

NFPA® 1620

Standard for  
Pre-Incident Planning

2010 Edition



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

**IMPORTANT NOTICES AND DISCLAIMERS CONCERNING NFPA® DOCUMENTS**  
**NOTICE AND DISCLAIMER OF LIABILITY CONCERNING THE USE OF NFPA DOCUMENTS**

NFPA® codes, standards, recommended practices, and guides (“NFPA Documents”), 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 Documents.

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 Documents. The NFPA also makes no guaranty or warranty as to the accuracy or completeness of any information published herein.

In issuing and making NFPA Documents 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 Documents. 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.

## **IMPORTANT NOTICES AND DISCLAIMERS CONCERNING NFPA DOCUMENTS**

### **ADDITIONAL NOTICES AND DISCLAIMERS**

#### **Updating of NFPA Documents**

Users of NFPA codes, standards, recommended practices, and guides (“NFPA Documents”) should be aware that these documents may be superseded at any time by the issuance of new editions or may be amended from time to time through the issuance of Tentative Interim Amendments. An official NFPA Document at any point in time consists of the current edition of the document together with any Tentative Interim Amendments and any Errata then in effect. In order to determine whether a given document is the current edition and whether it has been amended through the issuance of Tentative Interim Amendments or corrected through the issuance of Errata, consult appropriate NFPA publications such as the National Fire Codes® Subscription Service, visit the NFPA website at [www.nfpa.org](http://www.nfpa.org), or contact the NFPA at the address listed below.

#### **Interpretations of NFPA Documents**

A statement, written or oral, that is not processed in accordance with Section 6 of the Regulations Governing Committee Projects 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 Document. The users of NFPA Documents 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 Documents.

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 Document 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 Documents 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 Documents are copyrighted by the NFPA. 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 Documents 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 Documents, contact NFPA at the address below.

#### **For Further Information**

All questions or other communications relating to NFPA Documents 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 documents 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 02169-7471; email: [stds\\_admin@nfpa.org](mailto:stds_admin@nfpa.org)

For more information about NFPA, visit the NFPA website at [www.nfpa.org](http://www.nfpa.org).

Copyright © 2009 National Fire Protection Association®. All Rights Reserved.

**NFPA® 1620**  
**Standard for**  
**Pre-Incident Planning**  
**2010 Edition**

This edition of NFPA 1620, *Standard for Pre-Incident Planning*, was prepared by the Technical Committee on Pre-Incident Planning. It was issued by the Standards Council on October 27, 2009, with an effective date of December 5, 2009, and supersedes all previous editions.

This edition of NFPA 1620 was approved as an American National Standard on December 5, 2009.

**Origin and Development of NFPA 1620**

In 1987, following a report of a large loss fire to a sprinklered warehouse in Ohio, fire service and insurance company officials met at NFPA headquarters to discuss such fires and to determine whether there were steps that could be taken to cooperatively address this problem. After a series of meetings, the group made several recommendations relating to large loss fires in sprinklered properties.

One of the recommendations was that NFPA develop a document that addressed the need for adequate pre-incident planning for such occupancies. The NFPA Standards Council assigned the project to the Fire Service Training Committee. The Committee established a subcommittee with additional expertise from the insurance industry to develop a document relating to pre-incident planning for warehouse occupancies. That document, NFPA 1420, *Recommended Practice for Pre-Incident Planning for Warehouse Occupancies*, was adopted by the NFPA membership in 1993.

Following adoption of NFPA 1420, the Subcommittee of the Training Committee that had been involved with developing NFPA 1420 felt that the scope of the document could be expanded to include all occupancies. At the urging of the subcommittee, the Standards Council established a separate technical committee to assume responsibility for the document and to expand it. The 1998 edition was the result of that work. The document was renumbered as NFPA 1620 and retitled *Recommended Practice for Pre-Incident Planning*.

The 2003 edition of NFPA 1620 incorporated editorial changes to comply with the NFPA *Manual of Style*.

The 2010 edition of NFPA 1620 features a number of technical and editorial changes. The document was completely revised and changed from a recommended practice to a standard as the technical committee established minimum requirements for developing pre-incident plans for use by personnel responding to emergencies.

In the 2010 edition, Chapters 4 through 10 address the pre-incident plan process, physical and site considerations, occupant considerations, water supplies and fire protection systems, special hazards, emergency operations, and pre-incident plan testing and maintenance.

In the annex, case histories, information addressing special or unique characteristics of specific occupancy classifications, and pre-incident plan field collection cards and facility data record sample forms are provided for the user of the standard.

## Technical Committee on Pre-Incident Planning

**John A. Welling, III**, *Chair*  
Bristol Myers Squibb Company, NJ [U]

**David R. Blossom**, Amerisure Insurance, FL [I]  
**George J. Browne**, Global Risk Consultants Corporation, NJ [SE]  
**Jeffery D. Carney**, Hamilton County Emergency Services, TN [E]  
**Michael E. Carsillo**, West Palm Beach Fire Rescue, FL [E]  
**Coleman L. Cashion**, FM Global, NC [I]  
**Flora Chen**, City of Peoria Fire Department, AZ [E]  
**Mary Julie Corrigan**, Harvard University, MA [U]  
**Richard W. Duncanson**, City of Middletown Fire Department, NY [E]  
 Rep. NFPA Fire Service Section  
**Jon M. Evenson**, The RJA Group, Inc., IL [SE]  
**James M. Feld**, Feld Engineering, CA [SE]  
**Darrell M. Franchuk**, HSB Professional Loss Control, FL [I]  
**Hugh H. Gibson, IV**, Insurance Services Office, Inc., NJ [I]  
**David J. Graupman**, Zurich Services Corporation, WI [I]  
**Gregory Jakubowski**, Fire Planning Associates, Inc., PA [SE]

**Donald R. Kirkham**, Velocys, Inc., OH [U]  
**Scott C. Kline**, Hoodland Fire District #74, OR [U]  
**Barry Lefler**, Chubb Group of Insurance Companies, NC [I]  
**Richard T. Long, Jr.**, Exponent, Inc., MD [SE]  
**Jack J. Murphy**, Fire Safety Directors Association of Greater New York, NJ [U]  
**Armando Porto**, New Jersey School Development Authority, NJ [U]  
**Donald L. Schmidt**, Preparedness, LLC, MA [SE]  
**Michael D. Snyder**, Dow Corning Corporation, MI [U]  
 Rep. NFPA Industrial Fire Protection Section  
**Karl K. Thompson**, Tennessee Fire Service & Codes Enforcement Academy, TN [E]  
**Barry R. Weissman**, Hillmann Environmental Group, LLC, NJ [SE]  
 Rep. Academy of Certified Hazardous Materials Managers  
**Jameson R. Wendell**, Kinder Morgan, Inc., TX [U]  
**Ronald W. Woodfin**, TetraTek, Inc. Fire Safety Technologies, TX [SE]

### Alternates

**David M. Hope**, TetraTek Inc. Fire Safety Technologies, TX [SE]  
 (Alt. to R. W. Woodfin)

**Barton J. Krauss**, Fire Planning Associates, Inc., (Alt. to G. Jakubowski)

**David G. Trebisacci**, 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 the site-specific pre-incident planning for response to fires and other types of emergencies.

## Contents

<b>Chapter 1 Administration</b> .....	1620- 4	6.2 Life Safety Considerations .....	1620- 9
1.1 Scope .....	1620- 4	6.3 On-Site Emergency Organization .....	1620- 9
1.2 Purpose .....	1620- 4		
1.3 Application .....	1620- 4	<b>Chapter 7 Water Supplies and Fire Protection Systems</b> .....	1620- 9
<b>Chapter 2 Referenced Publications</b> .....	1620- 4	7.1 General .....	1620- 9
2.1 General .....	1620- 4	7.2 Water Supplies .....	1620- 9
2.2 NFPA Publications .....	1620- 4	7.3 Water-Based Fire Protection Systems .....	1620- 9
2.3 Other Publications .....	1620- 4	7.4 Non-Water-Based Fire Protection Systems .....	1620- 9
2.4 References for Extracts in Mandatory Sections .....	1620- 4	7.5 Fire Alarm Systems .....	1620- 9
<b>Chapter 3 Definitions</b> .....	1620- 4	7.6 Portable Fire Extinguishers .....	1620- 9
3.1 General .....	1620- 4	7.7 Smoke Control Systems .....	1620- 9
3.2 NFPA Official Definitions .....	1620- 4	<b>Chapter 8 Special Hazards</b> .....	1620-10
3.3 General Definitions .....	1620- 5	8.1 General .....	1620-10
<b>Chapter 4 Pre-Incident Planning Process</b> .....	1620- 7	8.2 Transient Conditions .....	1620-10
4.1 General .....	1620- 7	8.3 Inventory .....	1620-10
4.2 Pre-incident Plan Development .....	1620- 7	8.4 Special Hazard Considerations .....	1620-10
4.3 Data Collection .....	1620- 7	<b>Chapter 9 Emergency Operations</b> .....	1620-10
4.4 Pre-Incident Plan Preparation .....	1620- 7	9.1 General .....	1620-10
4.5 Pre-Incident Plan Document .....	1620- 7	9.2 Incident Notification .....	1620-10
4.6 Pre-Incident Plan Sketches .....	1620- 7	9.3 Incident Operations .....	1620-10
4.7 Pre-Incident Plan Distribution .....	1620- 7	<b>Chapter 10 Pre-Incident Plan Testing and Maintenance</b> .....	1620-10
4.8 Training .....	1620- 7	10.1 General .....	1620-10
4.9 During the Incident .....	1620- 7	10.2 Pre-Incident Plan Update .....	1620-11
4.10 Post-Incident .....	1620- 7	<b>Annex A Explanatory Material</b> .....	1620-11
<b>Chapter 5 Physical and Site Considerations</b> .....	1620- 7	<b>Annex B Case Histories</b> .....	1620-21
5.1 General .....	1620- 7	<b>Annex C Special or Unique Characteristics of Occupancy Classifications</b> .....	1620-24
5.2 Construction .....	1620- 7	<b>Annex D Sample Pre-Incident Plan Field Collection Card and Facility Data Record</b> .....	1620-33
5.3 Building Management Systems and Utilities .....	1620- 8	<b>Annex E Informational References</b> .....	1620-39
5.4 External Site Conditions .....	1620- 8	<b>Index</b> .....	1620-40
5.5 Internal and External Security Features ..	1620- 8		
5.6 Fences or Other Barriers .....	1620- 8		
5.7 Security Animals .....	1620- 8		
5.8 Security Systems .....	1620- 8		
5.9 General Overall Condition .....	1620- 8		
5.10 Communications .....	1620- 8		
<b>Chapter 6 Occupant Considerations</b> .....	1620- 9		
6.1 General .....	1620- 9		

## NFPA 1620

### Standard for

## Pre-Incident Planning

### 2010 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 Documents." They can also be obtained on request from NFPA or viewed at [www.nfpa.org/disclaimers](http://www.nfpa.org/disclaimers).*

**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. As an aid to the user, the complete title and edition of the source documents for extracts in mandatory sections of the document are given in Chapter 2 and those for extracts in informational sections are given in Annex E. 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 publications can be found in Chapter 2 and Annex E.

## Chapter 1 Administration

**1.1 Scope.** This document provides criteria for developing pre-incident plans for use by personnel responding to emergencies. Not every portion of this standard is applicable to the development of all pre-incident plans.

**1.1.1** This document is not intended for pre-incident planning related to construction, alteration, and demolition. (*See NFPA 241*).

**1.1.2** Annex A, Explanatory Material; Annex B, Case Histories; Annex C, Special or Unique Characteristics of Occupancy Classifications; and Annex D, Sample Pre-Incident Plan Field Collection Card and Facility Data Record forms provide information to the users of this document.

**1.2\* Purpose.** The purpose of this document shall be to develop pre-incident plans to assist responding personnel in effectively managing emergencies for the protection of occupants, responding personnel, property, and the environment.

### 1.3 Application.

**1.3.1** The authority having jurisdiction (AHJ) shall determine the location(s) to be pre-incident planned, data to be collected, and extent of documentation appropriate for the jurisdiction.

**1.3.2** The authority having jurisdiction shall apply the requirements in this standard to the development of a pre-incident plan.

**1.3.3\*** When this 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.

**1.3.4\*** The authority having jurisdiction shall be permitted to establish a phase-in schedule for compliance with specific requirements of 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.

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

NFPA 170, *Standard for Fire Safety and Emergency Symbols*, 2009 edition.

NFPA 241, *Standard for Safeguarding Construction, Alteration, and Demolition Operations*, 2009 edition.

### 2.3 Other Publications.

**2.3.1 U. S. Government Publications.** U. S. Government Printing Office, Washington, DC 20402.

Title 29, Code of Federal Regulations, 1910.146.

### 2.3.2 Other Publications.

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

### 2.4 References for Extracts in Mandatory Sections.

NFPA 101<sup>®</sup>, *Life Safety Code*<sup>®</sup>, 2009 edition.

NFPA 301, *Code for Safety to Life from Fire on Merchant Vessels*, 2008 edition.

NFPA 472, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, 2008 edition.

NFPA 1006, *Standard for Technical Rescuer Professional Qualifications*, 2008 edition.

NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, 2007 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 NFPA Official Definitions.

**3.2.1\* Approved.** Acceptable to the authority having jurisdiction.

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

**3.2.3 Shall.** Indicates a mandatory requirement.

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

**3.2.5 Standard.** A document, the main text of which contains only mandatory provisions using the word "shall" to indicate requirements and which is in a form generally suitable for mandatory reference by another standard or code or for adoption.





tion into law. Nonmandatory provisions shall be located in an appendix or annex, footnote, or fine-print note and are not to be considered a part of the requirements of a standard.

### 3.3 General Definitions.

**3.3.1 Access Stairs.** Limited floor-level stair that is located between two or more common floors utilized by a single tenant and distinct from the main building staircase.

**3.3.2 Anchor Store.** A department store or major merchandising center that has direct access to the covered mall but in which all required means of egress is independent of the covered mall.

**3.3.3 Apartment Building.** A building or portion thereof containing three or more dwelling units with independent cooking and bathroom facilities.

**3.3.4 Area of Refuge.** An area that is either (1) a story in a building where the building is protected throughout by an approved, supervised automatic sprinkler system and has not less than two accessible rooms or spaces separated from each other by smoke-resisting partitions; or (2) a space located in a path of travel leading to a public way that is protected from the effects of fire, either by means of separation from other spaces in the same building or by virtue of location, thereby permitting a delay in egress travel from any level. [101, 2009]

**3.3.5\* Assembly Occupancy.** An occupancy (1) used for a gathering of 50 or more persons for deliberation, worship, entertainment, eating, drinking, amusement, awaiting transportation, or similar uses; or (2) used as a special amusement building, regardless of occupant load.

**3.3.6 Atrium.** A large-volume space created by a floor opening or series of floor openings connecting two or more stories that is covered at the top of the series of openings and is used for purposes other than an enclosed stairway; an elevator hoistway; an escalator opening; or as a utility shaft used for plumbing, electrical, air-conditioning, or communications facilities. [101, 2009]

**3.3.7 BNICE.** An acronym for biological, nuclear/radiological, incendiary, chemical, and explosive agents.

**3.3.8 Bulk Merchandising Retail Building.** A building in which the sales area includes the storage of combustible materials on pallets, in solid piles, or in racks in excess of 12 ft (3.7 m) in storage height.

**3.3.9\* Business Occupancy.** An occupancy used for account and record keeping or the transaction of business other than mercantile.

**3.3.10 CBRNE.** An acronym for chemical, biological, radiological, nuclear, and explosive agents.

**3.3.11 Clean Agent.** Electrically nonconductive, volatile, or gaseous fire extinguishant that does not leave a residue upon evaporation.

**3.3.12 Competent Person.** One who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them. [1006, 2008]

**3.3.13\* Covered Mall Building.** A building, including the covered mall, enclosing a number of tenants and occupancies, such as retail stores, drinking and dining establishments, entertainment and amusement facilities, offices, and other simi-

lar uses, wherein two or more tenants have a main entrance into the covered mall.

**3.3.14\* Confined Space.** A space that is large enough and so configured that an employee can bodily enter and perform assigned work; and has limited or restricted means for entry and exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry); and is not designed for continuous employee occupancy. [OSHA 29 CFR 1910.146]

**3.3.15 Controlled Atmosphere Warehouse.** A facility for storing specialty products, such as fruits, that generally includes sealed storage rooms, with controlled temperature and air content, the most common being an atmosphere containing a high percentage of a gas such as nitrogen.

