards defined for fragmentation tanks in NFPA 1901.

A number of SCBA manufacturers have developed systems to quickly fill cylinders. They enable cylinders to be filled while the user is wearing the SCBA. Even though some of these systems have been in use without incident for many years, it is felt that fire fighter and support personnel safety are paramount. This standard therefore recommends that personnel be protected when routinely refilling SCBA cylinders.

Until a commonly accepted standard for providing protection during routine refilling of cylinders is defined, the AHJ should determine how best to provide protection for its personnel during routine cylinder filling.

Without a commonly accepted standard defining a concise method of protecting personnel during cylinder refilling, the AHJ can choose which method best applies to its personnel. Such protection can consist of refilling cylinders in an enclosure considered acceptable to the AHJ. The protection can consist of using a refill system with a safe record of operation, with no experience of failures or damage to cylinders, supported by sufficient data, or it can consist of an alternate practice considered as safe by the AHJ.

A.7.17.7 The possibility exists for catastrophic failure of SCBA cylinders during refilling.

A.7.17.12 Table A.7.17.12 shows the approximate pressures associated with the 21.18 ft^3 (600 L) minimums when exiting procedures should have already begun to take place.

A.7.18.1 Technology has provided the integration of PASS devices with SCBA. When the SCBA unit is activated to an operational mode, the PASS device is activated. Fire departments are encouraged to utilize this technology. The use of PASS devices should be coupled with a solid incident management system, a personnel accountability system, and adequate communications to properly ensure the safety of fire fighters.

A.7.18.2 The mandatory use and operation of a PASS by fire fighters involved in rescue, fire suppression, or other hazardous duty is imperative for their safety. The primary intent of this device is to serve as an audible device to warn fellow fire fighters in the event a fire fighter becomes incapacitated or needs assistance.

Δ **Table A.7.17.12 Pressure Associated with 21.18 ft^3 (600 L) Minimum Exit Volume**

	2216 psi	3000 psi	4500 psi
30 minute/42.37 ft^3 (1200 L)	1100 psi	NA	2250 psi
30 minute/60.03 ft^3 (1700 L)	NA	1050 psi	NA
45 minute/64 ft^3 (1800 L)	750 psi	NA	1500 psi
60 minute/85 ft^3 (2400 L)	550 psi	NA	1100 psi

NA: Not applicable.

Past fire fighter fatality investigation reports document the critical need to wear and operate PASS devices when fire fighters operate in hazardous areas. Investigation results show that fire fighters most often failed to activate the PASS unit prior to entering a hazardous area. Training and operational procedures are imperative to ensure activation of the PASS whenever PASS devices are used.

A.7.19.3 Life safety rope can be significantly weakened by abrasion, misuse, contamination, wear, and stresses approaching its breaking strength, particularly impact loading. Because there is no approved method to service test a rope without compromising its strength, rope rescue and training operations should be carefully observed and monitored for conditions that could cause immediate failure or result in undetectable damage to the rope. If a rope has been used in a situation that could not be supervised or where potential damage could have occurred, it should be removed from service and destroyed.

It is important that ropes be inspected for signs of wear by qualified individuals after each use. If indications of wear or damage are noted, or if the rope has been stressed in excess of the manufacturers' recommendations or has been impact loaded, it should be destroyed.

The destruction of the rope means that it should be removed from service and altered in such a manner that it could not be mistakenly used as a life safety rope. This alteration could include disposal or removal of identifying labels and attachments and cutting the rope into short lengths that could be used for utility purposes.

The assignment of disposable life safety ropes to members or to vehicles has proven to be an effective system to manage ropes that are provided for emergency use and are used infrequently. Special rescue teams, which train frequently and use large quantities of rope, should include members who are qualified to manage and evaluate the condition of their ropes and determine the limitations upon their reuse.

A.7.20.1.1 Some examples of primary eye protection are goggles and safety glasses, as they provide specific and substantial eye protection against penetration and impact. Helmet faceshields are not primary eye protection, as they do not provide eye protection and should not be relied upon for eye protection. Faceshields should be used to protect the face as secondary protection to primary eye protection. Faceshields currently are often used incorrectly as the only form of eye protection. It is evident that when faceshields are exposed to ultraviolet degradation, abrasion, and products of combustion,

they become scratched, cloudy, opaque, and can be rendered unserviceable in a very short period of time. In many instances, the faceshield is lifted so that the wearer can see what he is doing, leaving the eyes unprotected and exposed to the dangers of flying debris. Goggles and other primary eye devices are more easily protected from damage and also provide specific protection for the wearer's eyes. There are numerous products on the market to protect the goggles from damage when stored on the helmet. Users desiring to keep goggles or eye protection stored on top of the helmets should consider one of these devices. The SCBA facepiece can provide both primary eye protection and full-face protection.

A.7.21.1 The use of PPE to limit noise exposure should be considered as an interim approach until the noise levels produced by vehicles, warning devices, and radios can be reduced. Protective ear muffs are recommended for fire fighters due to the difficulties of proper fit and insertion of ear plugs. Studies in some jurisdictions have indicated that the most harmful noise exposure can come from radios that are turned up loud enough to be heard over the noise of engines and warning devices. Ear muffs are available that provide effective sound attenuation and rapid donning. They should also be provided with built-in speakers and volume controls for radio and intercom communications. Ear muffs should be worn by operators of noisy equipment (in excess of 90 dBA) at the scene of incidents as well as during response. In some jurisdictions, traffic regulations could limit the use of hearing protection by drivers.

The fire apparatus standards require the noise level at any seated position to be a maximum of 90 dBA when measured as specified in the standard, without any warning devices in operation, as the vehicle proceeds at a speed of 45 mph (72 km/hr) on a level, hard, smooth surface road. However, it is recommended that the specifications for new fire apparatus provide maximum sound requirements that would allow members to ride in those vehicles without using hearing-protective devices. A maximum limit of 85 dBA without audible warning devices and 90 dBA with warning devices in operation is recommended. Interior noise levels should be measured with the vehicle in motion at the speed that produces the highest noise level, up to 55 mph (80 km/hr). All windows should be closed, and the noise level should be measured in each passenger area.

A.7.21.2 When operating in situations where other protective clothing and equipment are necessary, such as in structural fire fighting, the interface between hearing protection and other necessary protection might not be adequately addressed by currently used devices. For example, ear muffs might not interface with helmets, and foam plastic ear plugs could be dangerous in a fire environment due to the potential for melting. In addition, a reduction in hearing capability in an emergency operations setting could create additional hazards. Effective hearing protection should also be used during non-emergency activities such as equipment checks and engine warm-ups. Attention should be given to correcting the deficiencies through the advent of improved protective devices and through the use of alternate or improved procedures that create less noise.

A.7.21.3 An effective hearing conservation program should address the regular audiometric testing of members to identify hearing loss, the development and implementation of steps to prevent further hearing loss by members exhibiting such loss, and the ongoing identification and reduction or elimination of potentially harmful noise sources in the work environment. The standards for hearing conservation included in 29 CFR 1910.95, "Occupational Noise Exposure," should be used as a basic minimum approach to this problem.

Any approach to hearing conservation should address personal protective devices, audiometric testing, and the reduction of noise exposure that can be achieved by modifying existing equipment or changing procedures. Examples of modifications would include moving siren speakers and air horns down onto front bumpers, responding with windows closed, and installing sound-attenuating insulation in cabs of fire apparatus. The noise produced by audible warning devices should also be evaluated to determine the most effective balance between warning value and harmful characteristics. Some studies indicate that high-low alternating-tone sirens and lower-pitch air horns could be more effective warning devices and less damaging to hearing.

A long-term approach to hearing conservation should deal with the purchase of apparatus and equipment that is less noisy by design, with noise standards included in the specifications. Improved radio equipment that produces higher clarity of sound with less output volume should also be considered.

For more information on fire department hearing conservation programs, consult the US Fire Administration publication FA-118, *Fire and Emergency Service Hearing Conservation Program Manual*.

Δ **A.8.1.1** The National Wildfire Coordinating Group (NWCG) is an operational group that coordinates programs of the participating wildland fire management agencies and is comprised of representatives of the US Forest Service, four Department of Interior agencies (Bureau of Land Management, National Park Service, Bureau of Indian Affairs, and the US Fish and Wildlife Service), the Intertribal Timber Council, 50 state forestry agencies and Puerto Rico (through the National Association of State Foresters), the US Fire Administration, and the Federal Emergency Management Agency (FEMA).

The NWCG has several sources of information regarding wildland fire-fighting operations, safety, and training, including the NWCG-NFES No. 1077, *Incident Response Pocket Guide*, NWCG-PMS 410-1, *Fireline Handbook*, and NWCG-PMS 310-1, *Wildland Fire Qualification System Guide*. For a complete list of NWCG publications, see https://www.nwcg.gov/.

A.8.1.5 The incident commander should automatically integrate fire fighter safety and survival into the regular command functions. When this integration occurs, the incident commander promotes fire fighter welfare by performing the standard job of command. Under fire conditions, the incident commander is at an extreme disadvantage to perform any additional tasks. The safety plan for the incident commander has to be the regular command plan.

Due to the high number of fire fighter injuries and deaths attributable to lack of or poor implementation of the safety function on the incident scene, the incident commander should recognize the importance of integrating the safety function into the incident command structure as described in NFPA 1561.

A.8.1.7 Due to the high number of fire fighter injuries and deaths attributable to lack of or poor implementation of incident management, incident managers should be familiar with

the use of incident management teams or incident command team as described in NFPA 1561.

A.8.1.8 The following explains the responsibilities of the incident commander:

(1) The incident commander should always integrate fire fighter health and safety considerations into the command process. This integration ensures that safety will always be considered and will not be reserved for unusual or high-risk situations when the incident commander is under a high degree of stress. An incident action plan that addresses fire fighter safety should be a routine function of command.

(2) Early evaluation enables the incident commander to consider current conditions in a standard manner and then predict the sequence of events that will follow. The consideration of fire fighter safety should be incorporated into this evaluation and forecasting.

(3) Effective communications are essential to ensure that the incident commander is able to receive and transmit information, obtain reports to maintain an awareness of the situation, and communicate with all component parts of the incident organization to provide effective supervision and controls.

(4) Strategic decisions establish the basic positioning of resources and the types of functions they will be assigned to perform at the scene of a fire or emergency incident. The level of risk to which members are exposed is driven by the strategy; offensive strategy places members in interior positions where they are likely to have direct contact with the fire, while defensive strategy removes members from interior positions and high-risk activities. The attack plan is based on the overall strategy and drives the tactical assignments that are given to individual or groups of companies/crews and the specific functions they are expected to perform. Risk identification, evaluation, and management concepts should be incorporated into each stage of the command process.

(5) Tactical level management component people are command agents and are able to both monitor companies/crews at the actual location where the work is being done (geographic) and to provide the necessary support (functional). The incident commander uses a tactical-level management unit as off-site (from the command post) operational/communications/safety managers-supervisors. The incident commander uses the incident organization along with communications to stay connected. Some incident management systems identify tactical-level management components such as a *division* or a *group* for a functional position within the system, whereas other systems use the term *sectors* for either geographical or functional areas. As incidents escalate, the incident management system should be utilized to maintain an effective span of control ratio of not greater than 1 to 7 with an optimum ratio of 1 to 5.

(6) The incident commander should routinely evaluate and re-evaluate conditions and reports of progress or lack of progress in reaching objectives. This process will allow the incident commander to determine if the strategy and attack plans should be continued or revised. The failure to revise an inappropriate or outdated attack plan is likely to result in an elevated risk of death or injury to fire fighters.

(7) Effective command and control should be maintained from the beginning to the end of operations, particularly if command is transferred. Any lapse in the continuity of command and the transfer of information increases the risk to fire fighters.

A.8.2.3 The intent of the use of "clear text" for radio communications is to reduce confusion at incidents, particularly where multiple agencies are operating at the same incident.

A.8.2.4 Examples of emergency conditions could be "evacuate the building/area," "wind shift from the north to south," "change from offensive to defensive operations."

Examples of situations where the term "mayday" should be used include a lost or missing member, an SCBA malfunction or loss of air, a member seriously injured or incapacitated, a member trapped or entangled, or any life-threatening situation that cannot be immediately resolved.