**3.3.16 Defend in Place.** The operational response in which the action is to relocate the affected occupants to a safe place within the structure during an emergency.

**3.3.17\* Detention and Correctional Occupancy.** An occupancy used to house four or more persons under varied degrees of restraint or security where such occupants are mostly incapable of self-preservation because of security measures not under the occupants' control.

**3.3.18\* Dormitory.** A building or a space in a building in which group sleeping accommodations are provided for more than 16 persons who are not members of the same family in one room, or a series of closely associated rooms, under joint occupancy and single management, with or without meals, but without individual cooking facilities.

**3.3.19\* Educational Occupancy.** An occupancy used for educational purposes through the twelfth grade by six or more persons for 4 or more hours per day or more than 12 hours per week.

**3.3.20 Elevator Evacuation System.** A system, including a vertical series of elevator lobbies and associated elevator lobby doors, an elevator shaft(s), and a machine room(s), that provides protection from fire effects for elevator passengers, people waiting to use elevators, and elevator equipment so that elevators can be used safely for egress. [101, 2009]

**3.3.21 Emergency Operations Center.** A fixed, designated area to be used in supporting and coordinating operations during emergencies.

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

**3.3.23\* Evacuation Capability.** The ability of occupants, residents, and staff as a group either to evacuate a building or to relocate from the point of occupancy to a point of safety.

**3.3.24\* Facility Emergency Action Plan.** A plan of designated actions by employers, employees, and other building occupants to ensure their safety from fire and other emergencies.

**3.3.25 Fire Alarm System.** A system or portion of a combination system that consists of components and circuits arranged to monitor and annunciate the status of fire alarm or supervisory signal-initiating devices and to initiate the appropriate response to those signals.

**3.3.26\* Fire Barrier.** A continuous membrane or a membrane with discontinuities created by protected openings with a



specified fire protection rating, where such membrane is designed and constructed with a specified fire resistance rating to limit the spread of fire, and that also restricts the movement of smoke.

**3.3.27 Fire Compartment.** A space within a building that is enclosed by fire barriers on all sides, including the top and bottom.

**3.3.28 Fire Wall.** A wall separating buildings or subdividing a building to prevent the spread of fire and having a fire resistance rating and structural stability.

**3.3.29\* Health Care Occupancy.** An occupancy used for purposes of medical or other treatment or care of four or more persons where such occupants are mostly incapable of self-preservation due to age, physical or mental disability, or because of security measures not under the occupants' control.

**3.3.30\* Hotel.** A building or groups of buildings under the same management in which there are sleeping accommodations for more than 16 persons and primarily used by transients for lodging with or without meals.

**3.3.31 HVAC.** An acronym for heating, ventilation, and air conditioning systems and their related components.

**3.3.32 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. [1500, 2007]

**3.3.33\* Industrial Occupancy.** An occupancy in which products are manufactured or in which processing, assembling, mixing, packaging, finishing, decorating, or repair operations are conducted.

**3.3.34 Key Box.** See 3.3.36, *Lock Box*.

**3.3.35 Lift.** A mechanically or electrically operated platform used to work at various heights.

**3.3.36\* Lock Box.** A locked container often used to store building entry keys, pre-incident plans, and/or related data.

**3.3.37 Lodging or Rooming House.** A building or portion thereof that does not qualify as a one- or two-family dwelling, that provides sleeping accommodations for a total of 16 or fewer people on a transient or permanent basis, without personal care services, with or without meals, but without separate cooking facilities for individual occupants.

**3.3.38 Material Safety Data Sheet (MSDS).** A form provided by manufacturers and compounders (blenders) of chemicals containing information about chemical composition, physical and chemical properties, health and safety hazards, emergency response, and waste disposal of the material. [472, 2008]

**3.3.39\* Mercantile Occupancy.** An occupancy used for the display and sale of merchandise.

**3.3.40 Permit-Required Confined Space.** A confined space that has one or more of the following characteristics: (1) contains or has a potential to contain a hazardous atmosphere; (2) contains a material that has the potential for engulfing an entrant; (3) has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or (4) contains any other recognized serious safety or health hazard. [OSHA 29 CFR 1910.146]

**3.3.41 Pre-Incident Plan.** A document developed by gathering general and detailed data that is used by responding personnel in effectively managing emergencies for the protection of occupants, responding personnel, property, and the environment.

**3.3.42 Pre-Incident Plan Developer.** The individual, group, or agency responsible for developing or maintaining the pre-incident plan.

**3.3.43\* Process Hazard Analysis.** An analysis of a process or system used to identify potential cause and effect relationships and resultant hazards or system failures.

**3.3.44 Remain in Place.** The operational response of directing occupants to remain inside the structure, at their locations, during an emergency.

**3.3.45\* Residential Board and Care Occupancy.** A building or portion thereof that is used for lodging and boarding of four or more residents, not related by blood or marriage to the owners or operators, for the purpose of providing personal care services.

**3.3.46\* Responding Personnel.** Personnel, whether public or private, available to respond to emergencies.

**3.3.47 Sally Port (Security Vestibule).** A compartment provided with two or more doors where the intended purpose is to prevent continuous and unobstructed passage by allowing the release of only one door at a time.

**3.3.48 Scissor Stair.** Two interlocking stairways providing two separate paths of egress located within one stairwell enclosure. [301, 2008]

**3.3.49\* Security Vulnerability Assessment.** Security vulnerability assessment methodology identifies and assesses potential security threats, risks, and vulnerabilities and guides the chemical facility industry in making security improvements.

**3.3.50 Sky Lobby.** An intermediate floor where people can change from an express elevator that only stops at the sky lobby to a local elevator which stops at every floor within a segment of the building.

**3.3.51\* Smoke Barrier.** A continuous membrane, or a membrane with discontinuities created by protected openings, where such membrane is designed and constructed to restrict the movement of smoke.

**3.3.52 Smoke Compartment.** A space within a building enclosed by smoke barriers on all sides, including the top and bottom.

**3.3.53 Spill Prevention Control and Countermeasure (SPCC) Plan.** A plan prepared for facilities with a chemical or chemicals that exceed certain capacities in accordance with governmental regulations.

**3.3.54 Sprinkler System.** For fire protection purposes, an integrated system of underground and overhead piping designed in accordance with fire protection engineering standards. The installation includes one or more automatic water supplies. The portion of the sprinkler system above ground is a network of specially sized or hydraulically designed piping installed in a building, structure, or area, generally overhead, and to which sprinklers are attached in a systematic pattern. The valve controlling each system riser includes a device for actuating an alarm when the system is in operation. The sys-



tem is usually activated by heat from a fire and discharges water over the fire area.

**3.3.55 Standpipe System.** An arrangement of piping, valves, hose connections, and allied equipment installed in a building or structure, with the hose connections located in such a manner that water can be discharged in streams or spray patterns through attached hose and nozzles, for the purpose of extinguishing a fire, thereby protecting a building or structure and its contents in addition to protecting the occupants. This is accomplished by means of connections to water supply systems or by means of pumps, tanks, and other equipment necessary to provide an adequate supply of water to the hose connections.

**3.3.56\* Storage Occupancy.** An occupancy used primarily for the storage or sheltering of goods, merchandise, products, vehicles, or animals.

## Chapter 4 Pre-Incident Planning Process

### 4.1 General.

**4.1.1\*** The pre-incident plan shall be developed in accordance with a format approved by the authority having jurisdiction.

**4.1.2\*** The pre-incident plan developer shall be competent and familiar with the basic information to be collected and included in the final pre-incident plan.

**4.1.3** The pre-incident plan shall be a cooperative effort among the pre-incident plan developer, facility management and operations staff, and responding personnel.

**4.1.4** Persons shall be consulted who are able to provide valuable input, including technical experts who do not actually respond to an incident.

**4.1.5\*** The pre-incident plan shall be coordinated with an incident management system.

**4.1.6\*** The pre-incident plan developer shall solicit and document information from responding agencies and personnel regarding their availability and capabilities.

**4.1.7** The pre-incident plan shall identify all participants and their respective responsibilities.

**4.1.8\*** The development of a pre-incident plan for new facilities and other situations shall begin during the design phase.

**4.1.9** In establishing a program for the development of pre-incident plans, the following items shall be considered:

- (1) Potential life safety hazard, including emergency responder safety
- (2) Structure size and operations complexity
- (3) Economic impact
- (4) Importance to the community
- (5) Location and seasonal variations
- (6) Presence of hazardous materials
- (7) Susceptibility to natural disasters

### 4.2 Pre-incident Plan Development.

**4.2.1** Once a site has been selected for pre-incident planning, the developer shall determine the information required.

**4.2.2\*** To develop a pre-incident plan, the developers shall visit the property to become familiar with its layout, contents, construction, and protection features.

### 4.3\* Data Collection.

**4.3.1\*** The level of detail of the data collected shall be determined by the authority having jurisdiction for the pre-incident plan.

**4.3.1.1\*** The data shall be collected by consulting with knowledgeable personnel involved in site maintenance/operations or facility development.

**4.3.1.2\*** Policies and procedures shall be developed to ensure protection of proprietary or sensitive information.

**4.3.1.3\*** The data collected during the initial phase shall be evaluated to determine the data that is critical to the user and that shall be included in the pre-incident plan.

**4.4\* Pre-Incident Plan Preparation.** The authority having jurisdiction shall determine the complexity of the pre-incident plan to maintain ease of use.

**4.5\* Pre-Incident Plan Document.** A standardized pre-incident plan document shall be utilized throughout the authority having jurisdiction's response area.

**4.6\* Pre-Incident Plan Sketches.** The symbols provided in NFPA 170, *Standard for Fire Safety and Emergency Symbols*, shall be utilized on pre-incident plan sketches for consistency among pre-incident plan users.

**4.7 Pre-Incident Plan Distribution.** Copies of the pre-incident plan shall be distributed to responsible personnel as determined by the AHJ.

**4.8\* Training.** The pre-incident planning process shall include a provision for training and education in those portions of the pre-incident plan that involve unique or unusual operations.

**4.9\* During the Incident.** The pre-incident plan shall be available to the incident commander during the incident.

### 4.10 Post-Incident.

**4.10.1** The adequacy and accuracy of the pre-incident plan shall be evaluated after an emergency or event.

**4.10.2** The pre-incident plan shall be revised in accordance with 10.2.1.

## Chapter 5 Physical and Site Considerations

**5.1\* General.** Physical elements and site considerations shall be classified into the following five groups:

- (1) Construction (*see Section 5.2*)
- (2) Building management systems and utilities (*see Section 5.3*)
- (3) External site conditions (*see Section 5.4*)
- (4) Internal and external security features (*see Section 5.5*)
- (5) Fences or other barriers (*see Section 5.6*)

### 5.2 Construction.

**5.2.1\* Area, Height, and Age.** The entire building size, including overall height, number of stories, square footage, and approximate or actual year of original construction, shall be determined and included in the pre-incident plan.

### 5.2.2 Building Features.

**5.2.2.1** The construction type of the building, including the combustibility of the building, shall be noted or summarized in the pre-incident plan.

**5.2.2.2\*** Data regarding building construction details that shall be recorded include wall construction and insulation information.

**5.2.2.3\*** Data regarding roof construction shall be recorded in the pre-incident plan.

**5.2.2.4\*** Data regarding floor construction shall be recorded in the pre-incident plan.

**5.2.2.5\*** Data regarding other building features shall be recorded in the pre-incident plan.

**5.2.2.6\*** Data regarding the location, types, and construction of access features shall be recorded in the pre-incident plan.

**5.2.2.7\*** The pre-incident plan shall note areas where fire, products of combustion, or other contaminants could spread due to a lack of structural barriers.

**5.2.2.8\*** Data regarding atriums shall be recorded in the pre-incident plan.

**5.2.2.9\*** The pre-incident plan shall address the structural integrity of walls, roofs, and floors.

**5.2.2.10\*** Data regarding storage arrangements shall be recorded in the pre-incident plan.

**5.2.2.11** Information regarding the fire command center shall be recorded in the pre-incident plan, including the location, access, and fire rating of the area fire walls.

**5.3\* Building Management Systems and Utilities.** Building management systems and utilities data shall be recorded in the pre-incident plan.

**5.3.1\*** Emergency contact information shall be recorded in the pre-incident plan for persons responsible for the operation of building systems and utilities and for persons knowledgeable of the supervisory control and data acquisition or similar systems.

**5.3.2\*** Facility utility systems data shall be recorded in the pre-incident plan.

**5.3.2.1 Transformers.** The location of transformers filled with combustible and flammable fluids shall be recorded in the pre-incident plan.

**5.3.2.2\* Electric Utility Rooms.** The location of high-voltage electric utility rooms shall be recorded in the pre-incident plan.

**5.3.2.3\* Emergency Power.** The location and duration of emergency power components shall be recorded in the pre-incident plan.

**5.3.2.4** Emergency power systems requiring manual action shall be recorded in the pre-incident plan.

**5.3.2.5 Domestic Water and Process Water.** Water shutoffs shall be recorded in the pre-incident plan, with special consideration given to any equipment or processes that require an uninterrupted supply of water.

**5.3.2.6\* Compressed and Liquefied Gases.** The location of compressors, storage containers and pressure vessels, and the nearest shutoff means shall be recorded in the pre-incident plan.

**5.3.2.7\* Steam.** The location of steam lines and boilers and associated equipment, and shutoff valves for the steam supply, shall be recorded in the pre-incident plan.

### 5.3.2.8 Fuels.

**5.3.2.8.1** Information regarding systems that have the capability of changing over from one fuel source to another shall be recorded in the pre-incident plan.

**5.3.2.8.2** The location of all gas shutoff valves shall be recorded in the pre-incident plan.

**5.3.2.8.3** The location and size of LP-Gas system storage tanks and shutoff valves for liquid fuels shall be recorded in the pre-incident plan.

**5.3.2.8.4** The location of all fuel pumps, tanks, regulating equipment, and shutoff valves shall be recorded in the pre-incident plan.

### 5.3.3\* Elevators.

**5.3.3.1 Elevator Information.** Elevator information shall be recorded in the pre-incident plan.

**5.3.3.2\* Elevator Lobbies.** The pre-incident plan shall note the presence of any fire- or smoke-resistant elevator lobbies.

### 5.4 External Site Conditions.

**5.4.1\* Access.** The pre-incident plan shall note points of access for responding personnel.

**5.4.2\* Obstacles to Access.** Site conditions that would hamper access of emergency equipment, such as height, width, or weight restrictions, shall be noted in the pre-incident plan.

**5.5\* Internal and External Security Features.** Data regarding internal and external security measures shall be recorded in the pre-incident plan.

**5.6\* Fences or Other Barriers.** The height, construction, and ingress/egress points of fences or other barriers shall be recorded in the pre-incident plan.

**5.7\* Security Animals.** The use and number of security animals shall be noted in the pre-incident plan.

### 5.8 Security Systems.

**5.8.1\*** Data regarding intruder security systems shall be recorded in the pre-incident plan.

**5.8.2\*** Data regarding an on-site security service shall be recorded in the pre-incident plan.

### 5.9 General Overall Condition.

**5.9.1 Exposures.** The ground surrounding the site, structure, or building shall be surveyed to identify buildings, structures, equipment, storage, and people that could be exposed by an incident, and the information shall be noted in the pre-incident plan.

**5.9.2\* Environmental Impact.** Information shall be collected on potential environmental contaminants. (*See Section 8.4.*)

### 5.10\* Communications.

**5.10.1** Data regarding communications systems within the facility shall be recorded in the pre-incident plan.

**5.10.2\*** Data regarding communications impact shall be recorded in the pre-incident plan.

## Chapter 6 Occupant Considerations

**6.1 General.** Because the number and type of occupants in a facility can have a substantial impact on a pre-incident plan, information shall be collected on the number of occupants and population age range, their physical or mental conditions, and whether they are ambulatory or nonambulatory. (See Annex C.)

### 6.2 Life Safety Considerations.

#### 6.2.1 General.

**6.2.1.1** Life safety considerations shall be addressed to allow emergency responders to assist in the evacuation of a facility or to support defend-in-place/remain-in-place strategies.