When a fire fighter experiences a life-threatening situation, he or she must quickly and efficiently be able to take the steps necessary to survive and alert rescuers. This is the time when an individual fire fighter will be tested on his or her knowledge of self-survival techniques. Paramount to surviving such an experience is being able to communicate the emergency to rescuers. The terms used to communicate these needs must be chosen carefully. The terms used must be easily understood over the radio in times when operational noise is high. The terms used must also be recognizable as an emergency call for assistance by those on the incident. All persons, regardless of language accent, must easily be able to annunciate the terms used. And finally, the terms used must be short with two syllables maximum to allow for a simple single inflexion of the voice to recognize the term.

"Mayday" satisfies all of the above demands for a term that can be used to communicate a fire fighter's need for immediate assistance. "Mayday" is approved for fire service use by the National Search and Rescue Committee and is currently being used by most fire departments in the United States. Most importantly, "mayday" is easily remembered and understood over the radio when operational noise challenges radio communications.

The concern over "mayday" causing confusion with aeronautical and nautical emergencies is unfounded. In April 2002, Dr. Burton A. Clark, EFO, CFO, Management Science Program chair at the National Fire Academy, and operations chief for DHS/FEMA during national disasters wrote to Rear Admiral Ken Venuto (USCG), chairman of the National Search and Rescue Committee, requesting clarification on the use of "mayday." In August 2002, Captain Steve Sawyer (USCG) returned a letter to Dr. Clark stating, "Your recent letter inquired about use by fire departments of the term "mayday" over ground fire radios when the life of a fire fighter is in danger. Use of "mayday" under such circumstances is permissible under US law and regulations. The radio frequencies concerned are different from the aeronautical and maritime frequencies, so use of the term should not cause confusion. Further, any effective means of calling for help is authorized under both national and international radio regulations for true distress situations. Within the letter Captain Sawyer gives further insight on the appropriate use of "mayday." On page 2 of the letter it states, "'Mayday' is recognized nationally and internationally as a signal meaning life is in danger and immediate assistance is required, although federal regulations only

mention its use for ship aircraft. The above guidance is based on review of the regulations and consultation with experts of the Coast Guard, FCC, International Civil Aviation Organization, and others. We trust that this explanation will help not only for your local training and operations; you may also find it useful seeking to update relevant guidance in NFPA or other standards, as appropriate."

In addition to "emergency traffic" and "mayday," the fire department can use additional signals such as an air horn signal for members to evacuate as part of their standard operating procedures. Some fire departments have developed an evacuation signal that consists of repeated short blasts of apparatus air horns. The sequence of air horn blasts should not exceed 10 seconds in length, followed by a 10-second period of silence, and it is done three times (a total air horn evacuation signal including periods of silence lasts 50 seconds). When this evacuation signal is used, the incident commander should designate specific apparatus to sound the evacuation signal using air horns. The apparatus used should not be in close proximity to the command post, if possible, thus reducing the chance of missing any radio messages.

During fire fighter rescue operations, the incident commander should consider implementing the following:

(1) Requesting additional resources
(2) Including a medical component
(3) Utilizing staging for resources
(4) Committing the RIC team from standby mode to deployment
(5) Changing from strategic plan to a high-priority rescue operation
(6) Initiating a PAR (personnel accountability report)
(7) Withdrawing companies from the affected area
(8) Assigning a rescue officer
(9) Assigning a safety officer
(10) Assigning a backup rapid intervention crew/company
(11) Assigning an advanced life support (ALS) or basic life support (BLS) company
(12) Requesting additional command level officers
(13) Requesting specialized equipment
(14) Ensuring that dispatch is monitoring all radio channels
(15) Opening appropriate doors to facilitate egress and access
(16) Requesting additional vertical/horizontal ventilation
(17) Providing lighting at doorways, especially at points of entry

A.8.2.5 Some fire departments can also wish to be provided with reports of elapsed time-from-dispatch. This method can be more appropriate for fire departments with long travel times where significant incident progress could have occurred prior to the first unit arrival.

A.8.2.5.1 Common procedure is for the dispatch center to announce "incident clock is 10 minutes," "incident clock is 20 minutes," "incident clock is 30 minutes," and so forth.

A.8.3.1 The incident commander has the ultimate responsibility for the safety and survival of all fire department members operating at an incident. Crew Resource Management (CRM) provides a basis for improving the following:

(1) Communication
(2) Situational awareness
(3) Decision-making
(4) Teamwork
(5) Workload management
(6) Error management

A.8.4.1 The incident commander has the ultimate responsibility for the safety of all fire department members operating at an incident and for any and all other persons whose safety is affected by fire department operations. Risk management provides a basis for the following:

(1) Standard evaluation of the situation
(2) Strategic decision making
(3) Tactical planning
(4) Plan evaluation and revision
(5) Operational command and control

A.8.4.2.1 The risk to fire department members is the most important factor considered by the incident commander in determining the strategy that will be employed in each situation. The management of risk levels involves all of the following factors:

(1) Routine evaluation of risk in all situations
(2) Well-defined strategic options
(3) Standard operating procedures
(4) Effective training
(5) Full protective clothing ensemble and equipment
(6) Effective incident management and communications
(7) Safety procedures and safety officers
(8) Backup crews for rapid intervention
(9) Adequate resources
(10) Rest and rehabilitation
(11) Regular evaluation of changing conditions
(12) Experience based on previous incidents and critiques

When considering risk management, fire departments should consider the following Rules of Engagement after evaluating the survival profile of any victims in the involved compartment:

(1) We will risk our lives a lot, in a calculated manner, to save SAVABLE LIVES.
(2) We will risk our lives a LITTLE, in a calculated manner, to save SAVABLE property.
(3) We WILL NOT risk our lives at all for a building or lives that are already lost.

A.8.4.3 The acceptable level of risk is directly related to the potential to save lives or property. Where there is no potential to save lives, the risk to fire department members should be evaluated in proportion to the ability to save property of value. When there is no ability to save lives or property, there is no justification to expose fire department members to any avoidable risk, and defensive fire suppression operations are the appropriate strategy.

Δ **A.8.4.5** A safety officer should be established at all major incidents and at any high-risk incidents. The safety officer should be assigned to operate under the incident commander. Depending on the specific situation, this assignment could require one or more members. If the fire department's safety officer is not available or does not have the expertise necessary for the incident, the incident commander should assign one or more members that have the expertise to assume this responsibility. All members should be familiar with the basic duties and responsibilities of a safety officer.

A.8.4.7 Atropine auto-injectors are used in the military and have been purchased by many fire departments. Fire depart-

ments that have auto-injectors available for their members need to provide training on the use of the auto-injector.

A.8.5.1 A standard system to account for the identity and assignment of each member could be relatively simple when all members arrive as assigned crews on fire apparatus. The identity of each crew member should at least be recorded in a standard manner on the vehicle, and each company officer is responsible for those members. In fire departments where members arrive in their own vehicles or assemble at the scene, a system is required to record the identity of each member arriving and to organize them into companies or groups with appropriate supervision. This requires a standard system of "reporting in" at the incident and becoming part of the organized system of operations.

A.8.5.10 The personnel accountability system is a method of maintaining constant awareness of the identities and location of all personnel involved in emergency operations. The personnel accountability system philosophy starts with the incident command system principles of company unity and unity of command. These duties can be fulfilled initially maintaining company accountability by documenting the situation status and resource status on the tactical worksheet. Other methods include command boards, apparatus riding lists, company personnel boards, and electronic bar-coding systems. These components can be used in conjunction with one another to facilitate the tracking of personnel by both location and function. The components of the personnel accountability system should be modular and expand with the size and complexity of the incident.

At major incidents, this function should be separate from the role of the incident commander. The function of personnel accountability should be assigned to an accountability officer (resource status and situation status) who is responsible for maintaining the status of all assigned resources at an incident. As the incident escalates, this function would be placed under the planning section.

A.8.5.11 These accountability supervisors should work with the incident commander and the division or group supervisor to assist in the ongoing tracking and accountability of members.

A.8.6.1.3 The limitation of emergency scene operations to those that can be safely conducted by the number of personnel on the scene is intended to reduce the risk of fire fighter death or injury due to understaffing. While members can be assigned to and arrive at the scene of an incident in many different ways, it is strongly recommended that interior fire-fighting operations not be conducted without an adequate number of qualified fire fighters operating in companies under the supervision of company officers.

It is recommended that a minimum acceptable fire company staffing level for companies responding to any type of fire should be four members responding on or arriving with each engine and each ladder company. The minimum acceptable staffing level for companies responding in high-risk areas should be five members responding or arriving with each engine company and six members responding or arriving with each ladder company. These recommendations are based on experience derived from actual fires and in-depth fire simulations and are the result of critical and objective evaluation of fire company effectiveness. These studies indicate significant reductions in performance and safety when crews have fewer members than the above recommendations. Overall, five-member crews were found to provide a more coordinated approach for search and rescue and fire-suppression tasks.

During actual emergencies, the effectiveness of companies can become critical to the safety and health of fire fighters. Potentially fatal work environments can be created rapidly in many fire situations. Proper training and skills can make a difference in the need for additional personnel and in reducing the exposure to safety and health risks for fire fighters where a situation exceeds their capabilities.

A.8.6.4 For additional information, see 29 CFR 1910.134, "Respiratory Protection."

A.8.6.5 All members operating in the IDLH should use a hose line or a search rope as a point of reference for exit.

A.8.6.8 Studies have shown that the severity of incidents involving ARFF can rapidly escalate to catastrophic proportions. If fire-fighting and rescue operations are to be effective, fully assembled ARFF companies should be on-scene within the time requirements as specified in NFPA 403. Experience has shown that it is extremely difficult to assemble personnel who are responding from separate locations for individual ARFF companies within these time constraints. It is strongly recommended that the minimum ARFF company staffing level be three on-duty members responding on or with each ARFF vehicle.

It is also recommended that structural fire apparatus responding in support of ARFF operations should be staffed in accordance with A.8.6.1.3. *(See also NFPA 1710.)*

A.8.6.9 If advanced life support personnel are available, this level of service would be preferred. Basic life support is the minimum acceptable level.

Δ **A.8.6.14** Consideration for rescue of members working over, in, and around water should be addressed by the incident commander and safety officer within the incident action plan.

A.8.6.15.1 Examples include protective shields, mechanical/human barriers, or alerting techniques that are distinguishable and effective under the conditions.

A.8.6.15.5 It is recommended, based on known voltage, to stay away from such energized sources as described in 8.6.15.1 per the following distances in Table A.8.6.15.5.

A.8.6.15.9.1 Examples of procedures for isolating personnel from energized equipment include protective shields, mechanical/human barriers, and alerting techniques that are distinguishable and effective under the conditions.

Table A.8.6.15.5 Distance from Energized Sources

Voltage	Distance	
	ft	m
0–50,000	10	3
50,000–200,000	15	4.5
200,000–500,000	20	6.1
500,000–750,000	35	10.7
750,000–1,000,000	45	13.7

Sources: 29 CFR 1926.1407-1411, "Power Line Safety"; ASME B30.5a, *Standard on Mobile and Locomotive Cranes.*

A.8.6.15.9.5 Marking and labeling around the main service panels might assist in locating shutoffs. Attempts to secure the main electrical service and PV System Disconnect will lower the hazard, but personnel should consider the rooftop array as still energized. Systems equipped with module-level controls provide a higher degree of safety and will shut down each module and render it safe/de-energized. Contacting qualified PV installers might be required to safely shut down a damaged system.

A.8.7.4 Figure A.8.7.4 shows the concept of emergency incident hazard control zones. The hot zone is the area presenting the greatest risks to members and will often be classified as an IDLH atmosphere. The hot zone can include no-entry zones. Examples of no-entry zones could be holes in floors, explosive devices, crime scenes, and so forth.

The warm zone is a limited-access area for members directly aiding or in support of operations in the hot zone. Significant risk of human injury (respiratory, exposures, etc.) can still exist in the warm zone.

The cold zone establishes the public exclusion or clean zone. There are minimal risks for human injury and/or exposure in this zone.

It might not always be possible or practical to mark the emergency incident hazard control zones with colored tape, signage, or other appropriate means, depending on the nature or location of the incident, available resources, and so forth. If possible, these emergency incident hazard control zones should be clearly marked. Other means of marking emergency incident hazard control zones can include flashing beacons, streets, fences, and so forth. It is essential that the perimeters of these zones are communicated to all members at the incident and that they are aware of these zones and their implications.

When colored tape is being used to mark control zones, it is recommended that the following tape colors be used:

(1) No-entry zone: red/white chevron
(2) Hot zone: red
(3) Warm zone: yellow
(4) Cold zone: green

A.8.7.4.1 A hot zone can include the area where exterior fire control activities are taking place. A hot zone can also include a no-entry zone (marked with red and white chevron tape or other means). No personnel should enter the no-entry zone due to imminent hazard(s) or the need to protect evidence. Examples of no-entry zones could be holes in floors, explosive devices, crime scenes, and so forth. Examples of the PPE are SCBA, flash hood, and so forth.

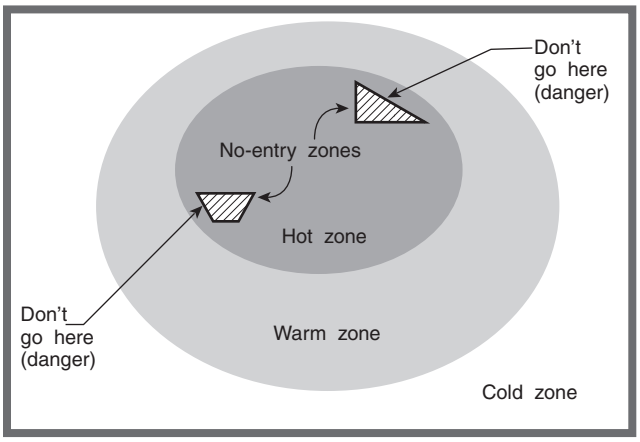


FIGURE A.8.7.4 Example of Control Zones.

A.8.7.4.1.1 The hot zone is an area with greater potential for risk of injury or exposure. Members entering the hot zone without an assigned task are placing themselves at greater risk for no reason. In addition, they can be increasing the risk of others operating within this zone by creating some confusion.

A.8.7.4.2 Examples of significant risk of human injury include respiratory and exposures.

N **A.8.7.4.2.1** The warm zone is the portion of the emergency scene where the contaminants might have been transported by the firefighters as they leave the hot zone with contamination. In many respects, the risk to responders is equal to that in the hot zone, and the need to wear PPE continues. Until the contaminants have been removed from the PPE or the contaminated PPE removed from the firefighters, the precautions used in the hot zone must continue to be used.

A.8.7.4.4.1 Any emergency incident hazard control zone can include a no-entry zone. In the event that personnel are exposed to a no-entry zone, appropriate contamination reduction strategies for the hazards encountered should be utilized.

A.8.7.4.4.2 The intent of arranging three horizontal strands of yellow barrier tape spaced 18 to 24 in. (460 to 610 mm) apart and securely fixed to supports is to create a "picket fence" visual appearance to better warn members of the no-entry zone.

A.8.7.4.4.3 Examples of ways to illuminate no-entry zones include orange cones with flashing strobe lights, glow sticks securely attached to barrier tape, and auxiliary scene lighting devices (e.g., box lights, portable flood lights).

A.8.7.4.4.4.2 One and a half (1.5) times the height of the building is considered the minimum; however, unreinforced masonry construction (URM) can represent hazards to fire fighters at distances greater than 1.5 times the height of the building.

A.8.8.2 The assembling of four members for the initial fire attack can be accomplished in many ways. In their response plan, the fire department should determine the manner in which they plan to assemble members. The four members assembled for initial fire-fighting operations can include an officer, chief officer, or any combination of members arriving at the incident. For career departments, the four members should arrive in tandem if on separate units.

If members are going to initiate actions that would involve entering a structure because of an imminent life-threatening situation where immediate action can prevent the loss of life or serious injury and four members are not yet on the scene, the members should carefully evaluate the level of risk that they would be exposed to by taking such action. If it is determined that the situation warrants such action, incoming companies should be notified so that they will be prepared to provide necessary support and backup upon arrival.

A.8.8.2.4 The following examples show how a department could deploy a team of four members initially at the scene of a structure fire, regardless of how the team members are assembled:

(1) The team leader and one fire fighter could advance a fire-fighting hose line into the IDLH atmosphere, and one fire fighter and the pump operator become the standby members.
(2) The team leader could designate the pump operator to be the incident commander. The team leader and one fire fighter enter the IDLH atmosphere, and one fire fighter and the pump operator remain outside as the standby members.
(3) Two fire fighters could advance the hose line in the IDLH atmosphere, and the team leader and the pump operator remain outside as standby members.

Δ **A.8.8.7** The difficulty in rescuing a downed member or member in trouble cannot be overstated. While one crew/company might suffice at a single-family dwelling, the act of rescuing a member who is lost, trapped, or missing will become increasingly difficult at a large commercial building or high-rise building.

The ability to rapidly deploy a rapid intervention crew/company from the command post to an area remote from the location of the command post can adversely affect the successful rescue of a member. Consideration should be given to assigning a RIC to each point of crew entry at a commercial building.

A.8.9.1 Having a preplanned rehabilitation program that is applicable to most incident types is essential for the health and safety of members. The rehabilitation plan should outline an ongoing rehabilitation for simple or short-duration incidents as well as a process to transition into the rehabilitation needs of a large or long-duration incident.

A.8.9.1.1 Rehabilitation operations include work cycles using SCBAs during active fire-fighting operations and overhaul operations.

A.8.10.1 Fire department members should not enter an environment where there is ongoing violence, or the threat of violence such as persons with weapons, without coordination with law enforcement personnel. This does not necessarily limit the ability of cross-trained fire/law enforcement personnel or specialty trained EMS personnel from entering a violent scene to assist the law enforcement or fire department responders.

A.8.10.3 Such situations include but are not limited to civil disturbances, fights, violent crimes, drug-related situations, family disturbances, deranged individuals, and people interfering with fire department operations.

A.8.10.3.1 The Firefighting Resources of California Organized for Potential Emergency (FIRESCOPE) has developed ICS-701, *Emergency Response to Tactical Law Enforcement Incidents,* which might be useful in developing a standard operating procedure in this area.

A.8.10.5 Incidents that appear routine in nature can, after the arrival of responding crews, turn into a violent or hostile environment. A standard communication phrase, known only by communications personnel and other responders, can warn others to the dangers of the situation without triggering violence or hostilities.

A.9.4 This could be done as shown in the *Manual on Uniform Traffic Control Devices (MUTCD).*

A.9.4.1 In most cases, the primary traffic threat will be upstream; however, first-arriving responders might find that the primary traffic threat is other than upstream (intersections, on and off ramps, steep grades, etc.).

When resources are available, responders should establish a temporary traffic incident management area (TIMA). A TIMA is defined as an area of a highway where temporary traffic control (TTC) is imposed by authorized officials responding to a road user incident, natural disaster, hazardous material spill, or other unplanned incident. The TIMA extends from the first warning device (such as a sign, light, or cone) to the last TTC device, or to a point where vehicles return to the original lane alignment and are clear of the incident. The *MUTCD*, Chapter 6I contains detailed guidance on the recommended size of a TIMA, depending upon road configuration, vehicle speed, and weather conditions.

A.9.4.2 In accordance with *MUTCD,* the use of emergency-vehicle lighting (such as high-intensity rotating, flashing, oscillating, or strobe lights) is essential, especially in the initial stages of a traffic incident, for the safety of emergency responders and persons involved in the traffic incident, as well as road users approaching the traffic incident. Emergency-vehicle lighting, however, provides warning only and provides no effective traffic control. The use of too many lights at an incident scene can be distracting and can create confusion for approaching road users, especially at night.

A.9.4.5 Warning signs should be placed in accordance with the *MUTCD*, depending upon the severity of the incident and anticipated on-scene time, with the intent of providing early warning to the motoring public so as to provide for proper reaction time to safely traverse the TTC zone created around an emergency scene.

Minor Traffic Incidents. Minor traffic incidents are typically disabled vehicles and minor crashes that result in lane closures of less than 30 minutes. On-scene responders are typically law enforcement and towing companies, and occasionally highway agency service patrol vehicles. [**MUTCD:**6I.04.01]

Diversion of traffic into other lanes is often not needed or is needed only briefly. It is not generally possible or practical to set up a lane closure with traffic control devices for a minor traffic incident. Traffic control is the responsibility of on-scene responders.

Intermediate Traffic Incidents. Intermediate traffic incidents typically affect travel lanes for a time period of 30 minutes to 2 hours, and usually require traffic control on the scene to divert road users past the blockage. Full roadway closures might be needed for short periods during traffic incident clearance to allow traffic incident responders to accomplish their tasks. [**MUTCD:**6I.03.01]

The establishment, maintenance, and prompt removal of lane diversions can be effectively managed by interagency planning that includes representatives of highway and public safety agencies. [**MUTCD:**6I.03.02]

Major Traffic Incidents. Major traffic incidents are typically traffic incidents involving hazardous materials, fatal traffic crashes involving numerous vehicles, and other natural or man-made disasters. These traffic incidents typically involve closing all or part of a roadway facility for a period exceeding 2 hours. [**MUTCD:**6I.02.01]

A road closure can be caused by a traffic incident such as a road user crash that blocks the traveled way. Road users are

usually diverted through lane shifts or detoured around the traffic incident and back to the original roadway. A combination of traffic engineering and enforcement preparations is needed to determine the detour route, and to install, maintain or operate, and then to remove the necessary traffic control devices when the detour is terminated. Large trucks are a significant concern in such a detour, especially when detouring them from a controlled-access roadway onto local or arterial streets. [**MUTCD:**6I.02.03]

During traffic incidents, large trucks might need to follow a route separate from that of automobiles because of bridge, weight, clearance, or geometric restrictions. Also, vehicles carrying hazardous material might need to follow a different route from other vehicles. [**MUTCD:**6I.02.04]

Some traffic incidents such as hazardous material spills might require closure of an entire highway. Through road users must have adequate guidance around the traffic incident. Maintaining good public relations is desirable. The cooperation of the news media in publicizing the existence of, and reasons for, traffic incident management areas and their TTC can be of great assistance in keeping road users and the general public well informed. [**MUTCD:**6I.02.05]

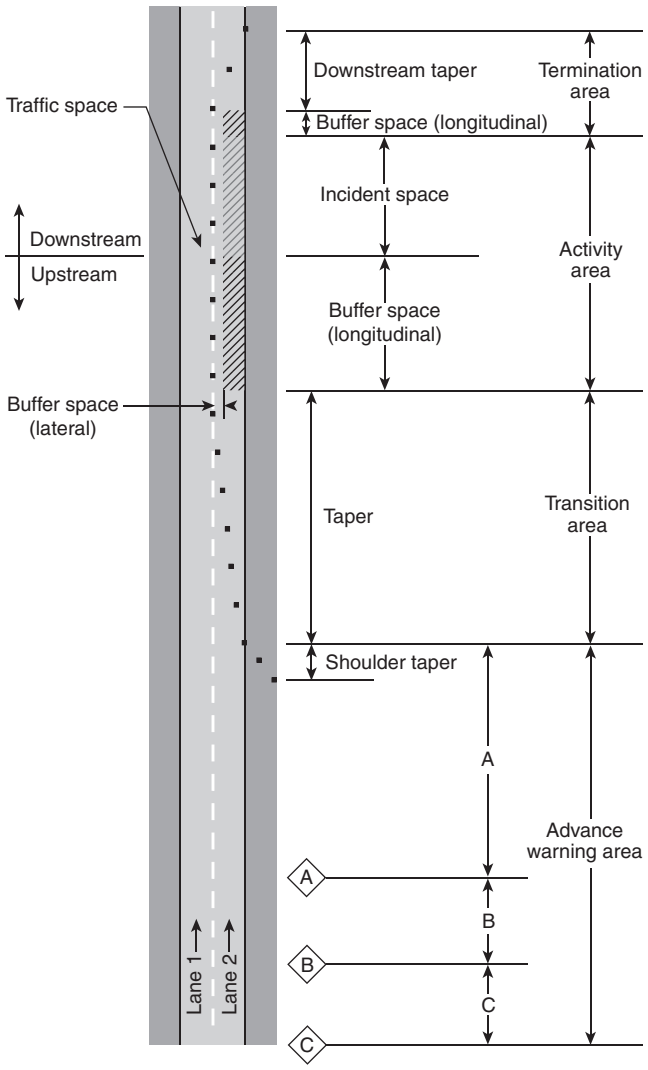
The establishment, maintenance, and prompt removal of lane diversions can be effectively managed by interagency planning that includes representatives of highway and public safety agencies. [**MUTCD:**6I.02.06]

Figure A.9.4.5 shows the different traffic areas while operating at a roadway incident.