**6.2.1.2** The following information shall be noted in the pre-incident plan:

- (1)\*Hours of operation
- (2)\*Occupant load
- (3)\*Occupant accountability
- (4)\*Assistance for people with disabilities
- (5)\*Strategies for protecting facility occupants, other than evacuation

**6.2.2\* Means of Egress.** The number of exits, their location, and any special locking conditions, such as delayed release, limited security access, and stairwell locking, shall be noted on the pre-incident plan.

### 6.3 On-Site Emergency Organization.

**6.3.1\* Facility Emergency Action Plan.** If a facility has an emergency action plan, it shall be obtained for reference during an emergency.

**6.3.2\* Emergency Response Capabilities.** The on-site emergency response capabilities and their coordination with responding personnel shall be incorporated into the pre-incident plan.

**6.3.3 Specialized Operations, Processes, and Hazards.** Where occupancies contain specialized operations, processes, and hazards that can pose unique challenges in an emergency, the emergency operating procedures and personnel knowledgeable of these conditions shall be documented in the pre-incident plan.

## Chapter 7 Water Supplies and Fire Protection Systems

**7.1 General.** Information on water supplies and fire protection systems shall be included in the pre-incident plan.

**7.2\* Water Supplies.** Water supplies for fire suppression operations and water-based fire protection systems shall be described and identified in the pre-incident plan.

**7.2.1\* Required Fire Flow.** The required fire flow shall be determined by the authority having jurisdiction.

#### 7.2.2\* Available Water Supply.

**7.2.2.1** The available water supply shall be included in the pre-incident plan.

**7.2.2.2\*** Where the required fire flow exceeds the available water supply, the pre-incident plan shall address a response to mitigate the deficiency.

**7.2.3\* Public and Private Water Supply Utility Sources.** The source of water supply, whether it is from a public or private water distribution system, shall be recorded in the pre-incident plan.

**7.2.4 Static Water Supply Sources.** Static water sources, such as ponds, lakes, rivers, tanks, and cisterns, shall be recorded in the pre-incident plan.

#### 7.2.5\* Water Storage Tanks.

**7.2.5.1** Where a water storage tank is used as a source of water, the water storage capacity shall be recorded in the pre-incident plan.

**7.2.5.2\*** The method of obtaining water from the water storage tank shall be recorded in the pre-incident plan.

#### 7.2.6 Bodies of Water.

**7.2.6.1\*** The pre-incident plan shall include seasonal variation information for bodies of water.

**7.2.6.2** The method of drafting from the water source shall be recorded in the pre-incident plan.

**7.2.7\* Fire Hydrants.** The location of fire hydrants shall be recorded in the pre-incident plan.

### 7.3\* Water-Based Fire Protection Systems.

**7.3.1\* Sprinkler and Water Spray.** All water-based systems, including type of system, location and identification of main riser valves, extent of coverage, and means of manual activation, shall be recorded in the pre-incident plan.

**7.3.2\* Standpipe Systems.** All standpipe systems, including type of system, location and identification of control valves, location of hose valves, and presence of pressure reducing devices (PRV), shall be recorded in the pre-incident plan.

**7.3.3\* Fire Pumps.** Data regarding each fire pump, including location of, and access to, the fire pump and controller; rated capacity; source of water supply; and areas or systems served, shall be recorded in the pre-incident plan.

**7.3.4 Fire Department Connection (FDC).** Data regarding each fire department connection (FDC) shall be recorded in the pre-incident plan, including physical location, size, type, locking means, and area/systems supplied.

**7.4\* Non-Water-Based Fire Protection Systems.** All non-water-based fire protection systems shall be recorded in the pre-incident plan, including type of system, hazard or area protected, means of activation, location of abort devices, location of control panel, location of agent supply and reserve containers, and personnel hazards following agent release.

**7.5\* Fire Alarm Systems.** Data regarding the fire alarm system shall be recorded in the pre-incident plan, including area of coverage, location of fire alarm control unit (FACU) and remote annunciator panels, method of system activation, and method and extent of occupant notification.

**7.6\* Portable Fire Extinguishers.** The pre-incident plan shall note the location and type of large, wheeled equipment or specialized extinguishers or both.

#### 7.7 Smoke Control Systems.

**7.7.1 Pressurization-Based Smoke Management Systems.** Data regarding pressurization-based smoke management systems shall be recorded in the pre-incident plan, including location of areas served by system, location of control systems, system



operation information, location of manual override controls, and location of supply and discharge arrangement.

**7.7.2 Smoke and Heat Vents.** Data regarding smoke and heat vents shall be recorded in the pre-incident plan, including location of smoke and heat vents and type of activation (manual or automatic).

## Chapter 8 Special Hazards

**8.1\* General.** The pre-incident plan shall identify and document any special hazards recognized by the authority having jurisdiction that present extraordinary life safety challenges, operations challenges, or other challenges to emergency responders.

**8.2\* Transient Conditions.** Where special hazards exist intermittently, the authority having jurisdiction shall determine the need to identify and record relevant information for each hazard and the length of time the hazard is expected to be present.

**8.3\* Inventory.** Where the storage or use of hazardous materials has been identified as a special hazard, the pre-incident plan shall include the anticipated maximum inventory and bulk storage locations.

**8.4\* Special Hazard Considerations.** Special hazard considerations shall be noted on the pre-incident plan.

**8.4.1\* Large-Scale Public Gatherings.** The authority having jurisdiction shall identify the need for, and level of detail for, addressing large-scale public gatherings in the pre-incident plan.

**8.4.2 Hazardous Materials.** Where the storage or use of hazardous materials has been identified as a special hazard, the pre-incident plan shall include the specifications of 8.4.2.1 through 8.4.2.5.2.

**8.4.2.1 Explosives.** The use or storage of explosive materials in an occupancy shall require preplanning as determined by the authority having jurisdiction.

**8.4.2.1.1\*** The presence, approximate amount, explosive class and division, and location of explosive materials shall be recorded in the pre-incident plan.

**8.4.2.1.2\*** Typical commercial materials that have the potential to explode exposure to fire, heat, and pressure shall be documented on the pre-incident plan.

**8.4.2.1.3** Isolation and evacuation distances based on the type and quantity of explosives within a facility shall be recorded in the pre-incident plan.

**8.4.2.2\* Flammable and Combustible Liquids.** Where the authority having jurisdiction has determined that a facility using, handling, or storing flammable and combustible liquids requires pre-incident planning, the following shall be recorded in the pre-incident plan:

- (1)\*Drainage, such as the location where the flammable or combustible liquid will flow and collect if spilled
- (2) Secondary containment, such as the presence of, and capacity of, built-in secondary containment features for the collection of fire-fighting water and spilled product
- (3)\*Specialized extinguishing agent, such as product-specific requirements for the use of specialized fire-extinguishing agents

(4)\*Storage information

**8.4.2.3\* Toxic or Biological Agents.**

**8.4.2.3.1** The location and quantity of toxic or biological agents shall be documented in the pre-incident plan.

**8.4.2.3.2** The impact of toxic or biological agents on neighboring or downwind occupancies should be evaluated.

**8.4.2.4\* Radioactive Materials.**

**8.4.2.4.1** The location and type of radioactive materials and radiation-producing devices shall be recorded in the pre-incident plan.

**8.4.2.4.2** Isolation and evacuation distances, based on the type and quantity of radioactive material within a facility, shall be recorded in the pre-incident plan.

**8.4.2.5\* Reactive Chemicals and Materials.**

**8.4.2.5.1** Reactive chemicals and materials shall be recorded in the pre-incident plan.

**8.4.2.5.2** Isolation and evacuation distances, based on the type and quantity of reactive chemical and material within a facility, shall be recorded in the pre-incident plan.

**8.4.3\* Special Atmospheres.** Any area of an occupancy that contains rooms or equipment storing or using special gases or vapors that can present a hazard to the emergency responders shall be identified in the pre-incident plan.

## Chapter 9 Emergency Operations

**9.1 General.** A system that allows immediate access to either the pre-incident plan or to a summary of its key elements while responding to and during an incident shall be developed.

**9.2\* Incident Notification.** The pre-incident plan shall provide critical information for responding personnel at the time of dispatch, as determined by the authority having jurisdiction.

**9.3 Incident Operations.**

**9.3.1\*** The pre-incident plan shall address the initial response to an incident at the facility or site and additional resources as required.

**9.3.2\*** The pre-incident plan shall indicate the facility's emergency response capabilities.

**9.3.3** The pre-incident plan shall include initial actions based on the priorities of life safety, scene stabilization, and incident mitigation.

**9.3.4** The pre-incident plan shall address the implementation of an incident management system (IMS) upon the arrival of the first responder units.

## Chapter 10 Pre-Incident Plan Testing and Maintenance

**10.1 General.**

**10.1.1\*** Pre-incident plan development shall provide for initial and periodic review, testing, and update, as approved by the authority having jurisdiction, to review the data and refine the pre-incident plan.



**10.1.2** The person or agency responsible for testing of the pre-incident plan shall be determined at the time of pre-incident plan development.

## **10.2 Pre-Incident Plan Update.**

**10.2.1\*** Where conditions indicate that a change in a pre-incident plan is warranted, the pre-incident plan shall be updated and distributed in accordance with Section 4.7.

**10.2.2** Prior editions of the pre-incident plan shall be archived or destroyed in accordance with local policy.

**10.2.3** The list of all pre-incident plan recipients maintained by the pre-incident plan developer shall be used for distribution of pre-incident plan updates.

## **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** Pre-incident planning involves evaluating the protection systems, building construction, contents, and operating procedures that can impact emergency operations and is not intended to replace code-enforcement inspections. However, fire hazards, life safety hazards, or both, observed during the pre-incident planning process should be abated or reported to the appropriate authority having jurisdiction or both.

**A.1.3.3** 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 emergency services organization (ESO) for its own use, the ESO is the authority having jurisdiction. Where the standard is legally adopted and enforced by a body having regulatory authority over an ESO, 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 pre-incident plan development should take into account the ESO services, the financial resources available, the availability of personnel, the availability of trainers, and such other factors as will affect the ESO's ability to achieve compliance.

**A.1.3.4** For an ESO to evaluate its compliance with this standard, it must develop some type of logical process. This standard is intended to be implemented in a logical sequence, based on a balanced evaluation of economic factors, as well as public safety and personnel safety factors. The compliance schedule request ensures that risk is objectively assessed and reasonable priorities are set in 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 ESO's policies and procedures. Such measures can include, but are not limited to, increased inspections, testing, temporary suspension or restricted 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.3.3.5 Assembly Occupancy.** Assembly occupancies might include the following:

- (1) Armories
- (2) Assembly halls
- (3) Auditoriums
- (4) Bowling lanes
- (5) Club rooms
- (6) College and university classrooms, 50 persons and over
- (7) Conference rooms
- (8) Courtrooms
- (9) Dance halls
- (10) Drinking establishments
- (11) Exhibition halls
- (12) Gymnasiums
- (13) Libraries
- (14) Mortuary chapels
- (15) Motion picture theaters
- (16) Museums
- (17) Passenger stations and terminals of air, surface, underground, and marine public transportation facilities
- (18) Places of religious worship
- (19) Pool rooms
- (20) Recreation piers
- (21) Restaurants
- (22) Skating rinks
- (23) Special amusement buildings, regardless of occupant load
- (24) Theaters

Assembly occupancies are characterized by the presence or potential presence of crowds with attendant panic hazard in case of fire or other emergency. They are generally open or occasionally open to the public, and the occupants, who are present voluntarily, are not ordinarily subject to discipline or control. Such buildings are ordinarily occupied by able-bodied persons and are not used for sleeping purposes. Special conference rooms, snack areas, and other areas incidental to, and under the control of, the management of other occupancies, such as offices, fall under the 50-person limitation. Restaurants and drinking establishments with an occupant load of fewer than 50 persons should be classified as mercantile occupancies.

**A.3.3.9 Business Occupancy.** Business occupancies include the following:

- (1) Air traffic control towers (ATCTs)
- (2) City halls
- (3) College and university instructional buildings, classrooms under 50 persons, and instructional laboratories
- (4) Courthouses
- (5) Dentists' offices
- (6) Doctors' offices
- (7) General offices
- (8) Outpatient clinics (ambulatory)
- (9) Town halls

Doctors' and dentists' offices are included, unless of such character as to be classified as ambulatory health care occupancies. Birth centers should be classified as business occupancies if they are occupied by fewer than four patients, not including infants, at any one time; do not provide sleeping facilities for four or more occupants; and do not provide treatment procedures that render four or more patients, not including infants, incapable of self-preservation at any one time. Service facilities common to city office buildings, such as newsstands, lunch counters serving fewer than 50 persons, barber shops, and beauty parlors, are included in the business occupancy group. City halls, town halls, and courthouses are included in this occupancy group insofar as their principal function is the transaction of public business and the keeping of books and records. Insofar as they are used for assembly purposes, they are classified as assembly occupancies.

**A.3.3.13 Covered Mall Building.** Covered mall buildings are occupied primarily by mercantile occupancies. However, they can include other occupancies, such as drinking and dining establishments, entertainment and amusement facilities, offices, and similar uses that are incidental to the primary use of the building.

**A.3.3.14 Confined Space.** A confined space might include tanks, vessels, silos, storage bins, hoppers, vaults, crawl spaces, and pits.

**A.3.3.17 Detention and Correctional Occupancy.** Detention and correctional occupancies include the following:

- (1) Adult and juvenile substance abuse centers
- (2) Adult and juvenile work camps
- (3) Adult community residential centers
- (4) Adult correctional institutions
- (5) Adult local detention facilities
- (6) Juvenile community residential centers
- (7) Juvenile detention facilities
- (8) Juvenile training schools

**A.3.3.18 Dormitory.** Rooms within dormitories intended for the use of individuals for combined living and sleeping purposes are guest rooms or guest suites. Examples of dormitories are college dormitories, fraternity and sorority houses, and military barracks.

**A.3.3.19 Educational Occupancy.** Educational occupancies include the following:

- (1) Academies
- (2) Kindergartens
- (3) Schools

An educational occupancy is distinguished from an assembly occupancy in that the same occupants are regularly present.

**A.3.3.23 Evacuation Capability.** NFPA 101, *Life Safety Code*, should be referred to for further explanation and methods of determining the evacuation capabilities of an occupancy.

**A.3.3.24 Facility Emergency Action Plan.** A written emergency action plan that is consistent with available equipment and personnel should be established to respond to fires and related emergencies. The plan should include the following:

- (1) Procedures to be followed in case of fire, such as sounding the alarm, notifying the fire department, evacuating personnel, and controlling and extinguishing the fire
- (2) Procedures and schedules for conducting drills of these procedures
- (3) Appointment and training of personnel to carry out assigned duties, including review at the time of initial assignment, as responsibilities or response actions change, and whenever anticipated duties change
- (4) Maintenance of fire protection equipment
- (5) Procedures for shutting down or isolating equipment to reduce the release of liquid, including assigning personnel responsible for maintaining critical plant functions or shutdown of plant processes
- (6) Alternate measures for the safety of occupants

**A.3.3.26 Fire Barrier.** A fire barrier might be vertically or horizontally aligned, such as a wall or floor assembly.

**A.3.3.29 Health Care Occupancy.** Health care occupancies include the following:

- (1) Ambulatory health care facilities
- (2) Hospitals
- (3) Limited care facilities
- (4) Nursing homes

Occupants of health care occupancies typically have physical or mental illness, disease, or infirmity. They also include infants, convalescents, or infirm aged persons.

**A.3.3.30 Hotel.** Apartment hotels should be classified as hotels, because they are potentially subject to the same transient occupancy as hotels. Transients are those who occupy accommodations for less than 30 days.

**A.3.3.33 Industrial Occupancy.** Industrial occupancies include the following:

- (1) Drycleaning plants
- (2) Factories of all kinds
- (3) Food processing plants
- (4) Gas pre-incident plants
- (5) Hangars (for servicing/maintenance)
- (6) Laundries
- (7) Power plants
- (8) Pumping stations
- (9) Refineries
- (10) Sawmills
- (11) Telephone exchanges

In evaluating the appropriate classification of laboratories, the authority having jurisdiction should treat each case individually, based on the extent and nature of the associated hazards. Some laboratories are classified as occupancies other than industrial; for example, a physical therapy laboratory or a computer laboratory.

**A.3.3.36 Lock Box.** Keys to open these containers are assigned only to selected individuals, such as representatives of the local fire department or police department.





**A.3.3.39 Mercantile Occupancy.** Mercantile occupancies include the following:

- (1) Auction rooms
- (2) Department stores
- (3) Drugstores
- (4) Restaurants with fewer than 50 persons
- (5) Shopping centers
- (6) Supermarkets

Office, storage, and service facilities incidental to the sale of merchandise and located in the same building should be considered part of the mercantile occupancy classification.

**A.3.3.43 Process Hazard Analysis.** The methods used to perform the analysis vary from simple to complex and depend on the detail required and the risk being evaluated. For example, a simple checklist or a detailed fault tree analysis can be utilized.

**A.3.3.45 Residential Board and Care Occupancy.** The following are examples of facilities that are classified as residential board and care occupancies:

- (1) Group housing arrangement for physically or mentally handicapped persons who normally attend school in the community, attend worship in the community, or otherwise use community facilities
- (2) Group housing arrangement for physically or mentally handicapped persons who are undergoing training in preparation for independent living, for paid employment, or for other normal community activities
- (3) Group housing arrangement for the elderly that provides personal care services but that does not provide nursing care
- (4) Facilities for social rehabilitation, alcoholism, drug abuse, or mental health problems that contain a group housing arrangement and that provide personal care services but do not provide acute care
- (5) Assisted living facilities
- (6) Other group housing arrangements that provide personal care services but not nursing care

**A.3.3.46 Responding Personnel.** Responding personnel include, but are not limited to, the following:

- (1) Facility owners, operators, or occupants
- (2) Contractors hired by the owner or operator
- (3) Privately organized plant emergency organizations
- (4) Emergency response teams
- (5) Fire brigades
- (6) Hazardous material teams
- (7) Rescue or medical response teams
- (8) Health and safety personnel
- (9) Risk management or insurance personnel
- (10) Technical experts
- (11) Security personnel
- (12) Public fire services
- (13) Law enforcement
- (14) Emergency medical services
- (15) Emergency management
- (16) Environmental and utility departments or agencies
- (17) Military

**A.3.3.49 Security Vulnerability Assessment.** The use of the vulnerability assessment methodology is limited to preventing or mitigating terrorist or criminal actions that could have significant national impact, such as the loss of chemicals vital to the national defense or economy, or could seriously affect lo-

calities, such as the release of hazardous chemicals that would compromise the integrity of the facility, contaminate adjoining areas, or injure or kill facility employees or adjoining populations. It addresses physical security at fixed sites but not cyber and transportation security issues.

**A.3.3.51 Smoke Barrier.** A smoke barrier can be vertically or horizontally aligned, such as a wall, floor, or ceiling assembly. A smoke barrier might or might not have a fire resistance rating.

**A.3.3.56 Storage Occupancy.** Storage occupancies include the following:

- (1) Barns
- (2) Bulk oil storage
- (3) Cold storage
- (4) Freight terminals
- (5) Grain elevators
- (6) Hangars (for storage only)
- (7) Parking structures
- (8) Stables
- (9) Truck and marine terminals
- (10) Warehouses

Storage occupancies are characterized by the presence of relatively small numbers of persons in proportion to the area.

**A.4.1.1** A pre-incident plan is one of the most valuable tools available for aiding responding personnel in effectively controlling an emergency. The needs and benefits of pre-incident planning should be explained in detail to all involved participants. Although there are many types of incidents that require emergency response, fires generally represent the most frequent challenge to emergency responders. Many of the requirements in this document that relate to fires and fire protection features can be applied to other types of incidents.

Pre-incident planning is a total concept based upon the following:

- (1) Situation awareness
- (2) Management commitment
- (3) Education
- (4) Prevention
- (5) Protection
- (6) Emergency organization

A thorough pre-incident plan involves information gathering, analysis, and dissemination; applying the "what-if" approach; planning; reviewing; training; and evaluating. Pre-incident plans within a jurisdiction should be similar in style, procedures, and content to maximize effectiveness and to reduce the time required to familiarize responding forces with the pre-incident plan.

Emergency response programs are planned; emergencies are not. The best time to learn about an occupancy is before the incident.

**A.4.1.2** The pre-incident plan developer should be able to prepare a pre-incident survey, given the forms, the necessary tools, and an assignment, so that all required occupancy information is recorded, items of concern are noted, and accurate sketches or diagrams are prepared.

*Requisite Knowledge:* Sources of water supply for fire protection; fundamentals of fire suppression and detection systems; common symbols used in diagramming construction features, utilities, hazards, and fire protection systems; departmental requirements for a pre-incident survey and form completion; and importance of accurate diagrams.

*Requisite Skills:* Ability to identify the components of fire suppression and detection systems; sketch the site, buildings, and special features; detect hazards and special considerations to include in the pre-incident plan; and complete all related departmental forms.

Agencies, other than the fire department, might need different knowledge and skills to complete pre-incident plans that are applicable to their disciplines.

**A.4.1.5** The pre-incident plan will be most effective when coordinated with an incident management system, such as the one presented in NFPA 1561 *Standard on Emergency Services Incident Management System*.

**A.4.1.6** The pre-incident plan developer should determine the average and maximum response time of each responding agency, including, but not limited to, fire department, emergency medical services, law enforcement, hazardous materials response, and rescue service. The evaluation should seek to determine whether the responding agency's equipment, personnel, and training enable the agency to effectively manage an incident at the site or facility.

**A.4.1.8** The pre-incident planning process should begin during the construction design process of the proposed facility to identify emergency responders' concerns. The pre-incident planning process should allow for revisions to the pre-incident plan during different phases of construction.

**A.4.2.2** During a site visit, the pre-incident plan developer(s) should abide by all applicable safety and health procedures, which can include, but are not limited to, fall protection, confined space entry, personal protective equipment (PPE) and restricted access.

**A.4.3** Pre-incident plan data includes quantitative and qualitative information about the facility (such as physical site, operation features, personnel, and protection features).

**A.4.3.1** Effective pre-incident plans of simple sites or facilities or a pre-incident plan with simple objectives can be developed with minimal amounts of data. Additional data are required for pre-incident plans for more complex sites or facilities, facilities with more numerous potential hazards, pre-incident plans with more complex objectives, or potential incidents with greater risks. Data that might be useful should be collected with the understanding that it can be filtered out later if not needed in the final pre-incident plan. If a pre-incident plan developer intends to prepare a single pre-incident plan, the requirements provided in Chapters 1 through 10 and the information in Annex C can be followed to aid in determining the types of data that could be needed. Alternatively, data collection forms can be developed to aid in the efficient and consistent collection of data for pre-incident plan development. Sample data collection forms are provided in Annex D.

It is helpful to understand the intended audience for the final pre-incident plan and to obtain consensus regarding the information that is needed and the threshold of information that the pre-incident plan user can effectively utilize once an incident has occurred. These considerations should govern the scope of the data collection effort.

**A.4.3.1.1** The sources of data should include fire protection engineers, sprinkler and fire alarm contractors, building architects or engineers, building officials, water authorities, facility information experts, and insurance professionals. The collection of data could be limited by several factors, such as available resources, time, proprietary information, and privacy

concerns. It will be necessary for the pre-incident plan developer to determine which data will be most critical and to prioritize the data collection effort to obtain the largest data sets given the established constraints.

Historical data on similar occupancies/events involved in emergencies should be reviewed for items that could cause problems in the structure or venue being surveyed.

**A.4.3.1.2** Confidential information can be withheld from distributed copies of the pre-incident plan if the security of that information cannot be ensured by any entity that receives copies of the pre-incident plan. The confidential information should be made available to the responding agencies on their arrival at the scene of the incident.

**A.4.3.1.3** For this effort, it is critical that the pre-incident plan developer and user(s) interact. An overabundance of information can be as detrimental to a pre-incident plan user as a lack of information if the user cannot easily distinguish critical information. Additionally, the specifics of any particular incident cannot be exhaustively anticipated. Therefore, the pre-incident plan should not attempt to perform incident command or management functions (e.g., placing apparatus, specifying attack strategies), although this could be desirable in certain instances.

**A.4.4** A successful strategy for pre-incident plan development is an incremental process where simple pre-incident plans are developed and issued (in lieu of having none) and subsequently revised and enhanced. As an example, a local municipality could prepare simple pre-incident plans for all of the hospitals in its community for a given resource expenditure. As additional resources become available, the pre-incident plans for all of the hospitals can be brought up to another level. This method might be preferable to expending all of the available resources to prepare a complex and comprehensive pre-incident plan for one hospital while leaving the other hospitals without any pre-incident plan.

Three pre-incident planning levels have been established as follows:

- (1) Overview pre-incident plan
- (2) Building level pre-incident plan
- (3) Process level pre-incident plan

An overview pre-incident plan is the highest level pre-incident plan and the simplest. It is expected to identify the location of a simple facility, with a standard response by emergency responders. It shows details such as public water supplies, access, and occupancy. An overview pre-incident plan could be used as a starting point for large campus-style facilities to act as a directory to more detailed pre-incident plans.

A building level pre-incident plan provides a level of detail intended for circumstances where a strategy to respond to a fire within a unique building is needed. This level pre-incident plan will include building access and hazards, fire protection and water supply details, structural construction considerations, and specific occupancy details. If necessary, it is expected that this level pre-incident plan will be supported by an overview pre-incident plan, a process level pre-incident plan, or both.

A process level pre-incident plan is the most detailed level of pre-incident planning and is intended to include process hazards and protection schemes, detailed occupancy considerations, room or area layouts, and operational features (e.g., ventilation, power). The defining criterion does not have to be a process; it can be a floor, a building wing, or even a

unique building. A process level pre-incident plan is recommended where it is expected that emergency responders will require detailed information for limited scope scenarios.

**A.4.5** The pre-incident plan document should be consistent and concise. Annex D provides an example of a pre-incident plan field collection card and a completed pre-incident plan facility data record. Consideration should be given to interoperability with other emergency services organizations (ESOs).

**A.4.6** The pre-incident plan is intended primarily for use by the emergency responders. Therefore, it is critical that the information presented be relevant, clear, concise, and complete. It is unlikely that emergency responders will have the time to read extensive text. Information should be presented graphically (sketches and pictures) wherever possible.

Information that will not be of use to the emergency responder should be reserved for other uses and should not be allowed to clutter the pre-incident plan.

**A.4.8** Chapter 10 provides specific details on how review, testing, and maintenance of pre-incident plans should be completed. Training should be utilized to communicate the pre-incident plan expectations to individuals or agencies identified in the pre-incident plan that do not normally work together.

**A.4.9** The pre-incident plan should be a foundation for the decision-making process during an emergency situation and provide important data that will assist the incident commander in developing appropriate strategies and tactics for managing the incident. The pre-incident plan should help responding personnel identify critical factors that will affect the ultimate outcome of the incident, including personnel safety. The incident commander should use the information contained in a pre-incident plan to anticipate likely scenarios and to develop tactical options. The incident commander should also consult the pre-incident plan throughout the incident to remain aware of factors that might affect the success of the operation and the need for strategic or tactical adjustment.

**A.5.1** These elements are generally unaffected by outside influences and are therefore relatively static during the pre-incident planning process.

**A.5.2.1** The size of the building, both vertical and horizontal, can have a profound effect on the decision-making process during an emergency. The number of stories might not represent the height of the building. There are cases where the number of stories does not include half stories or mezzanines used for utilities that are found at varying levels throughout a facility. Additionally, there are cases where the first few stories of a building are higher than a standard floor-to-ceiling distance, and, thus, the number of stories should not be used to determine the overall height of the building.

Grade level access can be to different floors on various sides of an occupancy. It is critical that the pre-incident plan address access and floor designations from all potential avenues of approach.

**A.5.2.2.2** Data regarding building construction could include the following:

- (1) Exterior walls and their hourly fire rating
- (2) Metal panel walls and their hourly fire rating
- (3) Masonry walls
- (4) Glass walls and their hourly fire rating
- (5) Wood frame walls

- (6) Plastic wall components
- (7) Combustible insulation

See NFPA 220, *Standard on Types of Building Construction*, for additional information regarding building construction.

**A.5.2.2.3** Data regarding roof construction could include the following:

- (1) Roof support components (e.g., joists, trusses, beams, and girders), including the length of support spans, types of material, and fire protection rating
- (2) Roof deck material (e.g., wood, metal, concrete)
- (3) Roof covering materials, since combustibility and build-up thickness can affect fire-fighting tactics
- (4) Roof shape or configuration (e.g., peaked, flat, dome, saw tooth)
- (5) Availability of means for runoff drainage (e.g., trenches, drains, scuppers, slopes)

**A.5.2.2.4** Data regarding floor construction could include the following:

- (1) Floor support components (e.g., joists, trusses, beams, and girders), including long lengths of span and the level of protection afforded to the floor support
- (2) Floor members (e.g., wood deck, metal deck, concrete)
- (3) Availability of means for runoff drainage (e.g., trenches, drains, scuppers, slopes)

**A.5.2.2.5** Data regarding other building features could include the following:

- (1) Construction type of interior walls
- (2) Interior finish materials
- (3) Suspended ceiling assemblies
- (4) Raised floors
- (5) Concealed spaces, including multiple ceiling and roof levels
- (6) Windows used for rescue purposes, ventilation, or both
- (7) Confined spaces
- (8) Fire resistance and protection of structural members

**A.5.2.2.6** Data regarding the location, type, and construction of access features could include the following:

- (1) Doorways
- (2) Locking devices
- (3) Accessible windows
- (4) Fire escapes
- (5) Tunnels
- (6) Breachable walls

**A.5.2.2.7** The construction and fire rating of any fire/smoke barriers should be identified, as well as the presence of any protection items, such as fire doors, fire shutters, or automatic-closing devices or dampers designed to contain fire, products of combustion, or contaminants.

Data regarding the spread of combustion products or other contaminants could include the following:

- (1) Large undivided areas
- (2) Unprotected openings between floors
- (3) Stairwells
- (4) Elevator shafts
- (5) Utility shafts
- (6) Escalators
- (7) Light wells
- (8) High hazard areas
- (9) Wall openings

**A.5.2.2.8** Data regarding atriums should include the following:

- (1) Location of atrium(s) in the building
- (2) Number of stories connected by the atrium
- (3) Number of stories open to the atrium
- (4) Fire suppression system(s) present in the atrium area
- (5) Automatic fire detection and alarm system(s) present in the atrium
- (6) Smoke management systems, including location of controls and operation
- (7) Prescriptive- or performance-based design
- (8) Overall height of the atrium
- (9) Any fire protection equipment or devices located at the top of the atrium

**A.5.2.2.9** Note obvious signs of deterioration or structural weakening, alterations, renovations, unusual added live and dead loads, and any other conditions that could impact the following:

- (1) Spread of fire horizontally or vertically through the building's interior and exterior features
- (2) Ability of responding personnel to access the building's interior, either through openings or by breaching a wall, so as to safely perform interior operations
- (3) Potential for falling materials such as glass, curtain walls, exterior ornamentation, parapets, and overhanging components
- (4) Exposures

**A.5.2.2.10** Storage arrangements might include storage height, rack arrangements, special storage (e.g., aerosol, flammable liquids or gases, tires), storage encapsulation, and storage collapse hazards.

**A.5.3** Information on building management systems and utilities that should be collected includes the following:

- (1) HVAC systems and areas supplied
- (2) Building electrical
- (3) Boilers and chillers
- (4) Steam, chilled water, water, and chemical piping systems
- (5) Security systems and cameras
- (6) Control systems that can be activated or shut off on-site or at a remote location(s)

HVAC systems can contribute to the spread of products of combustion and contaminants throughout a facility. Some facilities might be provided with central HVAC, self-contained units, or a combination of both. Some HVAC systems are designed for smoke control. (See Section 7.7 for information on smoke control systems.)

Experience has shown that various building services and their associated equipment can cause or contribute to an emergency incident. Distributing information about these services and equipment can help reduce their potential to have an adverse impact on an incident. Conversely, this information might outline methods for using building services to support effective control of an incident.

**A.5.3.1** The pre-incident plan should identify when and where building services technicians are required to render site energy systems safe. Energy systems include any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, spring, or other stored energy, including controlled power sources.

**A.5.3.2** The location(s) and method of entrance (above-ground or underground) for electric power, multiple feeds,

location of disconnects both inside and outside the facility, and overhead primary and secondary conductors resulting in reduced vertical clearance should be noted.

Certain processes might require electrical power to operate properly. Disconnect could result in shutdown of agitators or other safety equipment that could result in uncontrolled reaction. Disconnect or loss of power in certain medical facilities, such as those with ventilator-dependent patients, might require first responders to provide manual medical intervention to keep patients stabilized.