Table A.9.4.5 shows the minimum distances used for each area within the operation at a roadway incident.

A.9.4.9 Members who operate on roadway incidents should be provided with garments that ensure proper conspicuity enhancement consistent with the requirements in the *Manual on Uniform Traffic Control Devices*.

A.9.4.10 Proper training in traffic control can be obtained from local or state highway departments, law enforcement, and other agencies involved with controlling the roadway traffic. The AHJ should participate in local or regional traffic incident management committees. The fire department should also be familiar with the National Traffic Incident Management Coalition's *National Unified Goal*.



Δ FIGURE A.9.4.5 Traffic Areas. (Source: US DOT Second Strategic Highway Research Program (SHRP2) Traffic Incident Management Training.)

Δ Table A.9.4.5 Warning Device Placement

	Advance Warning Area					Transition Area		Activity Area	Termination Area	
	Advance Warning Sign Minimum Distance (ft)					Recommended Lengths (ft)				
Speed (mph)	A	B	C	Cumulative Total	Shoulder Taper	Taper	Distance Between Tapers (Longitudinal)	Buffer (Longitudinal)	Downstream Taper	Cone Spacing (ft)
25	200	200	200	600	45	125	250	155	50–100	25
35	350	350	350	1050	85	245	490	250		35
45	500	500	500	1500	180	540	1080	360		45
55	1000	1500	2640	5140	220	660	1320	495		55
65	1000	1500	2640	5140	260	780	1560	645		65

For S.I. Units, 1 mph = 1.6 km/hr, 1 ft = 0.3 m.
Source: US DOT Second Strategic Highway Research Program (SHRP2) Traffic Incident Management Training.

A.10.1.1 Where health, safety, building, and fire codes are not legally applicable to fire department facilities, steps should be taken to ensure that equivalent standards are applied and enforced. In the absence of local requirements, the provisions of NFPA 1, *NFPA 70*, NFPA *101*, *NFPA 5000*, the *Uniform Plumbing Code*, and the *Uniform Mechanical Code* should be applied. In addition, the workplace safety standards specified in 29 CFR 1910, "Occupational Safety and Health Standards," or an equivalent standard should be applied. Applicable requirements of the Americans with Disabilities Act should be met.

For a more thorough overview of safety and health considerations that should be addressed at fire department facilities, see FA-168, *Safety and Health Considerations for the Design of Fire and Emergency Medical Service Stations.*

A.10.1.3 As new stations are constructed or existing stations are renovated, a separation between the apparatus floor and living quarters should be provided.

A.10.1.5 The operation of a fire department requires the storage and indoor operation of fire apparatus that are generally housed in an enclosed building. The need to keep the apparatus and other vehicles ready for immediate service and in good operating condition, which requires the indoor running of vehicles for response and routine service/pump checks, makes storage in an enclosed area, such as an apparatus bay, necessary. The exhaust from all internal combustion engines, including diesel and gasoline-powered engines, contains over 100 individual hazardous chemical components that, when combined, can result in as many as 10,000 chemical compounds. A large majority of these compounds are today listed by state and federal regulatory agencies as being cancer causing or suspected carcinogens. The target components listed by NIOSH/OSHA consist of both hydrocarbon carbon components and compounds, which are produced as both gas-phase and particulate-phase compounds. The gases and particulates, which are viewed by NIOSH and OSHA as life threatening, consist of a cancer-causing substance known as polynuclear aromatic hydrocarbons (PAHs). Gases in diesel exhaust, such as nitrous oxide, nitrogen dioxide, formaldehyde, benzene, sulfur dioxide, hydrogen sulfide, carbon dioxide, and carbon monoxide, can also create health problems. According to NIOSH, human and animal studies show that diesel exhaust should be treated as a human carcinogen (cancer-causing substance). In accordance with the NIOSH *Pocket Guide to Chemical Hazards*, as it pertains to diesel exhaust, NIOSH recommends that occupational exposure to carcinogens be limited to the lowest feasible concentration. NIOSH uses OSHA's classification, outlined in 29 CFR 1990.103, "Definitions," which states in part, "Potential occupational carcinogen means any substance, or combination or mixture of substances, which causes an increased incidence of benign and/or malignant neoplasm, or a substantial decrease in the latency period between exposure and onset of neoplasm in humans or in one or more experimental mammalian species as the result of any oral, respiratory or dermal exposure, or any other exposure which results in the induction of tumors at a site other than the site of administration." This definition also includes any substance that is metabolized into one or more potential occupational carcinogens by mammals.

A.10.1.8 As part of the fire station inspection program, the areas around the pole hole and the padding at the bottom of the pole should be regularly checked to ensure the safety of members using the pole.

A.10.3 In some jurisdictions, fire department facilities are maintained by other agencies. In these situations, fire departments should develop a process to expedite requests for repairs or modifications to the facility to address safety or health concerns.

N **A.10.4.1(1)** Such systems can be set automatically to activate louder during the day and quieter at night.

N **A.10.4.1(4)** This feature allows only members of the dispatched needed company to be alerted.

N **A.10.5.2.1** The transition area (yellow) should function as an air-lock vestibule between zones.

N **A.10.5.5** Ice machines should not be exposed to residual diesel exhaust and off-gassing of contaminated equipment and PPE.

A.11.1.5 If any member, either career or volunteer, reports for duty under the influence of alcohol or drugs, or any other substance that impairs the member's mental or physical capacity, this situation cannot be tolerated.

Evidence of substance abuse could include a combination of various factors such as slurred speech, red eyes, dilated pupils, incoherence, unsteadiness on feet, smell of alcohol or marijuana emanating from the member's body, inability to carry on a rational conversation, increased carelessness, erratic behavior, inability to perform a job, or other unexplained behavioral changes.

The possibility of liability exists if a member who is under the influence of alcohol or drugs is allowed to remain on duty, to operate or drive vehicles or equipment on duty, or to drive a private vehicle from the duty site. A member who is believed to be under the influence of alcohol or drugs cannot be allowed to operate equipment or drive a vehicle, including a private vehicle, until the condition of the member has been determined and verified.

A.11.2.1 Fire departments should consider use of the recruiting, mentoring, and training process found in the physical performance requirements referenced in the IAFF/IAFC Candidate Physical Ability Test (CPAT) Manual.

A.11.4.1 The health data base for a fire department should include the reports of regular physical evaluations, injury and illness reports, health exposures, and any supporting information that could be useful in tracking, analyzing, or predicting the health effects of various events on individuals or the group. This process should comply with the medical record-keeping requirements of 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response."

A.11.4.3 This information should be managed in a manner that respects the confidentiality of doctor-patient relationships. Electronic data processing is often employed to facilitate management of such a data base.

A.11.4.4 The fire department should try to obtain autopsy or other medical information for all deceased employees or former employees. This information could be useful in establishing relationships between occupational factors and resulting fatalities at some time in the future. Autopsies for fire fatalities should be conducted and recorded according to a standard protocol.

A.11.5.1 Where fire department members routinely respond to emergency medical incidents, the fire department should consult with medical professionals and agencies on measures to limit the exposure of members to infectious and contagious diseases. This should include the provision and maintenance of equipment to avoid or limit direct physical contact with patients, when feasible.

A.11.6.3 A fire department physician should have specific expertise and experience relating to the needs of fire department members and a thorough knowledge of the physical demands involved in emergency operations. If possible, the fire department physician should be a specialist in the field of occupational medicine.

A.11.6.4 Depending on the size and the needs of a fire department, the fire department physician might or might not be required on a full-time basis. A fire department should have a primary relationship with at least one officially designated physician. This physician can serve as the primary medical contact and, in turn, deal with a number of other physicians and specialists. A large fire department can designate more than one fire department physician or might determine that a relationship with a group practice or multiple-provider system is more appropriate to its needs. In any case, the option to consult with a physician who is particularly aware of the medical needs of fire department members and who is available on an immediate basis should exist.

Δ **A.12.1** A unique understanding of the fire service and its inherent dynamics, as well as advanced knowledge about trauma and addictions, is required of behavioral health specialists and clinicians to effectively address fire department members' behavioral issues and maintain overall behavioral health and wellness. The intrinsic value to the first responders of the availability of such behavioral health specialists trained in the unique cultural aspects of the fire service is essential to the success of the program. Such training should include regular opportunities for experiential learning such as ride-alongs and/or participation in live simulated training exercises, which help familiarize the behavioral health specialist with the daily working environment of the fire service.

Current research with first responders has shown that developing an understanding of how the body and brain respond to stress is essential. Developing coping mechanisms that support the unique behavioral health need and challenges of first responders maintain ongoing personal behavioral health is a core component of this program. Providing first responders with techniques to help mitigate the impacts of traumatic exposures is critical to long-term personal health, interpersonal dynamics, and overall organizational health. The term *resiliency* is used to address this multifaceted approach for overall health and well-being.

A behavioral health and wellness program can encompass all or some of the following services:

(1) Acute stress
(2) Traumatic exposures
(3) Post-traumatic stress (PTS)
(4) Depression
(5) Grief
(6) Family situations
(7) Line-of-duty death (LODD) support services
(8) Stress management
(9) Substance use
(10) Health and wellness concerns
(11) Resiliency

A behavioral health and wellness program can utilize all or some of the following delivery methods to reach members:

(1) Peer support program
(2) MAP or EAP behavioral health problem identification, assessment, and grief counseling
(3) Treatment and/or referrals to outside agencies, as appropriate
(4) Family support and outreach
(5) Follow-up services and case management
(6) Leadership development
(7) Executive coaching
(8) Coaching for supervisors dealing with troubled employees
(9) Workplace mediation
(10) Conflict resolution
(11) Health and psychoeducational materials/activities
(12) Management of behavioral health care under insurance plans
(13) Department diversity training
(14) Officer and department-wide training
(15) Chaplain services for spiritual needs

Δ **A.12.1.1** Basic levels of assistance as enumerated in the standard should be available at the first step of access. The objective should be to provide these services in a manner that facilitates ease of access and usage, minimizes delays and obstacles, and encourages proactive utilization. Members and their families should be informed about the program, its services, and how to access its resources, both at the time that they enter the organization and regularly throughout their tenure. The behavioral health program should also serve as a resource for identification of and access to other important community resources such as self-help groups (e.g., Alcoholics Anonymous, Alanon, and Alateen), community health resources, parenting resources, and so forth. The behavioral health program should collaborate with the fire department's program to address occupational exposure to atypically stressful events *(see Chapter 13)*.

The fire department behavioral health program does not need to be operated or financed by the fire department. Many community/county/state mental health agencies provide such services and these can be available without charge or at reduced fees. Labor and employee organizations can also sponsor and/or operate such programs. The fire department needs to have the ability to identify when pertinent problems exist and be able to provide confidential referral for professional services when indicated. Program standards developed by the Association of Labor-Management Administrators and Consultants on Alcoholism (ALMACA) and the Employee Assistance Professional Association (EAPA) recommend the following:

(1) The physical location at which services are provided should facilitate easy access while ensuring confidentiality.
(2) Medical and disability plans should be reviewed to ensure that plans provide adequate coverage for alcohol, substance, and mental health needs (including access to outpatient, intensive outpatient, partial hospitalization, inpatient and residential care, and day treatment options).
(3) Staff of the fire department behavioral health program should be sufficiently familiar with medical and disability

benefit plans to facilitate adequate advising regarding the extent, nature, and cost of the recommended treatment and the reimbursement available.

Primary staff for the program should possess the following:

(1) Appropriate managerial and administrative experience in a clinical setting
(2) Skill in clinical interviewing, diagnostic assessment, treatment planning, grief counseling, case management, and referral/care coordination for behavioral health problems and disorders
(3) A Ph.D. or Master's degree in the field of psychology, clinical social work, mental health counseling, or psychiatric nursing
(4) An active license in good standing in the state in which services will be delivered, as well as appropriate training and certification with respect to any direct clinical or counseling services relevant to the behavioral health issues in the fire service

Primary staff training should include regular opportunities for experiential learning such as ride-alongs and/or participation in live simulated training exercises, which help familiarize the behavioral health specialist with the daily working environment of the fire service.

Active and appropriately prepared peer personnel are often critical to the success of a fire service behavioral health program. These personnel serve most effectively as a bridge between the distressed member and professional services. They can serve valuable roles in outreach, referral, connection, awareness, and support for those who could benefit from support but might be unaware of its availability or benefits, are resistant to seeking help, or are uncertain about the confidentiality of services. With proper training, peer personnel can help coworkers evaluate situations, consider alternatives, and access resources. Preparation should include training regarding resources, protocols, and procedures related to the peer support program, as well as active listening skills, assessment, outreach, and referral skills. Preparation should emphasize boundaries between peer roles and staff responsibilities, especially with respect to counseling and intervention.

Peer personnel should operate in regular consultation with a licensed mental health provider, ideally the behavioral health specialist. It is important that members and their families are informed about the program and the services it offers and are continually updated on its existence, availability, and confidentiality. Information about the program should be made available to all new members and their families.

Δ **A.12.1.2** Referrals for specialty care should be made whenever a member or family requires treatment beyond primary counseling. Specialists receiving referrals should be fully licensed and certified to provide care consistent with appropriate standards (e.g., American Society of Addiction Medicine for alcohol and substance use treatment; American Association for Marriage and Family Therapy for family and relationship issues; American Psychiatric Association, American Counseling Association, and National Association of Social Workers for the treatment of mental disorders) and current guidelines for evidence-based practice in the treatment of clinical diagnoses (e.g., published reviews of the Cochrane Collaboration).

N **A.12.1.2.2.1** Confidentiality of all behavioral health data is critical to the success of the program. Members need to feel assured that the information provided to the clinicians and peer support personnel will not be inappropriately shared.

A.12.1.2.3 Adherence to federal regulations regarding confidentiality of alcohol and other drug abuse records is required of programs receiving federal funds, directly or indirectly.

Compliance with all aspects of the Health Insurance Portability and Accountability Act (HIPAA) is also required.

A.12.1.3 Referrals for specialty care should be made whenever a member or family requires treatment beyond primary counseling. Specialists receiving referrals should be fully licensed and certified to provide care consistent with appropriate standards (e.g., the American Society of Addiction Medicine for alcohol and substance abuse treatment; the American Association for Marriage and Family Therapy for family and relationship issues) and current guidelines for evidence-based practice in the treatment of clinical diagnoses (e.g., published reviews of the Cochrane Collaboration).

A.12.1.4 Policies should recognize the impacts of addictions on job performance, safety, and quality of life and emphasize the need for proactive efforts in treatment and rehabilitation.

Responsibilities of management, member organizations, and members as they relate to the policy should be clearly delineated.

Prerogatives of management and responsibilities of member organizations should not be altered or abridged by the policies enacted. Participation in assistance programs should not affect future service or career advancement. Joint sponsorship by management and member organizations is highly desirable, and cooperative action in administration of the policy is encouraged.

A.12.2.1 Components of a prevention and health promotion program should focus on cardiac risk reduction, smoking/tobacco cessation, blood pressure regulation, strength and aerobic physical fitness training, nutrition, stress management, diabetes prevention, metabolic syndrome prevention, weight management or control, shift work and sleep hygiene, infectious disease and control, and so forth, and should provide education and counseling for the purpose of preventing health problems and enhancing overall well-being.

The wellness program should also include education, resources, and counseling on a variety nonclinical issues relevant to member wellness and maintaining a balanced life, including, but not limited to, balancing emergency service work with marriage and family obligations, interpersonal communication skills, financial literacy, career/vocational guidance, and retirement planning.

A.12.2.2 The fire department should develop a policy on the use of tobacco products for all members. The fire department should also develop a policy on the acceptance of new members into the fire department with regard to the use of tobacco products.

N **A.12.2.3.4** Research indicates that firefighters are at a high risk for sleep deprivation, fatigue, and sleep disorders. Firefighters who grapple with their "internal body clock" or circadian rhythm due to shift work or other long work hours and are sleep deprived often struggle with memory, focus impairment, irritability, depression, and relationship/social problems. In turn these can lead to an increased risk of accidents and injuries. These studies also note that firefighters face potential

health problems, including a higher risk of ulcers, insulin resistance, metabolic syndrome, heart disease, and cancer. Strategies to consider to combat acute and chronic sleep and circadian rhythm disorders include the following:

(1) Strategic caffeine use
(2) Taking naps
(3) Proper sleep hygiene
(4) Identification and treatment of sleep disorders

A.13.1 Substantial research has been conducted and reported since the last revision of this standard, respecting occupational exposure to potentially traumatic events and interventions directed toward mitigating their impact. Certain well-engrained approaches, most specifically critical incident stress debriefing (CISD), have not been shown to be effective in controlled studies and have been reported to have resulted in paradoxical, adverse outcomes for at least some participants. A number of authoritative guidelines now recommend against routine debriefing. Accordingly, this revision specifically deletes reference to CISD/CISM (critical incident stress management) as a required or desirable intervention and shifts its emphasis toward the use of professional services.

N **A.13.1.1.2** The training of the behavioral health specialist should include regular opportunities for experiential learning such as ride-alongs and/or participation in live simulated training exercises, which help familiarize the behavioral health specialist with the daily working environment of the fire service.

A.13.1.2 Over the past 10 to 15 years, fire departments across the country have realized that some of the components and their implementation of the early critical incident stress management (CISM) programs have not met the needs of fire department members or responders from other emergency service departments and organizations.

Current approaches integrate information about the brain and brain trauma, understanding how repeated exposure to traumatic events can erode mental and physical resilience and accumulates over time, affecting each person differently, and how to empower each individual to manage his or her own symptoms.

Some examples of potentially traumatic events are as follows:

(1) Line-of-duty deaths
(2) Suicide of a colleague
(3) Serious work-related injury
(4) Multicasualty/disaster/terrorism incidents
(5) Events with a high degree of threat to the personnel
(6) Significant events involving children
(7) Events in which the victim is known to the personnel
(8) Events with excessive media interest
(9) Events that are prolonged and end with a negative outcome
(10) Any significantly powerful, overwhelming distressing event
(11) Administrative betrayal
(12) Forced retirement

A behavioral health program for potentially traumatic events should include the following:

(1) Selection of highly respected and trusted members to serve on the peer support team, along with the department's behavioral health specialist
(2) Department-wide education on the program prior to implementation to include training for new members
(3) Trained chaplains who can recognize signs of distress and use a nondenominational approach to persons needing emotional or spiritual support.
(4) Regularly scheduled peer team meetings for ongoing education and incident review

Interventions should focus specifically on those directly exposed to the traumatic event. Not all members who respond to an event are exposed to the trauma, and if participating in the intervention, might be unnecessarily exposed to the details of the trauma and subsequently negatively impacted.

The fire department's written policy should indicate the responsibilities of the organization, its officers, and its members in ensuring that the impact of occupational events is systematically anticipated and considered. The policy should enhance support from officers, supervisors, and peers and full integration where indicated with the department's behavioral health assistance *(see Chapter 12)*.

Research shows the importance of recognizing the long-term impacts of repeated exposure to stress and the need to educate organization members to recognize the signs of cumulative exposure. It is also critical to note that EMS providers, whether in a stand-alone EMS agency or part of a combined service, suffer at an even higher rate than many fire fighters. With the increasingly larger role the fire service plays in the delivery of EMS services, the data and consequences should not be ignored. Industry agencies are beginning to recognize and provide active support for stress-related issues.

A.13.1.3.2 Examples of licensed mental health providers include psychiatrists, psychiatric nurse practitioners, advanced practice psychiatric registered nurses, clinical psychologists, licensed clinical professional counselors, licensed mental health counselors, and clinical social workers.

N **A.14.1** Cancer has become one of the leading causes of line-of-duty deaths (LODDs) of fire fighters. Cancer rates of fire fighters have risen dramatically in correlation with the increase in toxicity of smoke. Smoke from a fire always contains contaminants, which are harmful to health when these toxins enter the body via mouth, respiratory tract, mucous tissue or skin. Research has shown that contaminants including volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs) settle on protective equipment and do not break down, leading to longer exposure times through off-gassing and an increased rate of various health problems. VOCs and PAHs are persistent toxins and remain constant in the air and on protective equipment. Additional hazards at the fireground might be caused by hazardous materials such as asbestos or flame retardant materials found in the products of combustion.

N **A.14.4.2** Prolonged incidents such as wildland fire-fighting operations, widespread natural disasters, acts of terrorism, or other occurrences in which emergency operations are segmented into extended work periods might not be conducive to the decontamination of equipment or personnel when moving from one geographic location to another during the course of the work period. In such instances, the fire department should make every reasonable effort to decontaminate personnel and equipment at regular intervals or during rehabilitation periods. All personnel and PPE should be decontaminated at the end of every work period before being released from emergency operations.

In jurisdictions where mutual aid is not readily available, or where call volume is high, call concurrency could inhibit thorough decontamination upon termination of the initial incident. In such instances, the fire department shall ensure that all personnel, contaminated PPE, contaminated fire-fighting equipment, and any area of the fire apparatus or automotive ambulance that is exposed to contaminants are taken out of service following the completion of the concurrent incidents and decontaminated prior to being returned to service.

N **A.14.5.2.1.1** The post-fire environment presents a wide range of chemical hazards, including gases, vapors, and particulates. Research from Underwriters Laboratories has concluded that the fire environment contains the following:

(1) Asphyxiants, such as carbon monoxide, carbon dioxide, and hydrogen sulfide
(2) Irritants, such as ammonia, hydrogen chloride, particulates, nitrogen oxides, phenol, and sulfur dioxide
(3) Allergens
(4) Carcinogens, such as asbestos, benzene, styrene, polycyclic aromatic hydrocarbons (PAHs) and certain heavy metals
(5) Particulates, including particles in the ultrafine range (particles less than 0.1 μ in diameter)

Exposure to these gaseous and particulate agents has been linked to acute and chronic effects resulting in increased firefighter mortality and morbidity, such as higher risk of specific cancers and cardiovascular disease. Research suggests that the use of air purifying respirators (APRs) fitted with chemical, biological, radiological, and nuclear (CBRN) canisters are effective in reducing occupational respiratory exposures in the post-fire environment. However, caution should be applied when using an APR, as cartridge breakthrough can occur with aldehydes and potentially with other chemical agents.

N **A.14.5.2.1.2** Various methods can be used for respirator change-out schedules to meet the OSHA requirement for respiratory protection. OSHA Instruction, Directive Number: CPL 02-00-158, Inspection Procedures for the Respiratory Protection Standard, can be found here: https://www.osha.gov/OshDoc/Directive_pdf/CPL_02-00-158.pdf. These include, among many methods, data from the manufacturer and software models to determine when to change the canister — some manufacturers provide "end of service life" models on their websites, which require information such as breathing rate, humidity, chemical, chemical concentration, and so forth.

N **A.14.5.3.1** Contaminated and soiled ensembles and ensemble elements can present a health risk to individuals who come in contact with them and need to be segregated. The potential for spread of contamination is particularly high when newly contaminated or soiled ensembles and ensemble elements are transported inside the passenger compartments of vehicles or stored in living quarters. It is recognized that it is not always possible to segregate contaminated or soiled elements. Therefore, airtight protective containers or bags should be used to minimize cross-contamination. Examples include disposable polyethylene bags or sealable plastic cases that are cleanable. If a plastic bag is used, it is recommended that the bag be clear to ensure that the contents can be readily identified.

If the protective ensemble or elements are wet, they should be removed as soon as possible following transport from the fire or other emergency scene since ensembles and elements that remain wet under closed conditions can result in the growth of mold or mildew that can cause permanent damage. It is further important that protective ensembles and elements be subjected to appropriate cleaning procedures *(see NFPA 1851)* or stored under conditions where the ensemble or elements can dry following their transport. To prevent the spread of disease or infections through cross-contamination, soiled elements should not be cleaned with other items of clothing or laundry.

N **A.14.6.6** Saunas use a heat source or light source (in the case of infrared saunas) in a defined space to generate heat. "Wet" saunas use steam in addition to the heat source, to generate moist heat. Use of saunas results in sweating, which has been advocated by some as a way to remove chemical toxicants from the body.

The use of saunas for detoxification dates back to at least the 1980s when L. Ron Hubbard and the Scientology community utilized saunas in what has become known as the Hubbard program. This involves 20 to 30 minutes of aerobic exercise followed by as close to 5 hours spent in a sauna at 140°F to 180°F "as could be comfortably taken," nutritional supplements (vitamins and minerals), increasing niacin doses, water and various salts to avoid dehydration and salt depletion, balanced meals, adequate sleep, and avoidance of alcohol and illegal drugs. This method of removing toxicants from the body has been advocated by the alternative medicine community.