**A.5.3.2.2** High-voltage electric utility rooms might consist of electrical distribution centers, motor control centers, utility service interface, or rectifier or inverter equipment (ac/dc).

**A.5.3.2.3** The location and duration of emergency power sources that should be recorded include those of generators, fuel supplies, batteries, uninterruptible power supply systems, and stored energy, as well as the equipment that remains powered when normal power is lost.

**A.5.3.2.6** All gases and gaseous mixtures should be noted and quantities recorded. Peak inventories should be noted. Be aware of incompatible gas storage. Special consideration should be given to any equipment or processes that might pose a hazard if the compressed or liquefied gas supply is interrupted.

**A.5.3.2.7** Steam pressure lines can vary from low pressure to high pressure.

**A.5.3.3** Elevator information should include the following:

- (1) Number and location of cars or elevator banks, or both
- (2) Location of elevator machine rooms (machine rooms might be located remote from hoistways)
- (3) Floors served
- (4) Type (e.g., electric or hydraulic, passenger or freight, manual or automatic, service, stretcher accessible)
- (5) Restrictions
- (6) Location of emergency access key
- (7) Power lockout location
- (8) Emergency access to car (roof hatch, sidewall panel)
- (9) Overall height of elevator shafts
- (10) Blind shaft and access panels
- (11) Location of sky lobby
- (12) Access point into elevator pit rooms
- (13) Elevator recall
- (14) Fire fighter service override
- (15) Emergency power

**A.5.3.3.2** Some elevator lobbies are formed by activation of a power-operated sliding door by the fire alarm system. These doors have either a swinging door or a special release device to open the door to a predefined width [typically 81 cm (32 in.)]. Other types of operable elevator lobby separations are available.

**A.5.4.1** Points of access might include the following:

- (1) Basement level of building
- (2) Main level of building
- (3) If needed, access to special areas/floors of building
- (4) Roof of building
- (5) Adjoining buildings that might provide a tactical strategic advantage by way of tunnels or skywalks

**A.5.4.2** Conditions that would hamper the access of responding personnel include the following:





- (1) Bridge width or weight restrictions
- (2) Narrow rights-of-way
- (3) Roads subject to flooding, drifting snow, washout, or other blockage
- (4) Low overhead clearances, railroad grade crossings, and drawbridges
- (5) Security checkpoints and barriers
- (6) Speed control devices
- (7) Traffic

**A.5.5** Security requirements are dynamic and can restrict access or egress to or from a facility. These measures can include various types of locking devices, access control features, and physical barriers. Some of these measures might be interlocked with fire alarm systems, surveillance, and other operational management systems.

Occupancies or facilities might also include extraordinary security measures or features that could delay response or evacuation. Some security measures might change, based on an increase or decrease in threat levels as dictated by the U.S. Department of Homeland Security. These types of facilities might include the following:

- (1) Jails and detention centers
- (2) Specialized wards in health care facilities
- (3) Large-scale data processing centers
- (4) Secure warehouses
- (5) Government installations
- (6) Public or mass transit (e.g., airports, ferry terminals, subways)
- (7) Power plants and transmission yards (e.g., nuclear power plants, electrical substations)
- (8) Bulk loading/unloading facilities with and without marine access
- (9) Precious metal processing
- (10) High profile or landmark facilities

**A.5.6** Pre-incident information regarding fences or other barriers might include the following:

- (1) Lock boxes
- (2) Alarms
- (3) Unusual locking devices
- (4) Electrification
- (5) Barbed or razor wire
- (6) Need to breach fences or barriers for operational considerations
- (7) Sound barriers
- (8) Jersey barriers

**A.5.7** Contact information should be obtained for the person(s) responsible for the security animals.

**A.5.8.1** The following are examples of intruder security systems:

- (1) Mantraps
- (2) Motion detection
- (3) Security smoke systems
- (4) Sound barriers
- (5) Strobes
- (6) Fail-secured locking mechanisms

**A.5.8.2** On-site security services include the following:

- (1) Procedure for contacting the security service
- (2) On-site location
- (3) Number of personnel on duty
- (4) Level of access within the facility
- (5) Scope of security service emergency response training

(6) Armed security personnel

**A.5.9.2** Sprinkler operation or manual fire-fighting operations can produce large quantities of contaminated water that can be harmful to wastewater treatment plants or the environment.

**A.5.10** Types of communications systems could include the following:

- (1) Facility public address (PA) systems
- (2) Facility audio signaling systems
- (3) Computer communications systems
- (4) Emergency fire fighter telephone systems
- (5) Facility portable radio systems
- (6) Interior telephones

**A.5.10.2** Data regarding communications could include the following:

- (1) Interference or poor coverage as a result of construction or radio system design, including coverage in the following areas:
  - (a) Belowgrade or shielded areas
  - (b) Interiors of large structures
  - (c) Upper floors of high-rise buildings
  - (d) Assignment of radio channels
  - (e) Other supplemental communications
- (2) Availability of facility radios for emergency responders

The capability of emergency responder portable radio communications should be verified to ensure an acceptable level of radio coverage throughout the facility.

**A.6.2.1.2(1)** The hours of operation should be noted. While most activities take place during daylight hours, many occupancies can have around-the-clock operations or varying activity levels.

**A.6.2.1.2(2)** Information should be collected regarding the normal/maximum occupant loads, any anticipated variations, or potential crowding.

**A.6.2.1.2(3)** Many occupancies have the ability for real-time occupant tracking and accountability, which should be noted in the pre-incident plan. This information is extremely helpful in determining occupant accountability and evacuation needs.

**A.6.2.1.2(4)** Certain occupants might have restricted or limited means of self-evacuation. The locations of occupants who need assistance to safely evacuate should be noted. Areas of refuge, if provided, should be noted. The location of equipment, such as stair chairs, stretchers, or lifts, that can assist evacuation should be identified.

**A.6.2.1.2(5)** All areas utilizing the defend-remain-in-place, internal relocation, or other methods and designated safe areas should be noted.

**A.6.2.2** The potential for exits to be compromised should be noted. This might include access control, perimeter protection, or any condition that might impede egress or access.

**A.6.3.1** An emergency plan might also be known as a site emergency plan or an emergency response plan, or it might be known by another name. The strategy and tactics to be used by emergency responders should be coordinated with the facility's emergency action plan. An emergency action plan organizational structure and emergency contact list should be obtained from facility management. At a minimum, the list should include whom to contact, in order of priority, in the

event of an emergency. A current list that specifies each individual's assigned emergency response duties should be available. This list might identify technical liaisons that are familiar with the building process, utility, and automation systems and other persons with similar assignments. The pre-incident plan should identify existing evacuation plans and the need for any interface with evacuation plans. The location of material safety data sheets (MSDS) and related data should be indicated in the pre-incident plan.

**A.6.3.2** The facility emergency action plan might specify total evacuation without any efforts to control the emergency or might specify an active occupant response. The authority having jurisdiction or the facility owner or occupant might require an emergency response organization of building occupants to specifically control fires, chemical spills, and related emergencies, or to facilitate evacuation or deliver emergency medical services.

**A.7.2** The adequacy of a water supply is based on the following two primary factors:

- (1) Capacity, which is the ability to deliver the water flow rate needed for the duration of the incident
- (2) Pressure, that is, having the pressure necessary to deliver the required water flow rate to the point of use plus the pressure necessary to meet any additional pressure requirements of the systems being supplied

When the evaluation of the available water supply is completed, the user should compare the water available to the water required.

**A.7.2.1** The following factors should be considered when evaluating the water required:

- (1) Volume of water required for fire protection, including the following:
  - (a) Automatic sprinkler system demand (see *NFPA 13*)
  - (b) Standpipe system requirements (see *NFPA 14*)
  - (c) Outside hose line requirements (see *NFPA 13*) and local fire department requirements
  - (d) Other aqueous-based extinguishing system demands (see *NFPA 11*, and *NFPA 16*)
- (2) Volume of water needed for processes that cannot be interrupted

Additional factors that could affect the quantity of water required or the duration of time that the water must be available include the following:

- (1) Combustibility of construction
- (2) Combustibility of contents
- (3) Presence of hazardous processes and materials
- (4) Exposures

Additional resources that could provide information on the quantity or duration of water that should be available include the following:

- (1) Local fire department requirements
- (2) Requirements in applicable fire protection standards, including the following:
  - (a) NFPA 13
  - (b) NFPA 14
  - (c) NFPA 15
  - (d) NFPA 16
  - (e) NFPA 30
  - (f) NFPA 30B
  - (g) NFPA 1142

**A.7.2.2** The available water supply should be determined by conducting a water supply test in accordance with NFPA 291.

The results of the water supply test should be reported in the pre-incident plan, including the following:

- (1) Static pressure
- (2) Residual pressure and flow rate
- (3) Flow rate available at 140 kPa (20 psi)

Care should be exercised in interpreting the test results, as only the available water supply in the water mains is determined. The actual flow from the hydrant will be less than the test results, depending on the size and length of the hydrant lateral, the type of hydrant, and the outlet that is used. The 140 kPa (20 psi) should be available at the hydrant outlet as a minimum. The available flow and pressure at the pump intake of the fire engine should be determined.

The fire protection system demands, including required fire flow, sprinkler system, standpipe system, water spray system, and foam water system should be obtained.

**A.7.2.2.2** A deficient water supply might be mitigated by any combination of the following:

- (1) Supply from an adjacent water distribution system pressure zone
- (2) Mutual aid
- (3) Tankers or water tenders
- (4) Drafting from static water sources, such as lakes, streams, and swimming pools

**A.7.2.3** The water distribution system should be defined in terms of adequacy and reliability, and the following should be recorded:

- (1) Flow rates and pressures at various locations
- (2) Source, such as gravity tank, pressure tank, wells, pumps (quantity and rated capacity)

The following information on the water distribution system should be recorded:

- (1) Gridded
- (2) Dead end
- (3) Pressure zones
- (4) Location of isolation valves
- (5) Multiple systems (e.g., process supplies, high and low pressure systems)
- (6) Interconnections with other systems
- (7) Emergency contacts

**A.7.2.5** The quantity of water stored in a tank might or might not be dedicated to fire protection. Where the tank serves both fire protection and domestic demands, the quantity of water dedicated for fire protection should be included in the pre-incident plan.

**A.7.2.5.2** The method of obtaining water from a water storage tank might be by various means, including a fire hydrant, fire hose valves, or a direct valved connection to the tank.

**A.7.2.6.1** Seasonal information might include the following:

- (1) Low water level
- (2) Whether the static source is subject to freezing
- (3) Access to the source
- (4) Tidal information

**A.7.2.7** Additional information on fire hydrants might include operating direction, thread type and size, hydrant color coding, and so forth.



**A.7.3** Types of water-based fire protection systems include the following:

- (1) Wet-pipe sprinkler
- (2) Dry-pipe sprinkler
- (3) Pre-action sprinkler
- (4) Deluge sprinkler
- (5) Foam-water sprinkler
- (6) Water spray
- (7) Water mist

**A.7.3.1** During the pre-incident plan process, key fire protection control valves should be noted. The facility owner or manager might have additional information regarding the location and function of valves in addition to the main riser valves in the building.

**A.7.3.2** Types of standpipe systems include the following:

- (1) Automatic wet
- (2) Automatic dry
- (3) Manual wet
- (4) Manual dry

Classes of standpipe hose connections include the following:

- (1) Class I
- (2) Class II
- (3) Class III

The name of the manufacturer of the pressure reducing valve should be noted, since different manufacturers have different override methods to increase hose stream pressure.

**A.7.3.3** For electric fire pumps, the location and means of electrical disconnect should be identified, so that the power to the pump is not compromised during the incident. If the fire pump power supply is not electrically separated from the facility disconnect, it should be noted in the pre-incident plan.

**A.7.4** Types of non-water-based fire protection systems include the following:

- (1) Wet chemical suppression systems
- (2) Dry chemical suppression systems
- (3) Gaseous suppression systems

**A.7.5** Types of alarm systems might include high-sensitivity detection systems and smoke, heat, and toxic gas monitoring, and notification systems. Some of these systems might report to a location other than the fire alarm system.

**A.7.6** Examples might include Class D, chemical neutralization units, Class K, foam-water, carbon dioxide (CO<sub>2</sub>), and clean agent.

**A.8.1** Pre-incident planning for facilities where hazardous materials are present should record the following:

- (1) Impact on emergency operations
- (2) Specific hazard(s) of the materials
- (3) Quantity and type of materials present and container type(s)
- (4) Engineering controls
- (5) Containment systems
- (6) Fire suppression systems
- (7) Special fire-fighting requirements

**A.8.2** Among the situations that could produce transient hazardous conditions are the following:

- (1) Periodic maintenance or shutdowns that create special hazards, or both
- (2) Renovations and alterations
- (3) Special manufacturing production runs
- (4) Crop-handling or storage
- (5) Material-handling facilities (loading docks, package sorting/transfer)

**A.8.3** Since the inventory of special hazard materials can fluctuate throughout the year, the pre-incident plan should identify an approved process to obtain the best estimate of current inventory at the time of the incident. Methods of tracking inventory might include internal tracking systems and shipping and receiving documentation.

The authority having jurisdiction should have a process to determine the need to document the operational conditions, locations, and characteristics of hazardous materials that might be present for a one-time condition or seasonally.

**A.8.4** Special hazards might include the following:

- (1) Chemical hazards
- (2) Physical hazards
- (3) Biological hazards
- (4) Nuclear hazards
- (5) Radiological hazards
- (6) Explosives
- (7) Research facilities
- (8) Hazardous processes
- (9) Large-scale data processing centers
- (10) Large-scale public gatherings

Other occupancies, by the nature of their use, or the unique characteristics of their presence, should be evaluated for pre-incident planning needs by the local authority having jurisdiction.

Plan developers should be familiar with the following documents before initiating preplanning for special hazard occupancies:

- (1) NFPA 101®
- (2) NFPA 472
- (3) NFPA 473
- (4) CCPS, *Guidelines for Chemical Process Quantitative Risk Analysis*
- (5) *The National Response Team's Integrated Contingency Pre-incident Plan Guidance*
- (6) NFPA 150, *Standard for Animal Housing Facilities*
- (7) NFPA 70, *National Electric Code*
- (8) Department of Homeland Security, *Chemical Facility Anti-Terrorism Standard*, Appendix A, Release Chemicals

**A.8.4.1** Where the authority having jurisdiction has determined that a pre-incident plan is required for large-scale public gatherings, the following items should be considered:

- (1) Access and egress
- (2) Evacuation
- (3) Weather
- (4) Emergency medical services
- (5) Security
- (6) Traffic
- (7) Crowd control
- (8) Fire protection
- (9) Food operations
- (10) Pyrotechnics
- (11) Aeronautical operations
- (12) Communications



- (13) Fuels (cooking equipment, internal combustion engines, hot air balloons, etc.)
- (14) Material safety data sheets (MSDS) as determined by the authority having jurisdiction

#### A.8.4.2.1.1 See NFPA 495.

**A.8.4.2.1.2** Ammonium nitrate has the potential to explode upon exposure to fire, heat, and pressure.

**A.8.4.2.2** Flammable and combustible liquids create fires that grow faster and produce much more heat than ordinary combustibles. The high heat release can cause premature structural collapse in addition to making entry into the fire area extremely difficult.

Many flammable liquids will flow with fire suppression water runoff and have the potential to spread the fire or contaminate the environment. To control this hazard, facilities might have built-in features, such as floor drainage or containment, for flammable liquids areas. If containment is provided (including piping the drainage to a containment area), fire fighters must be aware of the capacity of the containment area. Once the capacity of the area is known, emergency responders can calculate how long it will take to fill and potentially overflow the containment. The simplest method for calculating the overflow time is to divide the capacity of the containment area by the anticipated flow (gpm). The resulting number is the length of time, in minutes, that it will take to fill the containment area. In calculating the flow, be sure to include the design of the sprinkler system ( $\text{gpm}/\text{ft}^2 \times \text{area of design}$ ) as well as hose lines.

**A.8.4.2.2(1)** Materials can flow directly to an environmental receptor or to a spill containment holding area.

**A.8.4.2.2(3)** Specialized extinguishing agents, such as alcohol-resistant fire-fighting foams can be used to successfully extinguish a flammable liquids fire. Special agent requirements should also identify the presence of engineered systems for fire suppression.

**A.8.4.2.2(4)** Flammable and combustible liquids can be stored in flammable liquids storage rooms, flammable liquids handling rooms, or flammable storage cabinets or cans, and so forth.

**A.8.4.2.3** Special notation should be made of the special protective equipment that might be needed, location and identity of the agents, special security features and procedures, entry precautions and procedures, and special containment features, including locked storage, *in vivo* or *in vitro* use.

**A.8.4.2.4** Small radioactive sources used in laboratory, manufacturing, health care, or other occupancies could pose significant risks if removed from their storage or shielding. Information should be included about special entry requirements or security procedures and alarms for equipment such as lasers, irradiators, or other areas or devices that could result in exposure to responders.

**A.8.4.2.5** Many chemicals can produce an adverse reaction if contaminated or mixed with other materials chemicals could also undergo a chemical reaction when exposed to elevated temperatures as in a fire and have the potential for buildup of pressure in containers and the generation of toxic byproducts and heat.

Reactive chemicals that require cooling, for example, in a refrigerated warehouse, should also be noted, because it is likely that power could be interrupted during an emergency.

Plan for any chemical processes that could become hazardous if interrupted or left unattended (e.g., during the building evacuation).

Materials that react upon exposure to air or water should also be documented on the pre-incident plan. Include information about any secondary containment to prevent exposure to hazardous conditions.

**A.8.4.3** Examples of places that might contain hazardous atmospheres include the following:

- (1) Confined spaces
- (2) Inert atmospheres
- (3) Ripening facilities
- (4) Special equipment treating atmospheres
- (5) Fumigation chambers or active fumigation operation
- (6) Magnetic resonance imaging (MRI) quench gases

**A.9.2** This information should be easily accessible to the responders and should include, but not be limited to, hydrant locations, direct and alternate routes, staging information, known hazardous chemicals or conditions, and site access.

**A.9.3.1** Guidance on the development of all hazard emergency operations and post-incident recovery procedures can be found in state and local plans and many documents, including the following:

- (1) NFPA 472
- (2) NFPA 473
- (3) NFPA 600
- (4) *NFPA 1600*
- (5) NFPA 1710
- (6) NFPA 1720
- (7) NRT Integrated Contingency Plan (ICP)

The pre-incident plan should identify the emergency response resources that are available to respond to the incident and how they can be accessed. Documented agreements should be in place to ensure all organizations involved are committed to providing requested support.

**A.9.3.2** The scope and intensity level of the required information flow between the facility staff and the incident commander will vary during various phases of the incident; however, information flow, including any actions taken by the members of both parties, should continue throughout the incident.

When a facility representative is not available, the pre-incident plan should address the means needed for rapid access to, and consultation with, a site representative until an on-site liaison can be established.

**A.10.1.1** Testing can be conducted by various methods, including computer modeling, classroom discussion, tabletop simulation, or operational exercise. Where appropriate, it is recommended that the exercise design follow the U.S. Department of Homeland Security Exercise and Evaluation Program.

Pre-incident plan review should be conducted annually. During the initial pre-incident planning process, it can be difficult to recognize various problems or requirements that might be encountered during an emergency.

Issues that are brought to the attention of the authority having jurisdiction should initiate a pre-incident plan review, test, or update and include the following:

- (1) New construction or expansion
- (2) Changes in water supply
- (3) Changes in available hydrants



- (4) Changes in occupancy
- (5) Changes in response routes or traffic patterns
- (6) Testing that identifies problems
- (7) Problems in an actual incident

Operational exercises should be conducted under conditions approximating an actual emergency. The exercise should be planned with as much detail as that used in the development of the pre-incident plan itself. Plans for an exercise should rely on research, development, and experience, rather than perceptions or assumptions.

Exercise preparation should define procedures for response to an actual emergency that occurs during the exercise. The communications system for an exercise should include an “emergency signal” to indicate that an actual emergency has occurred during the exercise; for example, an injury to an exercise participant, a structural collapse, an equipment failure, loss of accountability of personnel, an actual alarm, and so forth.

Security, safety measures, and plans for traffic control should be established. Various occupancies might contain valuable objects, or there might be information on-site about operations and employees that should remain secure. Personnel participating in the exercise might be exposed to hazards, such as chemicals or other hazardous conditions that could put them at risk during the exercise.

Notification to all participating agencies and adjoining properties should be included. The exercise should involve emergency services organizations (ESOs), which are expected to assist during an actual emergency. A participant identification system should be established. The identification system should distinguish between an actual exercise participant, normal operation personnel, and spectators. Color-coded arm bands, head gear, vests, or some other form of visible identification should be used to identify the duties and responsibilities of the participants. Procedures should be established to control the movement and location of spectators. Personnel who are not participants in the exercise should be assigned to observe and provide critical evaluation to the post-exercise analysis.

Pre-incident plan exercises should be coordinated with both emergency responders and facility personnel. Because no facility or fire department is completely self-sufficient, external coordination should be established and is essential if the pre-incident plan is to be effective. Those persons who should be involved in pre-incident plan exercises include mutual aid units, emergency medical service personnel, law enforcement officials, facility management, and technical experts. External coordination should also involve public relations personnel, news media, police, medical services, dispatch center, and other units as appropriate.

Management should be advised of the benefit of a tabletop drill or on-site exercise and should be involved in the planning of the exercise. Internal coordination should be established to ensure that the owner and occupant are aware of their individual roles in the exercise and that all available resources are most efficiently utilized. Management should ensure that employees are aware of their individual roles and responsibilities during the exercise, stressing flexibility.

Copies of the operational exercise plan should be distributed to all participating parties, including facility representatives, so that all participants have full understanding of the plan.

A critique of the exercise should be conducted that includes all participants to the extent possible. The most valu-

able portion of an exercise is the post-exercise analysis, and subsequent modifications should be made to the pre-incident plan to correct any deficiency or increase efficiency. The analysis should fully discuss exercise procedures to assist in future exercises of the pre-incident plan.

**A.10.2.1** The following additional information or circumstances could indicate that a pre-incident plan revision is needed:

- (1) Property or deed transfers
- (2) Issuance of occupancy permits
- (3) Information from utilities (e.g., water, electric, gas, or sewer authorities)
- (4) Information from police and security officials
- (5) Changes in telephone numbers
- (6) Issuance of building permits
- (7) Inquiries from architects, engineers, or other consultants
- (8) Observations of economic or social change
- (9) Observations by response personnel during training exercises
- (10) Notices of street closings from highway department
- (11) Protection equipment impairment notices
- (12) Submission of data to regulatory authorities
- (13) Actual incidents
- (14) Loss experience in similar occupancies
- (15) Fire department inspections

## Annex B Case Histories

*This annex is not a part of the requirements of this NFPA document but is included for informational purposes only.*

**B.1 Office/Commercial High Rise, Quebec, 1986.** The building was a fire-resistive, 15-story high rise with stores on the basement and floor levels 1 and 2, parking garage space on floor levels 3 through 5, and offices on the floor levels above. There were three high-rise towers built on the commercial/parking garage plaza. The fire broke out at approximately 5:15 p.m. on a Sunday on the tenth floor of the east office tower. The tower was quickly evacuated. The fire spread and burned for 13 hours, causing a portion of one floor to collapse, and resulted in heavy fire damage on the tenth, eleventh, twelfth, and sixteenth floors (note — there was no numbered thirteenth floor), because fire fighters were unable to get enough water. The fire was eventually controlled utilizing “flying standpipes” off ladder trucks, ladder pipes (which had difficulty reaching the upper floors), and portable master streams from adjacent towers. There was great difficulty applying water to the top floor. The damage to the structure and contents was estimated at \$80 million (Canadian).

Several Siamese connections were installed around the complex. The Siamese connections were identified as to the type of suppression system that each supplied, but not the specific location that the suppression system supplied. Fire fighters did not connect the Siamese connection to the standpipe system, because the connection was labeled “sprinkler system.” Sprinklers were provided to the commercial floors of the building, but not to the offices located above. Fire fighters pressurized the connection that was labeled “standpipe system,” but this connection actually supplied the sprinklers on the lower floors. Continued requests from the fire area for more pressure resulted in fire fighters overpressurizing what was actually the sprinkler system Siamese, resulting in pipe

failures in the commercial area that caused significant damage in that area, which was unaffected by the fire. Following the fire, investigators also found a partially closed valve in the standpipe supply line.

The fire department was held liable by the Quebec Superior Court for 25 percent of the damages to the building, which was reported to be \$51 million (Canadian). The court chastised the fire department for failing to have an updated fire prevention plan for the facility that would have identified locations of standpipes and pumps that were improperly used or not used on the night of the fire. Five fire fighters were injured fighting this fire.

**B.2 Paper Products Warehouse, Connecticut, 1991.** The warehouse was 124 m × 118 m × 23 m (408 ft × 388 ft × 75 ft) high and of light noncombustible construction. The storage racks supported the roof of the warehouse and contained 11 tiers of gift and greeting card products. Ceiling sprinklers and eight levels of in-rack sprinklers were provided.

During an overnight shift, employees working on an automatic stacker crane in the warehouse heard a loud noise and saw sparks at the ceiling. Power was lost to the warehouse and the remainder of the facility. The fire department and the plant emergency organization were alerted as the fire developed at the top of the rack. The plant emergency organization members met and directed the fire department to the fire area.

The fire department connected to a yard hydrant and advanced two 44 mm (1¾ in.) hose lines into the warehouse. Fire fighters used a ladder on the stack crane to access the fire, which was 23 m (75 ft) above the floor. The fire was extinguished in less than 30 minutes and prior to the operation of the automatic sprinklers.

Fire and water damage was limited to three pallet loads of stock. The operation of the warehouse was partially interrupted for 3 days while repairs were made to the electrical system. Total damage from the fire was less than \$10,000.

**B.3 Two Fire Fighter Fatalities at Auto Parts Store, Virginia, 1996.** The building involved was approximately 12 years old. Two of the building's exterior bearing walls were constructed with unprotected steel frames, and two were constructed with masonry block. Lightweight wood trusses with a clear span of 15.2 m (50 ft) supported the building's roof.

The building contained a wide variety of combustible and noncombustible materials, flammable auto paints (liquid and aerosol), and other flammable and combustible liquids. During construction of this building, several roof trusses had collapsed while plywood roof sheathing was being installed, injuring three construction workers. Fire officers and fire fighters on the fire scene were unaware that the roof of the building was constructed with lightweight wood trusses.

The fire occurred when a utility worker damaged the electrical service drop conductors on the outside of the building. Electrical arcing inside the store ignited fires that quickly involved the wood trusses supporting the roof and ignited a fire in the area of an electric hot water heater. Though some of the fire was visible to anyone in the occupied area of the building, much of the fire was hidden in the concealed space above the building's ceiling, and the fire was able to spread in that area.

The fire department was dispatched at 11:29 a.m. Two fire fighters entered the building and located a small fire at the rear of the building. The fire fighters extinguished the fire and called for second crew and pike pole. Approximately 20 minutes after arrival, the roof of the building collapsed, and the two fire fight-

ers were trapped inside. The fire fighters both died of burns, with smoke inhalation being a contributing factor.

The Chesapeake Fire Department has a comprehensive, company level, commercial building inspection program. The building had a pre-fire plan that had last been reviewed in April 1994. The pre-fire plan had diagrams showing the building's location and a plan showing the interior arrangement of the building and the location of utilities. The pre-fire plan also showed the location, distance, and flow of the three closest fire hydrants. It is unclear if the pre-fire plan was referenced during the fire attack.

**B.4 Four Fire Fighter Fatalities, Warehouse, Washington, 1995.** The building in which the fire occurred was originally constructed in 1909 with a structural support system of heavy timber. Over the years, however, the warehouse had been modified a number of times. One of these modifications was a cripple wall (a short section of wall used to support a larger wall) that had been installed to support the joists of the floor assembly between the upper and lower levels. Unfortunately, this cripple wall was more susceptible to fire than the building's other structural support mechanisms, and, when it failed, it caused the floor to fail, creating the opening into which the four fire fighters fell.

From the outside, each face of the building presented a significantly different image. From the west side, it looked like a two-story structure constructed of various materials. When viewed from the north, a steep grade partially obscured the details of the building, and the structure appeared to have two stories, although only one level was accessible from the east side. From the east, it appeared to be a one-story building with no lower level. From the south, heavy vegetation obscured the building, so that only one floor was visible until one approached the parking lot at the southwest corner.

The layout of the building, the adjacent structures, and the sloping grades made it impossible to drive around the structure to size it up. However, it was possible, with some difficulty, to walk around the building.

Probably the most significant factor contributing to this fatal incident was the fact that the building had two levels. Members of the crew that attacked the fire from the east thought that they were working in a one-story structure without a basement. Members of the crew working on the west side of the building knew that the building had two floors but thought that the interior crew was fighting the same body of fire they were confronting.

This confusion over the number of levels and the level where the main body of fire was located allowed the crews working on the fire to operate longer than they possibly should have. They thought they were making headway on the fire and were hitting spot fires, while the main body of fire was actually working below them.

**B.5 Three Fire Fighter Fatalities, Pesticides Repackaging Facility, Arkansas, 1997.** The building involved was approximately 2 years old and of unprotected noncombustible construction. Most of the building's area was used for storage of product. However, in one small production area, where pesticides were repackaged, there were several offices. The building was served by a wet-pipe sprinkler system.

Facility personnel discovered greenish-yellow smoke coming from a 725 kg (1600 lb) intermediate bulk container (IBC) containing azinphos methyl in the facility's receiving area and called the fire department at 1:02 p.m. In response,





the fire department sent an engine and additional fire fighters. The fire chief reported yellow-colored dust or smoke showing upon arrival and requested a full response, including mutual aid.

The incident commander was provided MSDS on material in the facility by employees and was advised that the material was not explosive and that the primary hazard was inhalation. The MSDS were provided to the mutual aid chief officer for a more detailed review, and fire fighters were advised to don SCBAs prior to approaching the structure. As four fire fighters approached the building to conduct a more thorough size-up, an explosion occurred, and a huge ball of fire and smoke mushroomed from the building. The four fire fighters were struck by flying masonry blocks and other debris and were buried under the material. Other fire fighters on the scene began rescue operations, during which smaller explosions occurred. One of the four trapped fire fighters was successfully rescued, and it was determined that the other three fire fighters could not be uncovered without the use of power equipment. It was also reported that vital signs could not be found on any of the buried fire fighters. Considering this information, the severity of the still growing fire, and the information obtained from the MSDS, the incident commander ordered all personnel to evacuate the fire area and to withdraw to a distance he believed would be safe.

Hazmat team assistance was requested, and an area within a 2-mile radius on the downwind side of the scene was evacuated. One of the many facilities in the evacuation zone was the local hospital. Once hazardous materials specialists arrived on the scene, it was determined that the most prudent plan of action would be to allow the fire to burn itself out, and the hazmat team personnel focused on recovering the fire fighters' bodies.

A more detailed review of the MSDS sheets at the start of the incident by the mutual aid chief indicated that, the material involved posed primarily toxicological hazards for which the fire fighters were not properly protected, and one of the sheets indicated that, if the product were ignited, it would emit yellow smoke. The mutual aid chief believed that withdrawal of the fire fighters was appropriate and was approaching the incident commander to inform him of this when the explosion occurred. A formalized pre-plan of the facility had apparently not been conducted — incident engagement into the hazard area was initiated while information gathering on the situation was still being conducted.

**B.6 Six Fire Fighter Fatalities, Cold Storage and Warehouse Building, Massachusetts, 1999.** The structure was a six-story cold storage and warehouse that had been vacant since 1991. The original building was constructed in 1905, and 7 years later (1912), another building was constructed on the western side. The exterior walls were constructed of brick, while the interior walls were covered with asphalt-impregnated cork (6 in. to 18 in., depending on the floor level), 4 in. of polystyrene or foam glass, or both, and a thin layer of glass board. The flooring was wooden, except for the flooring in the basement and on the first and second floors, which was concrete. The joists consisted of heavy timbers. Two stairwells were present; one was located on the B side of the building and extended from the basement to the flat roof, and the other was located on the C side and extended to the third floor only. The building was essentially windowless, and although a few windows were present, they were covered with plywood. The building entrances and exits were secured by plywood, but

homeless people had gained access to the building and established living quarters.