The results of the use of this program have been published on fire fighters, fire fighters and other workers exposed at the World Trade Center, and police officers exposed to methamphetamine labs. Reports on this extreme regimen, which requires users to discontinue their prescription medications, have cited obvious risks including "brief full blown 'LSD trips' with hallucinations." Furthermore, no publications of adequate quality to evaluate the effectiveness of the program have been identified. Specifically, existing publications on the Hubbard program have one or more of the following research problems: small participant numbers, inadequate control groups, lack of peer review, and subjective outcomes.

Saunas can cause dehydration and heat stress. Data supporting detoxification through sweating are very limited. A recent review summarized 24 articles that examined metal levels in sweat. However, although the authors conclude that sweating should receive additional consideration for toxic element detoxification, they noted that much of the data they reviewed was old and that research was needed to establish safe, effective therapeutic protocols. Additionally, they did not select their studies based on quality. Small participant numbers were common and variation in collection and measurement methods make comparisons difficult.

A research project entitled the "Blood, Urine, and Sweat (BUS) Study" analyzed these three fluids for approximately 120 chemicals. The authors reported that some toxic elements were present in sweat but not serum in some participants. As noted above, that might have been due to smaller volumes resulting in more concentrated, easier to measure chemical levels in sweat. The authors also noted loss of required trace minerals into sweat. They specifically mentioned fire fighters as a group "who by the nature of their occupations are exposed to toxic elements, may be advised to regularly undertake induced sweating." The authors noted that "Further research is required, however, to determine whether induced sweating on the day of exposure is beneficial or detrimental because enhanced circulation to the skin associated with sauna may stimulate greater

absorption of toxicants on the skin." Importantly, this was a small study that included only 20 participants.

Fire fighters are concerned about reducing health risks from their occupational chemical exposures. However, there are a number of reasons why the use of saunas after fire suppression activities is not recommended:

(1) The science on sauna use is still too limited to determine whether this increases excretion of chemicals in a significant way. Most chemicals are not stored long term in the body and are excreted normally.
(2) Sauna use immediately after fire suppression activities has the potential to increase absorption. Chemicals on the skin could evaporate and be inhaled. The heat in the sauna increases blood flow to the skin, which also has the potential to increase absorption across the skin including any contaminants on the skin.
(3) Fire suppression can cause heat stress and heat illnesses. Increased body temperature results in sweating and fluid loss, which can cause serum electrolyte changes and dehydration. The lower blood volume from dehydration causes less blood to be pumped with each heartbeat. These effects contribute to the well-documented increased risk of heart attack during and in the hours immediately after fire fighting. Use of saunas after fire fighting can increase the potential for dehydration, heat-related illnesses, and heart and kidney disorders. Just walking on a treadmill in turn-out gear increases body temperature.

In summary, at the present time, there is insufficient medical evidence to support a recommendation for use of saunas to remove toxicants from the body after fire fighting, and the potential adverse health effects outweigh potential benefits.

N **A.14.7.2** Possible inhalation, dermal, or ocular exposure hazards include the following: Fire smoke, products of combustion, chemical vapors, diesel exhaust, burning synthetics, bedbugs, vermin, biological hazards, asbestos, perfluorooctanoic acid (PFOA), heavy metals, black mold, hazardous materials, radiation, infectious disease, unknown vapors or mists.

Toxic substances and harmful physical agents might include the following:

(1) Metals and dusts, such as lead, cadmium, and silica
(2) Biological agents, such as bacteria, viruses, and fungi
(3) Physical stress, such as noise, heat, cold, vibration, repetitive motion, and ionizing and nonionizing radiation

Biological agent is a term used to describe microorganisms that are biological in nature and origin, to which exposure in sufficient quantities and duration could result in illness or injury to human health. Biological agents include bacteria, viruses, fungi, and parasites or parts thereof or products they generate. *Reporting exposures to common agents such as cold and common influenza is not required.*

Chemical agent is a term used to describe all chemical elements and compounds in a natural state or in a processed state and their by-products, the exposure to which in sufficient quantities and duration could result in illness or injury to human health.

Physical agent is a term used to describe energies, the exposures to which in sufficient quantities and duration could result in illness or injury to human health. Physical agents include noise, ionizing or nonionizing radiation, extremes in temperature and pressure, vibration, electric and magnetic fields.

N **A.14.7.3.1** Exposures include direct dermal, respiratory, or ocular exposure to a toxic substance or harmful biological, chemical, or physical agent.

A personal exposure report should collect responder-specific information about the potential exposure and activities undertaken during the response. A personal exposure reporting system, such as the National Fire Operations Reporting System (NFORS), should be used.

The NFORS exposure tracking module serves as a personal database providing a detailed history of work and exposures in a private, encrypted, and secure online environment.

With the mobile app, any fire fighter, paramedic, or officer can access and use the exposure tracker. NFORS exposure tracking module is available as an app from the Google Play store and the Apple App store.

Annex B Monitoring Compliance with a Fire Service Occupational Safety, Health, and Wellness Program

This annex is not a part of the requirements of this NFPA document but is included for informational purposes only.

Δ **B.1 Management Plan Adoption.** The purpose of this standard is to specify the minimum requirements for an occupational safety and health program for a fire department *(see 1.2.1)*. Further, paragraph 1.2.4 says that nothing in the standard is intended to restrict any jurisdiction from exceeding the minimum requirements stated in the standard. Section 1.5 requires that when the standard is adopted by a jurisdiction, the authority having jurisdiction shall set a date or dates for achieving compliance with the requirements of this standard. As part of that adoption, the fire department is required to adopt a risk management plan that includes a written plan for compliance with this standard.

B.2 Fire Service Occupational Safety, Health, and Wellness Program Worksheet. The worksheet *(see Figure B.2)* in this annex was developed to provide a template for fire departments that are beginning implementation of an occupational safety and health program or that are evaluating the current status of their programs.

B.3 Risk Management Compliance. This worksheet provides a tool for assessing the yearly progress of the program and for developing a fiscal policy plan to achieve compliance with the applicable requirements of the standard. In the second column, the user can record the percentage of compliance with a specific requirement, whether just getting started, about 50 percent complete, or in full compliance. The remarks can indicate factors that are affecting achieving compliance, whether they are financial, administrative, or in need of legislative action. Where compliance will cost money, the third column can be used to record an estimate of the cost to comply. Again the remarks can indicate whether this is an operating budget or a capital planning budget–type expense. The fourth column allows for indicating an expected or anticipated compliance date. Any additional remarks or changes should be included in the last column for explanatory purposes. This is not a "one size fits all" worksheet and should be modified or expanded to meet the user's needs.

NFPA 1500
FIRE DEPARTMENT OCCUPATIONAL SAFETY AND HEALTH PROGRAM WORKSHEET

Fire Department: _____ Date: _____

Person(s) Completing Worksheet

Name: _____ Title: _____

Name: _____ Title: _____

Name: _____ Title: _____

Reference in Standard	Percent in Compliance	Estimated Cost to Comply	Expected Compliance Date	Remarks
Chapter 1 Administration				
1.4 Equivalency				
1.4.1 Equivalency levels of qualifications				
1.4.2 Training, education, competency, safety				
Chapter 4 Organization				
4.1 Fire Department Organizational Statement				
4.1.1 Written statement or policy				
4.1.2 Operational response criteria				
4.1.3 Statement available for inspection				
4.1.5 Pre-incident plan development				
4.2 Risk Management Plan				
4.2.1 Written risk management plan				
4.2.2 Risk management plan coverage				
4.2.3 Risk management plan components				
4.3 Safety and Health Policy				
4.3.1 Written fire department occupational safety and health policy				
4.3.2 Program complies with NFPA 1500				
4.3.3 Evaluate effectiveness of plan				
4.4 Roles and Responsibilities				
4.4.1 Fire department responsibility				
4.4.2 Comply with laws				
4.4.3 Fire department rules, regulations, and SOPs				
4.4.4 Accident investigation procedure				
4.4.5 Accidents and illnesses investigated				
4.4.6 Individuals cooperate, participate, and comply				

Δ **FIGURE B.2 Fire Service Occupational Safety Health, and Wellness Program Worksheet.**

NFPA 1500
FIRE DEPARTMENT OCCUPATIONAL SAFETY AND HEALTH PROGRAM WORKSHEET *(continued)*

Reference in Standard	Percent in Compliance	Estimated Cost to Comply	Expected Compliance Date	Remarks
Chapter 4 Organization *(continued)*				
4.4.7 Member has right to be protected and participate				
4.4.8 Member organization role				
4.5 Occupational Safety and Health Committee				
4.5.1 Establish committee				
4.5.2 Committee purpose				
4.5.3 Regular meetings				
4.5.4 Relevant NFPA standards training				
4.6 Records				
4.6.1 Accidents, injury, illness, exposures, death records				
4.6.2 Occupational exposures				
4.6.3 Confidential health records				
4.6.4 Training records				
4.6.5 Vehicles and equipment records				
4.7 Appointment of the Health and Safety Officer				
4.7.1 Appointed by fire chief				
4.7.2 Meets qualifications				
4.7.3 Given authority to administer program				
4.7.4 Performing functions in NFPA 1521				
4.7.5 Managing occupational safety and health program				
4.7.6 Additional safety officers and resources available				
Chapter 5 Training, Education, and Professional Development				
5.1 General Requirements				
5.1.1 Establish and maintain safety and health training				
5.1.2 Training commensurate with duties and functions				
5.1.3 Training and education programs for new members				
5.1.4 Restrict the activities of new members				
5.1.5 Training on the risk management plan				
5.1.6 Training on department's written procedures				
5.1.7 Training for emergency medical services				

Δ **FIGURE B.2** *Continued*

NFPA 1500
FIRE DEPARTMENT OCCUPATIONAL SAFETY AND HEALTH PROGRAM WORKSHEET *(continued)*

Reference in Standard	Percent in Compliance	Estimated Cost to Comply	Expected Compliance Date	Remarks
Chapter 5 Training, Education, and Professional Development *(continued)*				
5.1.8 Training on operation, limitation, maintenance, and retirement criteria for personal protective equipment				
5.1.9 Maintaining proficiency in skills and knowledge				
5.1.10 Training includes safe exiting and accountability				
5.1.13 Training includes incident management and accountability system used by the fire department				
5.2 Member Qualifications				
5.2.1 Fire fighters meet NFPA 1001				
5.2.2 Drivers/operators meet NFPA 1002				
5.2.3 Airport fire fighters meet NFPA 1003				
5.2.4 Fire officers meet NFPA 1021				
5.2.5 Wildland fire fighters meet NFPA 1051				
5.2.6 Hazardous materials responders trained to at least operations level per NFPA 472				
5.2.7 Fire investigation training meeting NFPA 1033				
5.2.8 Fire inspection training meeting NFPA 1031				
5.3 Training Requirements				
5.3.1 Adopt or develop training and education curriculums				
5.3.2 Training supports minimum qualifications and certifications of members				
5.3.3 Members practice assigned skill sets on a regular basis but not less than annually				
5.3.4 Training for members when written policies, practices, procedures, or guidelines are changed				
5.3.5 SCBA training program per NFPA 1404				
5.3.6 Wildland fire fighters trained at least annually in the proper deployment of fire shelter				
5.3.7 Live fire training in accordance with NFPA 1403				
5.3.8 Supervised training				
5.3.9 Emergency medical services training				