An off-duty police officer driving by reported smoke coming from the top of the building at 1813 hours, and a full first-alarm assignment was dispatched. It was later determined that the fire had been in progress for 30 minutes to 90 minutes prior to the time of dispatch. Fire fighters from the apparatus responding on the first alarm were ordered to search the building for homeless people and fire extension. During the search efforts, two fire fighters became lost, and one sounded an emergency message. Fire fighters who responded on the first and third alarms were then ordered to conduct search-and-rescue operations for the missing fire fighters and the homeless people. During these efforts, four more fire fighters became lost. Forty-five minutes after the dispatch, fire conditions worsened, and it was reported that the structural integrity of the building had been compromised. Command ordered all companies to evacuate the building. After the fire had been knocked down, search-and-recovery operations commenced until the bodies of all six missing fire fighters were recovered 8 days later.

Five minutes after dispatch, the incident commander radioed the dispatch center and requested any available building information, but no information was ever found or received. Due to the lack of pre-fire planning and inspection, and the lack of building plans/drawings, confusion existed among the fire fighters as to the configuration and number of floors contained within the building.

**B.7 Three Fire Fighter Fatalities, Auto Parts Store, Oregon, 2002.** The building involved was built in 1938, was approximately 13,520 ft<sup>2</sup>, and was of Type IV heavy timber construction. The nonsprinklered building had numerous modifications, which included the addition of a warehouse and a mezzanine. Inspections of the building had been completed by the fire department prior to the incident; however, no pre-emergency plans were ever developed.

There was a delayed notification of the fire department while occupants investigated a burning odor. Fire fighters advancing attack lines found fire in the rafters. Roof stability deteriorated, and the IC called for an evacuation; however, five fire fighters were still operating in the building when the roof collapsed. Two fire fighters were able to escape; however, three were trapped. One fire fighter was able to be removed while conditions deteriorated further but was later pronounced dead. It took fire fighters approximately 2 hours to control the fire before they could re-enter the building to locate the remaining two fire fighters, who were pronounced dead on the scene.

**B.8 Fire Fighter Fatality, Restaurant/Lounge, Missouri, 2004.** The building was a one story, nonsprinklered commercial restaurant/lounge that was constructed of sheet metal walls and roof over wood frame and lightweight wood trusses. The interior ceiling was metal decking attached to the bottom of the trusses, suspended from the bottom chord. The building was approximately 5000 ft<sup>2</sup>, built in 1995. None of the responding departments had inspected the building or developed a pre-incident plan.

The initial alarm was dispatched at 1331 hours for five units from three separate departments for a structure fire. The victim, providing mutual aid, had been searching for the seat of the fire with two volunteer fire fighters from another department when one of these fire fighters lost the seal on his SCBA face piece. The fire fighter immediately abandoned the nozzle

position and retreated out of the closest door. The backup fire fighter also retreated out of the building when his partner left. In black smoke and zero visibility, the fire fighters were unaware that the victim was still inside the structure. Soon after, the incident commander ordered an emergency evacuation because of an imminent roof collapse. Personnel accounting indicated that a missing fire fighter was still inside the building when the roof partially collapsed. After several search attempts, the victim was found in a face-down position with his mask and a thermal imaging camera cable entangled in a chair. He was pronounced dead at the scene.

In this case, the metal building, roof and ceiling, and light-weight wood roof truss construction created a dangerous fire environment conducive to early structural collapse. Concealed spaces above suspended ceilings allow flame spread to go undetected. The presence of concealed spaces can be noted in pre-incident visits and referenced. Also, a pre-incident inspection provides an opportunity to test radio transmission capabilities. In this case, it is unknown whether the metal building interfered with communications to the victim's designated radio channel. It was not tested before the building was razed. NFPA 1620 addresses the need for testing communications and interference of radio coverage during the pre-incident planning process.

**B.9 Major Oil Depot Fire, England, 2005.** In the early hours of Sunday, December 11, 2005, a number of explosions occurred at Buncefield Oil Storage Depot, Hemel Hempstead, Hertfordshire. At least one of the initial explosions was of massive proportions, and there was a large fire, which engulfed a high proportion of the site. Over 40 people were injured; fortunately, there were no fatalities. Significant damage occurred to both commercial and residential properties in the vicinity, and a large area around the site was evacuated on emergency service advice. The fire burned for several days, destroying most of the site and emitting large clouds of black smoke into the atmosphere. The fire fighting required a national response, with a total of 32 fire and rescue services attending in some capacity. In total, 786,000 L of foam were used to extinguish the fire in 22 tanks. Insufficient guidance was available to primary responders on a number of critical early issues, such as how to assess the impact of the smoke plume on air quality. Decisions on whether to fight the fire or to allow it to burn out in a controlled fashion depend on the availability of such assessments. The incident exceeded the worst-case planned scenario, which was a single tank fire, and the water supply lagoons on the facility were rendered useless by the incident. Following the incident, it was determined that the main water supply lagoon may not have had adequate capacity for fire fighting during summer months.

A special investigative board established by the British government recommended, among other things: Where operators depend on local services (e.g., the local fire and rescue service) to provide alternative resources, they need to consult the local provider to identify any limitations on the availability of services. Any such limitations should be considered and addressed within the site's emergency planning arrangements, local authorities should review their off-site emergency response plans, and, in the case of fuel storage sites, take account of explosions and multi-tank fire scenarios; and facilities should work in conjunction with neighboring local authorities in developing their off-site emergency plans and involve these authorities in training and in emergency exercises.

**B.10 Paint Manufacturing Facility Fire, North Carolina, 2007.** In October 2007, fire units responded to a fire alarm at a paint manufacturing facility. The department's hazmat team had just conducted a pre-plan at that facility the previous week. Shortly after arriving on-scene, the incident commander requested additional resources, including the hazmat team, due to an explosion at the facility. The product involved was nitrocellulose, a DOT Class 4 flammable solid.

The first arriving companies attempted to gather information by looking the product up in the emergency response guide, but were frustrated by the fact that there were six different entries for nitrocellulose. Due to the knowledge gained in the preplanning process, the hazardous materials unit was able to tell the companies exactly which entry to use until the hazmat team arrived. The hazardous materials team also knew the exact location of the product in the facility and the location of the deluge valve to turn off the suppression system.

Because of the preplanning process, responding personnel had information on the product, its location, and the location of pertinent fire protection systems without having to send a team into the hazard zone and without having to wait for a property representative to arrive on-scene. Company officials were impressed with the fire department's knowledge base and the speed with which the incident was mitigated. While the incident could have been mitigated without a pre-plan, it certainly made the operation much faster and, more importantly, much safer.

**B.11 Nursing Facility Fire, Florida, 2008.** On the morning of March 29, 2008, fire units responded to an elder care / skilled nursing facility less than 1 mile from fire station #2. The first due company, Engine 2, had done a pre-incident plan for the four-story building. The fire was reported to be in the laundry room area, which was in a difficult-to-access area of the facility. Using the pre-incident plan information, the company officer was able to direct the other responding units to the most appropriate location and establish the best course of action for the incident prior to first unit on-scene.

The fire attack was quickly handled and ventilation properly established in such a fashion to prevent having to remove any of the elderly inhabitants. As planned, a company was sent to the upper floors to quickly determine if the smoke had accessed the resident floors and, finding none, the defend-in-place option was chosen, maintaining personnel on the floors to monitor for any situational change. The pre-incident planning process required the company officer to anticipate fire scenarios and apply department SOGs. This very process provided the basis for a successful approach and outcome for a large group of vulnerable citizens.

## Annex C Special or Unique Characteristics of Occupancy Classifications

*Annex C provides recommendations and explanatory information addressing special or unique characteristics of specific occupancy classifications that should be considered in the development of the pre-incident plan. All pre-incident plans should follow the general provisions set forth in Chapters 4 through 10.*

### C.1 Assembly Occupancies.

**C.1.1 Administration.** Pre-incident planning in an assembly occupancy should involve not only the emergency responders, but also administrators, event supervisors, and other staff members.



**C.1.2 Physical Elements and Site Considerations.** Conditions under which access is difficult due to location and other conditions that include the following should be noted in the plan:

- (1) Low levels of lighting
- (2) High-rise top stories
- (3) Waterfront locations
- (4) Fixed water craft
- (5) Subgrade locations

**C.1.3 Occupant Considerations.**

**C.1.3.1** Due to the possible large numbers of occupants, consideration should be given to the expected characteristics of occupants, including the following:

- (1) Age
- (2) Mobility
- (3) Awareness
- (4) Knowledge
- (5) Maximum number of occupants at any given time

**C.1.3.2** Obstruction or impairment of means of egress by the following should be noted:

- (1) Variable seating arrangements (e.g., festival and temporary)
- (2) Decorations and displays
- (3) Temporary storage
- (4) Waiting spaces
- (5) Furniture and fixtures

**C.1.3.3** Expected effectiveness of crowd managers, security, or on-site emergency services, if provided, should be included in the pre-incident plan.

**C.1.4 Protection Systems and Water Supplies.**

**C.1.4.1** The automatic sprinkler systems in locations where exhibits, live stage productions, and similar shows are conducted should be closely evaluated to determine whether adequate protection is present for the intended use, and the findings should be noted in the plan.

**C.1.4.2** Because the nature of an event could result in the intentional temporary impairment of a protection system to allow for pyrotechnic displays or theatrical smoke generation, the plan should note alternate protection means or procedures for these situations.

**C.1.5 Special Hazards.** The following conditions should be noted, as they pertain to intermittent special events and transient conditions:

- (1) Hazardous materials
- (2) Combustible load
- (3) Obstructions to sprinkler discharge
- (4) Means of egress

**C.1.6 Emergency Operations.**

**C.1.6.1** Consideration of life safety at places of assembly should be the major point addressed by the plan.

**C.1.6.2** Sufficient space and resources should be provided to relocate occupants away from operating emergency units.

**C.1.6.3** The potential for an emergency responder's access to become obstructed or impaired should be noted in the plan.

**C.2 Educational Occupancies.**

**C.2.1 Administration.** Pre-incident planning in an educational occupancy should involve not only the emergency re-

sponders but school administrators, teachers, other staff members, and students.

**C.2.2 Physical Elements and Site Considerations.** The pre-incident plan should note any changes in access patterns that might occur during occupancy.

**C.2.3 Occupant Considerations.** The pre-incident plan should contain the following:

- (1) Number of students and their age range
- (2) Location of various age groups within the facility
- (3) Location and occupant load of any assembly areas
- (4) Areas of rescue assistance

**C.2.4 Security.** Many educational occupancies implement security pre-incident plans to address various violence scenarios. These security plans might impact traditional emergency response procedures for educational facilities and might present unique challenges, such as high-security locking doors and special needs for media communication. Information regarding special security procedures for educational facilities should be collected and included in the pre-incident plan.

**C.2.5 Special Hazards.**

**C.2.5.1** The location of any hazard areas, such as shops, laboratories, and kitchens, should be noted on the pre-incident plan.

**C.2.5.2** The quantity, type, and location of any hazardous materials should be noted on the pre-incident plan.

**C.2.6 Emergency Operations.**

**C.2.6.1** The pre-incident plan should note the system or method used for accounting for all of the occupants.

**C.2.6.2** The pre-incident plan should include provisions for handling the interaction between emergency responders, facility staff, and students and their parents or guardians.

**C.3 Health Care Occupancies.**

**C.3.1 Administration.** Health care occupancies create a special hazard in that patients might need assistance to evacuate during an emergency. This operation creates large emergency services demands. Patients will also need continuous medical care after evacuation. A mass casualty event might cause the facility to modify operations by isolating ingress and egress.

**C.3.2 Staff.** Pre-incident planning should include health care administrators and key staff supervisors. The staff of the health care facility is responsible for medical decisions regarding patient care and will be actively involved in moving or sheltering patients prior to the arrival of emergency responders.

**C.3.3 Pre-Incident Planning Process.**

**C.3.3.1** The information in the health care facility's fire or disaster plan should be incorporated into the pre-incident plan. Health care facilities typically plan and train for emergencies. The pre-incident plan should incorporate the facility emergency response plan.

**C.3.3.2** The acronyms used in the facility to implement the emergency plan should be recorded.

**C.3.3.3** During the planning process, the following safety-related documentation can be used in the development of the pre-incident plan:

- (1) Chemical spill plan



- (2) Procedures for operating room, intensive care unit (ICU), or surgical suite emergencies, including evacuation and equipment shutdown procedures, and provisions for control of emergencies by facility staff until arrival of the emergency responders
- (3) Emergency procedures for radioactive materials, radiation-generating equipment, magnetic resonance imaging (MRI), and laser units

### C.3.4 Physical Elements and Site Considerations.

#### C.3.4.1 General.

**C.3.4.1.1 Building Interdependencies.** Pre-incident plans should address building interdependencies.

**C.3.4.1.2 Construction.** In general, health care facilities are designed with construction features to compartmentalize a fire within the enclosure or area of origin, and the location of these features, such as fire walls, fire barriers, smoke barriers, and areas of refuge, should be noted in the pre-incident plan.

**C.3.4.1.3 Access.** The location of multiple entrances to health care facilities, including a main entrance, an emergency room entrance, and specialized treatment entrances, should be identified.

**C.3.4.2 Building Services.** The pre-incident plan should incorporate the facility's process for shutting off utilities, including the following:

- (1) HVAC controls
- (2) Emergency power sources
- (3) Water supply shutoffs (potable, high purity, sanitary)
- (4) Medical gases (should be isolated as locally as possible)
- (5) Vacuum systems
- (6) Wastewater
- (7) Diagnostic equipment (e.g., shutdown procedure for MRIs)

Health care facilities can have piped nonflammable medical gas systems, flammable and nonflammable laboratory gas systems, and vacuum systems. The type of systems, control points, and significance to patient care should be noted. Typical patient care gases used in health care facilities include oxygen and nitrous oxide, which are both strong oxidizers, isoflurane, and ethylene oxide sterilizers.

These gases can be contained as follows:

- (1) In individual compressed gas cylinders located in patient care areas or in bulk storage rooms
- (2) In individual cylinders located on carts and hand trucks
- (3) In compressed tanks located on the exterior of the building and serving a closed pipe network

Similarly, nonpatient care gases used in clinical and associated research laboratories or medical equipment can be contained as follows:

- (1) In portable cylinders
- (2) In fixed cylinders in the laboratory
- (3) In bulk storage or individual cylinders
- (4) In bulk storage cylinders outside the building

Compressed gas systems used for patient care are usually zoned by treatment or use areas, with an emergency shutoff valve located in the zone served. Zone control valve locations should be noted in the pre-incident plan. The pre-incident plan should note when it is necessary to shut off compressed gases used for patient care, and that shutdown should be per-

formed at the zone control valve. A shutoff valve at remotely located supply cylinders should never be used to shut off medical gases in a health care facility, except as a last resort. Large health care facilities can have dedicated environmental exhaust systems for such areas as anesthetizing locations, research animal facilities, and laboratories. These systems could have been designed for automatic venting of smoke and products of combustion. The areas served by these systems and associated manual controls should be noted.

**C.3.5 Occupant Considerations.** The pre-incident plan should record the maximum bed capacity and specialized care units (e.g., Alzheimer's care, mental health units).

#### C.3.5.1 Health Care Facility Evacuation Procedures.

**C.3.5.1.1** An analysis of the required resources necessary for the horizontal evacuation of patients should be considered as part of the pre-incident plan.

**C.3.5.1.2** Building plans should be used to assist in evaluating the features of compartmentalization.

**C.3.5.2 Additional Issues.** Additional issues that should be considered when evacuating patients from health care facilities include the following:

- (1) Weather
- (2) Relocation facilities and transportation support for patient evacuation
- (3) Movement of bedridden patients and patients on life-support systems
- (4) Special needs of the patients
- (5) Medical records and required medications
- (6) Patient identification and family reunion procedures

**C.3.6 Special Considerations for Health Care Facilities.** Due to the unique functions performed in health care facilities, special occupant considerations are needed, particularly in the following areas:

- (1) Operating rooms and surgical suites
- (2) Recovery rooms
- (3) Intensive care, neonatal care, and cardiac care units
- (4) Locked floors, wings, or rooms that house patients with dementia or psychiatric illnesses who are under the control of the courts, and so forth
- (5) Dialysis units
- (6) Imaging facilities
- (7) Pediatric populations

### C.4 Detention and Correctional Occupancies.

**C.4.1 Administration.** All pre-incident plans should follow the general provisions set forth in Chapters 4 through 10.

**C.4.1.1** This section contains recommendations that should be applied to pre-incident planning for emergencies in detention and correctional occupancies.