Δ **FIGURE B.2** *Continued*

NFPA 1500

FIRE DEPARTMENT OCCUPATIONAL SAFETY AND HEALTH PROGRAM WORKSHEET *(continued)*

Reference in Standard	Percent in Compliance	Estimated Cost to Comply	Expected Compliance Date	Remarks
Chapter 5 Training, Education, and Professional Development *(continued)*				
5.3.10 Training on care, use, inspection, maintenance, and limitations of the protective clothing and equipment				
5.3.11 Incident management training to NFPA 1561				
5.3.12 Infectious disease control training to NFPA 1581				
5.4 Special Operations Training				
5.4.1 Advanced training for special operations				
5.4.2 Train members for support to special operations				
5.4.3 Technician level for hazardous materials mitigation				
5.4.4 Rescue technician training to NFPA 1006 when required				
5.5 Member Proficiency				
5.5.1 Proficiency of members				
5.5.2 Monitor training progress				
5.5.3 Annual skills check				
5.6 Training Activities				
5.6.1 Training and exercises conducted by qualified instructor				
5.6.2 Live training and exercises to NFPA 1403				
5.6.3 Risk assessment to determine medical capabilities at training site				
Chapter 6 Fire Apparatus, Equipment, and Drivers/Operators				
6.1 Fire Department Apparatus				
6.1.1 Safety and health concerns related to fire apparatus				
6.1.2 New fire apparatus meets NFPA 1901				
6.1.3 New wildland fire apparatus meets NFPA 1906				
6.1.4 New automotive ambulances meet NFPA 1917				
6.1.5 New marine fire-fighting vessels meet NFPA 1925				
6.1.6 Tools, equipment, and SCBA properly secured				
6.1.7 Apparatus refurbished per NFPA 1912				
6.1.8 Restraints and harnesses for aircraft operations				
6.1.9 Apparatus has hose storage area with positive means to prevent unintentional hose deployment				
6.2 Drivers/Operators of Fire Department Apparatus				
6.2.1 Successful completion of approved driver training				
6.2.2 Complies with traffic laws including having valid driver's licenses				

Δ **FIGURE B.2** *Continued*

NFPA 1500
FIRE DEPARTMENT OCCUPATIONAL SAFETY AND HEALTH PROGRAM WORKSHEET *(continued)*

Reference in Standard	Percent in Compliance	Estimated Cost to Comply	Expected Compliance Date	Remarks
Chapter 6 Fire Apparatus, Equipment, and Drivers/Operators *(continued)*				
6.2.3 Rules and regulations for operating fire department vehicles				
6.2.4 Drivers are responsible				
6.2.5 All persons secured				
6.2.6 Drivers obey all traffic laws				
6.2.7 SOPs for non-emergency and emergency response				
6.2.8 Emergency response, drivers bring vehicle to a complete stop				
6.2.9 Proceed only when safe				
6.2.10 Stop at unguarded railroad grade crossings				
6.2.11 Use caution at guarded railroad grade crossings				
6.2.12 SOPs — engine, transmission and driveline retarders				
6.2.13 SOPs — manual brake limiting valves				
6.2.14 Rules and regulations for private vehicles for emergency response				
6.3 Riding in Fire Apparatus				
6.3.1 Seated and belted securely while riding in fire apparatus				
6.3.2 Tail steps and standing prohibited				
6.3.3 Seat belts not released while the vehicle is in motion				
6.3.4 Secured to vehicle while performing emergency medical care				
6.3.5 Hose loading operations				
6.3.6 Tiller training				
6.3.7 Helmets for riding in unenclosed areas				
6.3.8 Eye protection for riding in unenclosed areas				
6.3.9 Alternative transportation				
6.4 Inspection, Maintenance, and Repair of Fire Apparatus				
6.4.1 Fire apparatus inspection, maintenance, and repair per NFPA 1911				
6.4.2 Pumpers service tested per NFPA 1911				
6.4.3 Aerial ladders and elevating platforms tested per NFPA 1911				
6.4.4 Apparatus and equipment disinfected per NFPA 1581				

Δ **FIGURE B.2** *Continued*

NFPA 1500

FIRE DEPARTMENT OCCUPATIONAL SAFETY AND HEALTH PROGRAM WORKSHEET *(continued)*

Reference in Standard	Percent in Compliance	Estimated Cost to Comply	Expected Compliance Date	Remarks
Chapter 6 Fire Apparatus, Equipment, and Driver/Operators *(continued)*				
6.5 Tools and Equipment				
6.5.1 Safety and health are primary concerns				
6.5.2 Hearing conservation				
6.5.3 New fire department ground ladders meet NFPA 1931				
6.5.4 New fire hose meets NFPA 1961				
6.5.5 New spray nozzles meet NFPA 1964				
6.5.6 Equipment inspected at least weekly and within 24 hours after any use				
6.5.7 Records maintained for the equipment				
6.5.8 Tested at least annually				
6.5.9 Defective or unserviceable equipment removed from service				
6.5.10 Tools and equipment cleaned per NFPA 1581				
6.5.11 Fire department ground ladders tested per NFPA 1932				
6.5.12 Fire hose inspected and tested per NFPA 1962				
6.5.13 Portable fire extinguishers inspected and tested per NFPA 10				
6.5.14 Powered rescue tools meet NFPA 1936				
Chapter 7 Protective Clothing and Protective Equipment				
7.1 General				
7.1.1 Fire department provides PPE				
7.1.2 Use of PPE				
7.1.3 Use of PPE specific to operation				
7.1.4 PPE cleaned every 6 months per NFPA 1851				
7.1.5 Where worn, station work uniforms meet NFPA 1975				
7.1.7 Compliance training for a cleaning program for protective clothing and equipment				
7.2 Protective Clothing for Structural Fire Fighting				
7.2.1 Protective clothing meets NFPA 1971				
7.2.2 Minimum 2 in. (50 mm) overlap of all protective clothing layers				

Δ **FIGURE B.2** *Continued*

NFPA 1500
FIRE DEPARTMENT OCCUPATIONAL SAFETY AND HEALTH PROGRAM WORKSHEET *(continued)*

Reference in Standard	Percent in Compliance	Estimated Cost to Comply	Expected Compliance Date	Remarks
Chapter 7 Protective Clothing and Protective Equipment *(continued)*				
7.2.3 Overlap not required on single-piece protection coveralls				
7.2.4.2 Gloves have proper interface				
7.2.5.1 Program in place for selection, care, maintenance, and use of protective clothing				
7.2.6 Require all members to wear appropriate protective ensemble				
7.3 Protective Clothing for Proximity Fire-Fighting Operations				
7.3.1 Risk assessment performed as required by Chapter 5 of NFPA 1851 to determine need for proximity ensembles				
7.3.2 Proximity fire-fighting protective equipment meeting NFPA 1971 provided and used				
7.3.3 Overlap not required on single-piece protection coveralls				
7.3.4 SCBA protected				
7.4 Protective Clothing for Emergency Medical Operations				
7.4.1.1 Emergency medical protective clothing meeting NFPA 1999 provided and used				
7.4.2 Members use emergency medical gloves				
7.4.3 Members use emergency medical body and face protection				
7.4.4 Infection control program for EMS protective clothing meets NFPA 1581				
7.6 Chemical-Protective Clothing for Hazardous Materials Emergency Operations				
7.6.1 Members have and use vapor-protective garments that meet NFPA 1991 when appropriate				
7.6.1 Members have and use liquid splash-protective garments that meet NFPA 1992 when appropriate				
7.6.1 Members have and use appropriate protective ensemble for CBRN terrorism incidents				
7.7 Inspection, Maintenance, and Disposal of Chemical-Protective Clothing				
7.7.1 Inspected and maintained per manufacturer's recommendation				
7.7.2 Dispose of contaminated garments				

Δ **FIGURE B.2** *Continued*

NFPA 1500
FIRE DEPARTMENT OCCUPATIONAL SAFETY AND HEALTH PROGRAM WORKSHEET *(continued)*

Reference in Standard	Percent in Compliance	Estimated Cost to Comply	Expected Compliance Date	Remarks
Chapter 7 Protective Clothing and Protective Equipment *(continued)*				
7.8 Protective Clothing and Equipment for Wildland Fire Fighting				
7.8.1 SOPs for use of protective clothing				
7.8.2 Protective clothing that meets NFPA 1977 provided and used				
7.8.3 Fire shelter provided and worn properly				
7.9 Protective Ensemble for Technical Rescue Operations				
7.9.1 Selection, care, and maintenance as specified in NFPA 1855				
7.9.2 Technical rescue protective clothing meeting NFPA 1951 provided and used				
7.9.3 Minimum 2 in. (50 mm) overlap of all protective clothing layers				
7.9.4 Respiratory protection certified by NIOSH provided and used				
7.9.5 Primary eye protection that meets NFPA 1951 provided and used				
7.9.6 Protective clothing used and maintained per manufacturer's instructions				
7.10 Protective Clothing and Equipment for Surface Water Operations				
7.10.1 Members who engage in surface water operations use a protective ensemble meeting NFPA 1952				
7.10.2 Surface water protective ensembles used and maintained in accordance to manufacturer's instructions				
7.10.3 Fire department established maintenance and inspection program for surface water operation protective ensembles				
7.10.4 Proper decontamination procedures for surface water protective ensembles				
7.12 Respiratory Protection Program				
7.12.1 Respiratory protection program addresses the selection, care, maintenance, and use				
7.12.2 SOPs address respiratory protection				
7.12.3 Members qualified at least annually in use				
7.12.4 Reserve SCBA provided and maintained				
7.12.5 Adequate reserve air supply				
7.12.6 Equipment stored ready-for-use and properly protected				

Δ **FIGURE B.2** *Continued*

NFPA 1500
FIRE DEPARTMENT OCCUPATIONAL SAFETY AND HEALTH PROGRAM WORKSHEET *(continued)*

Reference in Standard	Percent in Compliance	Estimated Cost to Comply	Expected Compliance Date	Remarks
Chapter 7 Protective Clothing and Protective Equipment *(continued)*				
7.12.7 SCBA provided that meets NFPA 1981 and required to be used				
7.12.8 Members understand keeping facepiece in place				
7.12.9 Respiratory protection in the post-fire environment				
7.13 Breathing Air				
7.13 Breathing air meets NFPA 1989				
7.14 Respiratory Protection Equipment				
7.14.1 SCBA meet appropriate standards				
7.14.2 Supplied-air respirators appropriate for intended application				
7.14.3 Air-purifying respirators NIOSH certified with policy for use				
7.15 Fit Testing				
7.15.1 Quantitative fit test annually				
7.15.2 New members fit tested before permitted in hazardous atmospheres				
7.15.3 Respirators quantitative fit testing in negative pressure mode				
7.15.4 Records of facepiece fitting test				
7.15.5 Protection factor at least 500 for negative-pressure facepieces				
7.16 Using Respiratory Protection				
7.16.1 Facepiece-to-face seal required				
7.16.2 Nothing passes through area of seal				
7.16.3 No beard and facial hair in area of seal				
7.16.4 Spectacles fitted to inside of facepiece				
7.16.5 Spectacle strap or temple bars prohibited				
7.16.6 Contact lenses permitted				
7.16.7 Head covering breaking seal prohibited				
7.16.8 SCBA facepiece/head harness worn under protective hood				
7.16.9 SCBA facepiece/head harness worn under hazardous chemical-protective helmet				
7.16.10 Helmet does not interfere with the facepiece-to-face seal				

Δ **FIGURE B.2** *Continued*

NFPA 1500
FIRE DEPARTMENT OCCUPATIONAL SAFETY AND HEALTH PROGRAM WORKSHEET *(continued)*

Reference in Standard	Percent in Compliance	Estimated Cost to Comply	Expected Compliance Date	Remarks
Chapter 7 Protective Clothing and Protective Equipment *(continued)*				
7.17 SCBA Cylinders				
7.17.1 Inspected annually				
7.17.2 Hydrostatic test cylinders				
7.17.3 SCBA cylinders minimum gas capacity				
7.17.4 In-service SCBA cylinders stored charged				
7.17.5 In-service SCBA cylinders inspected weekly, monthly, and prior to filling				
7.17.6 Personnel protected during SCBA cylinder filling				
7.17.7 Unique situations for rapid filling identified				
7.17.8 Risk assessment process used to identify rapid filling situations				
7.17.9 Rapid refilling of SCBA on person limited				
7.17.10 Emergency situation for air transfer permitted				
7.17.11 Transfilling per manufacturer's instructions				
7.17.12 Exit strategy practiced when SCBA cylinder reaches 600 L or more				
7.18 Personal Alert Safety Systems (PASS)				
7.18.1 PASS meet NFPA 1982				
7.18.2 Members provided with and use PASS device				
7.18.3 Tested at least weekly and prior to use				
7.19 Life Safety Rope and System Components				
7.19.1 Life safety rope and system components meet NFPA 1983				
7.19.2.1 Life safety rope used for other purposes removed from service				
7.19.3 Reuse of life safety rope only after evaluation				
7.19.4 Rope inspection by qualified person				
7.19.5 Records document each life safety rope use				
7.20 Face and Eye Protection				
7.20.1 Eye protection appropriate for hazard provided and used				
7.20.2 SCBA facepiece used as primary face and eye protection				
7.20.3 Primary eye protection used when full facepiece not used				

Δ **FIGURE B.2** *Continued*

NFPA 1500
FIRE DEPARTMENT OCCUPATIONAL SAFETY AND HEALTH PROGRAM WORKSHEET *(continued)*

Reference in Standard	Percent in Compliance	Estimated Cost to Comply	Expected Compliance Date	Remarks
Chapter 7 Protective Clothing and Protective Equipment *(continued)*				
7.21 Hearing Protection				
7.21.1 Provided and used when apparatus noise in excess of 90 dBA				
7.21.2 Provided and used when tool and equipment noise in excess of 90 dBA				
7.21.3 Hearing conservation program				
7.23 New and Existing Protective Clothing and Protective Equipment				
7.23.1 New PPE meets current standards				
7.23.2 Existing PPE met standards when manufactured				
7.23.3 PPE retired in accordance with NFPA 1851				
7.23.4 Open circuit SCBA retired in accordance with NFPA 1852				
7.23.5 Program for retirement and disposal of PPE				
7.23.6 Manufacturer criteria to be used				
Chapter 8 Emergency Operations				
8.1 Incident Management				
8.1.1 Prevent accidents and injuries				
8.1.2 Incident management system in writing and meets NFPA 1561				
8.1.3 IMS used at all emergency incidents				
8.1.4 IMS applied to drills, exercises, and training				
8.1.5 Incident commander responsible for safety				
8.1.6 Safety officer assigned when needed				
8.1.7 Span of control				
8.1.8 Incident commander's responsibility				
8.2 Communications				
8.2.1 Dispatch and incident communication systems meet NFPA 1561 and NFPA 1221				
8.2.2 Portable radios in warm or hot zones				
8.2.3 SOPs for use of clear text radio messages				
8.2.4 Procedures for emergency traffic				
8.2.5 Incident clock used				
8.3 Crew Resource Management (CRM) During Emergency Operations				
8.3.1 CRM function of incident commander				
8.4 Risk Management During Emergency Operations				
8.4.1 Risk management integrated in incident command				

Δ **FIGURE B.2** *Continued*

NFPA 1500

FIRE DEPARTMENT OCCUPATIONAL SAFETY AND HEALTH PROGRAM WORKSHEET *(continued)*

Reference in Standard	Percent in Compliance	Estimated Cost to Comply	Expected Compliance Date	Remarks
Chapter 8 Emergency Operations *(continued)*				
8.4.2 Risk management principles used				
8.4.3 IC evaluates risk to members				
8.4.4 Risk management principles routinely employed by supervisors				
8.4.5 Safety officer with proper expertise appointed				
8.4.6 Protective equipment appropriate for CBRN exposure				
8.5 Personnel Accountability During Emergency Operations				
8.5.1 Written SOPs for personnel accountability				
8.5.2 Local conditions and characteristics considered				
8.5.3 Members actively participate				
8.5.4 IC maintains awareness				
8.5.5 Officers supervise assigned companies/crews				
8.5.6 Company officers responsible for members				
8.5.7 Members remain with company				
8.5.8 Member responsible for following personnel accountability system				
8.5.9 Personnel accountability system used at all incidents				
8.5.10 Accountability system effective				
8.5.11 Additional accountability officers				
8.5.12 IC and supervisors responsible for tracking and accountability of assigned companies				
8.6 Members Operating at Emergency Incidents				
8.6.1 Adequate number of personnel provided to safely conduct emergency operations				
8.6.2 No evolutions outside of established safety criteria				
8.6.3 Inexperienced members directly supervised				
8.6.4 Members operate in teams of two or more				
8.6.5 Crew members in communication with each other				

Δ **FIGURE B.2** *Continued*

NFPA 1500
FIRE DEPARTMENT OCCUPATIONAL SAFETY AND HEALTH PROGRAM WORKSHEET *(continued)*

Reference in Standard	Percent in Compliance	Estimated Cost to Comply	Expected Compliance Date	Remarks
Chapter 8 Emergency Operations *(continued)*				
8.6.6 Crew members operate in proximity to each other				
8.6.7 Two in, two out in initial stages				
8.6.8 At aircraft rescue and fire fighting, IDLH area wingtip to wingtip				
8.6.9 Highest available level of EMS available for special operations				
8.6.10 EMS personnel at hazmat operations meet NFPA 473				
8.6.11 IC requests EMS to be available				
8.6.12 Members secured to aerial device				
8.6.13 PPE and SCBA used by fire investigators and others in IDLH atmosphere				
8.6.14 Water rescue members wear personal flotation devices				
8.6.15 SOP for hazardous energy source operations				
8.7 Emergency Incident Hazard Control Zones				
8.7.1 Hazard control zones established with members wearing appropriate level of PPE				
8.7.2 Hazard control zone perimeters established				
8.7.3 Changes in perimeters communicated to all members on scene				
8.7.4 Hazard control zones identified				
8.7.5 The IC ensures that the designation of the appropriate protective clothing and equipment is commensurate with the hazard zone the member is operating in				
8.7.6 All officers and members using appropriate PPE within that zone				
8.7.7 The use of hazard control zones continued until the hazards have been mitigated				

Δ **FIGURE B.2** *Continued*

NFPA 1500

FIRE DEPARTMENT OCCUPATIONAL SAFETY AND HEALTH PROGRAM WORKSHEET *(continued)*

Reference in Standard	Percent in Compliance	Estimated Cost to Comply	Expected Compliance Date	Remarks
Chapter 8 Emergency Operations *(continued)*				
8.8 Rapid Intervention for Rescue of Members				
8.8.1 Personnel provided for rescue of members				
8.8.2.2 Standby members maintain awareness				
8.8.2.3 Standby members remain in communication				
8.8.2.4 Standby member permitted to perform other duties outside of the hazard area				
8.8.2.5 Standby member restricted activities				
8.8.2.6 Standby members have full PPE and SCBA				
8.8.2.7 Standby members don full PPE and SCBA before entering hazardous area				
8.8.2.8 Standby member limitations				
8.8.2.9 Rapid intervention crew deployed when incident no longer in initial stage				
8.8.2.10 In imminent life-threatening situation, action to prevent loss of life permitted with less than four personnel				
8.8.4 Rapid intervention crew equipped and available				
8.8.6 Composure and structure of RIC flexible				
8.8.7 IC provides RICs appropriate for incident size				
8.8.8 RIC status in early stages				
8.8.11 RICs for special operations				

Δ **FIGURE B.2** *Continued*

NFPA 1500
FIRE DEPARTMENT OCCUPATIONAL SAFETY AND HEALTH PROGRAM WORKSHEET *(continued)*

Reference in Standard	Percent in Compliance	Estimated Cost to Comply	Expected Compliance Date	Remarks
Chapter 8 Emergency Operations *(continued)*				
8.10 Scenes of Violence, Civil Unrest, or Terrorism				
8.10.1 Fire department not involved in activity without law enforcement present				
8.10.2 Fire department personnel not involved in crowd control				
8.10.3 SOPs for member safety at civil disturbance				
8.10.4 Interagency agreement for protection of members				
8.10.5 Communication to indicate life-and-death situations				
8.10.6 Fire department to coordinate with law enforcement				
8.10.7 Fire department IC identifies and reacts to violent situations				
8.10.8 Fire department IC communicates with law enforcement IC				
8.10.9 Stage resources in a safe area until scene secure				
8.10.10 Secure law enforcement or withdraw when violence occurs				
8.10.11 Body armor used only by members trained and qualified				
8.10.12 Members supporting SWAT operations trained and operating under SOPs				
8.11 Post-Incident Analysis				
8.11.1 SOPs for standardized post-incident critique				
8.11.2 Safety officer involved in critique				
8.11.3 Review of conditions and actions on the safety and health of members				

Δ FIGURE B.2 ***Continued***

NFPA 1500

FIRE DEPARTMENT OCCUPATIONAL SAFETY AND HEALTH PROGRAM WORKSHEET *(continued)*

Reference in Standard	Percent in Compliance	Estimated Cost to Comply	Expected Compliance Date	Remarks
Chapter 8 Emergency Operations *(continued)*				
8.11.4 Identify needed action to improve welfare of members				
8.11.5 Analysis includes standard action plan				
Chapter 10 Facility Safety				
10.1 Safety Standards				
10.1.1 Comply with codes				
10.1.2 Facilities for disinfecting, cleaning, and storage per NFPA 1581				
10.1.3 All facilities comply with NFPA *101*				
10.1.3.1 All facilities have smoke detectors				
10.1.3.4 All facilities have carbon monoxide detectors				
10.1.5 Methods to prevent exhaust exposure				
10.1.6 Contaminated PPE not in living and sleeping areas				
10.1.7 Smoke-free facilities				
10.1.8 Pole holes secured				
10.2 Inspections				
10.2.1 Annual code inspection				
10.2.2 Inspections documented				
10.2.3 Monthly safety and health inspection				
10.3 Maintenance and Repairs				
10.3 System to maintain facilities and correct safety or health hazards				
Chapter 11 Medical and Physical Requirements				
11.1 Medical Requirements				
11.1.1 Medical qualified before becoming a member				
11.1.2 Members meet chapter 7 and chapter 9 of NFPA 1582				
11.1.3 Medical evaluation considers risks and functions associated with duties				
11.1.4 Aircraft pilots comply with FAA regulations				
11.1.5 Members under influence of drugs or alcohol excluded from participation				

Δ **FIGURE B.2** *Continued*

NFPA 1500
FIRE DEPARTMENT OCCUPATIONAL SAFETY AND HEALTH PROGRAM WORKSHEET *(continued)*

Reference in Standard	Percent in Compliance	Estimated Cost to Comply	Expected Compliance Date	Remarks
Chapter 11 Medical and Physical Requirements *(continued)*				
11.2 Physical Performance Requirements				
11.2.1 Fire department develops requirements				
11.2.2 Candidates qualified prior to training				
11.2.3 Members annually qualified				
11.2.4 Members not qualified not involved in emergency operations				
11.2.5 Physical performance rehabilitation program available				
11.3 Health and Fitness				
11.3.1 Health and fitness program meets NFPA 1583				
11.3.2 Fitness levels determined by individual's assigned functions				
11.3.3 Health and fitness coordinator administers the program				
11.3.4 Health and fitness coordinator acts as liaison				
11.4 Confidential Health Data Base				
11.4.1 Individual health file for each member				
11.4.2 Health file complete				
11.4.3 Composite data base for analysis				
11.4.4 Autopsy results in health data base				
11.5 Infection Control				
11.5.1 Fire department limits or prevents member's exposure				
11.5.2 Infection control program meets NFPA 1581				
11.6 Fire Department Physician				
11.6.1 Fire department physician officially designated				
11.6.2 Provides medical guidance in management of safety and health program				
11.6.3 Physician licensed				
11.6.4 Available on urgent basis				
11.6.5 Health and safety officer and health fitness coordinator liaison with physician				
11.7 Fitness for Duty Evaluation				
11.7.1 Process for evaluating essential job functions				
11.7.2 Evaluation by qualified person and confirmed by fire department physician				
11.7.3 Treatment provided to allow member to perform essential job functions				
11.7.4 Fire department physician to confirm member can return to duty				

Δ **FIGURE B.2** *Continued*

NFPA 1500
FIRE DEPARTMENT OCCUPATIONAL SAFETY AND HEALTH PROGRAM WORKSHEET *(continued)*

Reference in Standard	Percent in Compliance	Estimated Cost to Comply	Expected Compliance Date	Remarks
Chapter 12 Behavioral Health and Wellness Programs				
12.1 Behavioral Health Program				
12.1.1 Provide member assistance program				
12.1.2 Program refers members to appropriate health care services				
12.1.3 Program to assist members in creating personal resiliency to stress and traumatic exposures				
12.1.4 Program that supports the enhancement of behavioral health and wellness through leadership development and organizational/group dynamics evaluation and training				
12.2 Wellness Program				
12.2.1 Wellness program preventative goals and strategies				
12.2.2 Wellness program uses peer reviewed and researched strategies supporting safety and efficacy of the program				
12.2.3 Program on health effects with tobacco products				
Chapter 13 Occupational Exposure to Potentially Traumatic Events				
13.1 General				
13.1.1 Physician to provide guidance				
13.1.2 Written policy that establishes program to relieve stress				
13.1.3 Clearly outlined assistance and intervention available to affected members				

Δ **FIGURE B.2** *Continued*