**C.4.1.2** Pre-incident planning in a detention and correctional occupancy should involve not only emergency responders but detention and correctional facility administrators, section or department supervisors, the maintenance director or building engineer(s), and other staff members.

#### C.4.2 Pre-Incident Planning Process.

**C.4.2.1** The information in the detention and correctional facility's fire or disaster plan should be incorporated into the pre-incident plan.





**C.4.2.2** The pre-incident plan should address the level of security provided in a facility and the restrictions under which the emergency responders will be operating.

**C.4.2.3** The following issues should be understood and considered in the development of the pre-incident plan:

- (1) The site or facility's buildings, or both, will be secured; therefore, access will be delayed.
- (2) Exiting a facility or site will also be delayed.
- (3) Facility staff could limit access of responding personnel to the site or a building to ensure the safety of the responding personnel.

**C.4.3 Physical Elements and Site Considerations.** Facilities can be small, stand-alone buildings or can be located as part of another occupancy, in high-rise buildings, or on campus-style sites. Large facilities on large sites can contain numerous occupancies in addition to the resident housing and administration buildings. Such facilities can include assembly occupancies such as gymnasiums, industrial occupancies used in the production of furniture or other commodities, warehouse occupancies, and health care occupancies. Each occupancy can have different levels of security (use condition). Different areas within a given facility could have different use conditions. The use condition of a facility or area within a facility dictates the life safety features that have been provided in the facility.

The level of restraint will fall into one of the following five classifications, as defined in NFPA 101, *Life Safety Code*.

- (1) *Use Condition I — Free Egress.* Free movement is allowed from sleeping areas and other spaces where access or occupancy is permitted to the exterior via means of egress that meet the requirements of NFPA 101.
- (2) *Use Condition II — Zoned Egress.* Free movement is allowed from sleeping areas and any other occupied smoke compartment to one or more other smoke compartments.
- (3) *Use Condition III — Zoned Impeded Egress.* Free movement is allowed within individual smoke compartments, such as within a residential unit comprised of individual sleeping rooms and a group activity space, with egress impeded by remote-controlled release of means of egress from such a smoke compartment to another smoke compartment.
- (4) *Use Condition IV — Impeded Egress.* Free movement is restricted from an occupied space, with remote-controlled release provided to allow movement from all sleeping rooms, activity spaces, and other occupied areas within the smoke compartment to another smoke compartment.
- (5) *Use Condition V — Contained.* Free movement is restricted from an occupied space, with staff-controlled manual release at each door provided to allow movement from all sleeping rooms, activity spaces, and other occupied areas within the smoke compartment to another smoke compartment.

**C.4.3.1 Access.** The pre-incident plan should reference the security measures necessary to enter a site or facility. Large facilities can require access through sally ports.

**C.4.3.2 Construction.** The location of fire and smoke barriers should be noted on the pre-incident plan. Detention and correctional facilities are designed with construction features to compartmentalize a fire within the enclosure or area of originate.

**C.4.3.3 Building Services.** The plan should address the decision-making process for shutting off any utilities. Evacuation of a detention and correctional facility is not always prac-

tical or necessary. Shutting off building utilities can be detrimental to the residents' safety and health. Detention and correctional facilities can be located in buildings of different occupancies.

**C.4.4 Occupant Considerations.** The pre-incident plan should address a process for identifying the maximum number of residents, staff members, or visitors within smoke zones.

**C.4.4.1 Level of Restraint.** The level of restraint of the residents will vary between facilities, as well as between different areas within a facility. Inmates, in most cases, will not automatically be released outside the secured boundaries (the boundaries being within a building or site).

**C.4.4.2 Data.** The pre-incident plan should incorporate appropriate data from the facility emergency action plan.

**C.4.4.3 Inmate/Staff Relations.** Movement of inmates is an issue that requires consideration, and, therefore, planning should include developing a close working relationship with the facility staff.

**C.4.4.4 Evacuation Procedures.** The location of the smoke zones and areas of refuge should be emphasized in the pre-incident plan. Due to the security measures imposed on the residents in a detention and correctional facility, the construction features of the facility have been designed to minimize the probability that a fire would require the movement of occupants. The building standards for detention and correctional facilities recognize that movement of residents is difficult, not only due to security measures imposed on the residents, but also due to the potential impact imposed on others by the movement of residents. Fire and products of combustion or contaminant barriers have been designed in detention and correctional facilities that are intended to allow residents to remain in place or provide for the horizontal movement of residents to areas of refuge on a single floor, limiting residents' exposure to any single fire. This philosophy is known as the defend-in-place concept. In order to achieve the successful outcome of a fire in a detention and correctional facility, the municipal fire service must work closely with the facility staff throughout the incident. The working relationship should be stressed in the pre-incident plan. Detention and correctional facility staff are trained to evacuate residents, when necessary, to an adjacent smoke zone through horizontal exits as the first level of evacuation.

**C.4.4.4.1** The pre-incident plan should include relevant procedures and guidelines that could be needed if exterior evacuation of residents, outside of secured enclosures, becomes necessary.

**C.4.4.4.2** In all cases, regardless of how far residents are moved in a fire incident, any movement of residents should be done under the direction of on-site staff.

**C.4.5 Protection Systems and Water Supplies.** The pre-incident plan should note the location of all fire department connections serving sprinkler systems or standpipe systems, or both, and the protection system each serves, because such connections can be remotely located away from the building served or outside of the secured site perimeter.

**C.4.6 Special Hazards.** Armory or munitions storage areas should be noted on the plan.

**C.4.7 Emergency Operations.** During an emergency operation, the following special considerations should be kept in mind:

- (1) Any direct contact with inmates is to be avoided.
- (2) All equipment brought into a facility should be accounted for, as any piece of equipment brought to the site by responding personnel can be used as a weapon.
- (3) In most cases, responding personnel will not be given keys to secured doors and will probably require escorting by facility staff.

## **C.5 Residential Occupancies.**

**C.5.1 Administration.** Pre-incident planning in residential occupancies, such as hotels, motels, dormitories, apartment buildings, and lodging or rooming houses, should involve not only the emergency responders but administrators, owners, managers, the maintenance director or building engineer(s), and other staff members.

## **C.5.2 Physical Elements and Site Considerations.**

### **C.5.2.1 Construction.**

**C.5.2.1.1** Corridors and fire-resistive separation, or lack thereof, between guest rooms in transient occupancies should be noted in the pre-incident plan, and the pre-incident plan should include details on transoms, transfer grilles, and door closures.

**C.5.2.1.2** Common attics, cocklofts, truss spaces, and other areas of potential concealed fire spread should be noted in the pre-incident plan.

**C.5.2.2 Building Services.** Supplemental heating equipment, such as coal or wood stoves, should be noted in the pre-incident plan.

### **C.5.2.3 External Conditions.**

**C.5.2.3.1** The availability of a master key(s) and a list of doors that cannot be opened by the master key(s) should be noted in the pre-incident plan.

**C.5.2.3.2** Where the locking of any door impacts the accessibility of emergency responders, it should be noted in the pre-incident plan. During operating, and especially late-night, hours, exterior doors might be locked, preventing access to the building(s). Interior doors and stairwells might be locked to prevent movement within or between buildings.

## **C.5.3 Occupant Considerations.**

**C.5.3.1 Evacuation.** Where means of egress or escape are considered inadequate, operational considerations necessary to effect evacuation should be included in the pre-incident plan.

**C.5.3.2 Public Assembly Areas.** Special attention should be paid to public assembly areas, including auditoriums, banquet halls, meeting rooms, theatrical stages, and so forth.

**C.5.3.3 Hours of Operation.** The pre-incident plan should include a process to identify occupant load by area of the building(s) and operating hours.

**C.5.3.4 Occupant Load.** The pre-incident plan should note whether the hotel management maintains a continual list of guests by room number at the front or registration desk.

**C.5.3.5 Staffing.** The pre-incident plan should identify those members of hotel management, supervisory staff, and other personnel who are responsible for building operations or who can assist in emergency operations, because the number of such personnel varies greatly according to the time of day.

**C.5.3.6 Location of Occupants.** The pre-incident plan should include information to help locate occupants needing assistance, which might or might not be available from the guest list in hotel occupancies.

## **C.5.4 Protection Systems and Water Supplies.**

**C.5.4.1 Type and Design.** The type and design of automatic sprinkler systems should be noted in the pre-incident plan. In residential occupancies, systems designed in accordance with NFPA 13, NFPA 13D, or NFPA 13R often utilize fast-response residential-type sprinklers.

**C.5.4.2 Design Area.** The design area of automatic sprinkler applications and nonsprinklered areas should be noted.

**C.5.4.3 Special Extinguishing Systems.** The areas or hazards protected by special extinguishing systems and the operating procedures for those areas should be noted in the pre-incident plan. In hotel occupancies, special extinguishing systems might be installed in kitchens and might also be found in computer rooms.

**C.5.5 Special Hazards.** Special hazards, such as hotel or tenant storage areas, automobile parking, maintenance shops, kitchens, restaurants, retail outlets, exhibition halls, and mechanical rooms, should be noted in the pre-incident plan.

## **C.6 Residential Board and Care Occupancies.**

**C.6.1 Administration.** Pre-incident planning in a board and care occupancy should involve not only the emergency responders but managers, owners, the maintenance director or building engineer(s), and other staff members.

## **C.6.2 Occupant Considerations.**

### **C.6.2.1 Evacuation Capability.**

**C.6.2.1.1** The pre-incident plan should note the evacuation capabilities of the residents.

**C.6.2.1.2** Where evacuation capabilities are determined to be slow or impractical, the pre-incident plan should note any additional required resources.

**C.6.2.2 Number of Staff.** The number of staff according to time of day, their assigned locations within the facility, and whether they could be asleep at night should be noted in the pre-incident plan. The number of staff who are responsible for residents will vary depending on time of day, size of the facility, and personal care needs of the residents. In many residential board and care facilities, staff could be asleep at night.

**C.6.2.3 Location of Occupants.** The location of occupants needing assistance to evacuate should be noted in the pre-incident plan.

**C.6.2.4 Means of Egress.** The adequacy and arrangement of means of egress should be noted in the pre-incident plan. In addition to normal means of egress provisions, residential board and care facilities can include emergency escape routes consisting of exterior windows or doors.

## **C.6.3 Protection Systems and Water Supplies.**

**C.6.3.1** The type and design of automatic sprinkler systems should be noted in the pre-incident plan. In residential board and care occupancies, systems designed in accordance with NFPA 13, NFPA 13D, or NFPA 13R often utilize fast-response residential-type sprinklers.



**C.6.3.2** The design area of automatic sprinkler applications and nonsprinklered areas should be noted.

**C.6.4 Emergency Operations.** The pre-incident plan should contain provisions for sheltering evacuated occupants with special needs.

## **C.7 Mercantile Occupancies.**

**C.7.1 Administration.** Pre-incident planning in a mercantile occupancy should involve not only the emergency responders but administrators, section or department supervisors, the maintenance director or building engineer(s), and other staff members.

## **C.7.2 Physical Elements and Site Considerations.**

### **C.7.2.1 Construction.**

**C.7.2.1.1** The presence, location, and component ratings of fire walls, fire barriers, and smoke compartments, as well as the protection provided for any openings, should be noted on the pre-incident plan.

**C.7.2.1.2** Specific items that should be noted on the pre-incident plan where strip mall shopping center occupancies, or rows of attached mercantile occupancies, exist include the following:

- (1) Common walls between occupancies
- (2) Common areas in cocklofts, attics, or basements
- (3) Breached fire barriers

**C.7.2.1.3** Specific items that should be noted on the pre-incident plan where covered mall buildings having large, undivided areas and unprotected openings between floors are present include the following:

- (1) Tenants that are open to the covered mall, adding to the size of the open areas
- (2) Protection provided at the entrances to anchor stores from the covered mall, including water curtains, fire barriers, or smoke barriers
- (3) Size and characteristics of the protection for the openings, along with reliability of the closing mechanism
- (4) Roof construction

**C.7.3 Occupant Consideration.** Information on the following characteristics should be noted on the pre-incident plan:

- (1) In multi-tenanted locations, variations in the hours of operation of the tenants
- (2) Any separate entrance and egress controls for tenants
- (3) Seasonal events, temporary kiosks, and special promotions in common areas that could affect occupant evacuation or the operations of emergency responders

### **C.7.4 Emergency Organization.**

**C.7.4.1** The expected effectiveness of mall or store managers, security, or on-site emergency services, if provided, should be included in the pre-incident plan.

**C.7.4.2** Evacuations of multi-tenanted occupancies can be difficult to accomplish, and details of resources needed to complete an evacuation, including joint operations with the emergency organization, should be noted in the pre-incident plan.

## **C.7.5 Protection Systems and Water Supplies.**

### **C.7.5.1 Hydrants.**

**C.7.5.1.1** The water supply for on-site hydrants, public or private, has the potential to be complex, particularly when multiple sources are involved, and details should be noted in the pre-incident plan.

**C.7.5.1.2** For private systems, an emergency contact familiar with the supply should be noted.

**C.7.5.2 Automatic Sprinkler Systems.** Details on the types of systems and their location, layout, and protected areas should be noted, because numerous risers and control valves often exist where multiple systems are located throughout large mercantile or multi-tenanted occupancies.

**C.7.5.3 Standpipes.** Interior hose line stretches within large mercantile occupancies can be extensive and should be noted.

**C.7.5.4 Protective Signaling Systems.** The presence of multiple fire alarm control panels and variations in areas of coverage and method of occupant notification within multi-tenanted occupancies should be noted on the pre-incident plan.

**C.7.6 Special Hazards.** Special hazards that should be noted include those associated with the following:

- (1) Stock areas
- (2) High-challenge commodities or hazardous materials such as aerosols, oxidizers, pesticides, and flammable or combustible liquids, with identification of incompatible materials such as oxidizers and petroleum products provided
- (3) Warehouse store hazards typically found in large home improvement stores, large furniture stores, carpet outlets, and automobile tire distributors
- (4) Food courts or restaurants with commercial cooking equipment
- (5) Trash collection and compactor rooms
- (6) Seasonal events, temporary kiosks, and special promotions in common areas

## **C.8 Business Occupancies.**

**C.8.1 Administration.** Pre-incident planning in general business offices; physician's offices; outpatient clinics; college, instructional, and university classrooms under 50 persons; and government offices should involve not only responding personnel but administrators, owners, managers, the maintenance director/ building engineer(s), and other staff members.

### **C.8.2 Occupant Considerations.**

**C.8.2.1** Special attention should be paid to public assembly areas, including auditoriums, banquet halls, cafeterias, and conference or meeting rooms, that are common to business occupancies.

**C.8.2.2** The pre-incident plan should include information to help locate occupants needing assistance.

**C.8.2.3** Conditions that could affect rescue should be noted. These include, but are not limited to, high-rise construction, subterranean spaces, hours of operation, vehicle access, and crowd control.

### **C.8.3 Special Hazards.**

**C.8.3.1** Significant high hazard contents that might be stored in multiple areas throughout the building(s), including print shops, storage areas, file storage areas, automobile parking areas, maintenance shops, kitchens, and retail outlets, should be noted in the pre-incident plan.

**C.8.3.2** Storage of flammable/combustible liquids or flammable gases in areas such as physician's offices, outpatient clinics, biological/radiological areas, or instructional laboratories should be noted in the pre-incident plan.

**C.8.4 Emergency Operations.** Open floor pre-incident plans could be a maze of cubicles, so information should be recorded in the pre-incident plan to assist emergency responders in dealing with hazards in such areas during operations.

### **C.9 Industrial Occupancies.**

**C.9.1 Administration.** Requests for information and other material related to pre-incident planning should be referred to the local facility management team, where appropriate.

**C.9.2 Personnel.** Pre-incident planning in an industrial occupancy should involve not only responding personnel but administrators, section or department supervisors, the maintenance director or building engineer(s), and other staff members. Within industrial occupancies, an established management team will often have the overall responsibility of operating a specific facility, including its environmental and safety functions. Personnel with knowledge of, or direct control over, industrial hygiene operations, emergency response teams, and pre-incident plant engineering will be assigned to this team. Much of the preliminary data gathering process and assignment of safety duties might already be established.

**C.9.3 Pre-Incident Planning Process.** During the pre-incident planning process, pre-existing safety-related documentation, including documentation on the following, should be reviewed to enhance and expedite the development of the pre-incident plan itself:

- (1) Process hazard analysis
- (2) Confined space rescue pre-incident plans
- (3) Spill prevention control and countermeasure (SPCC) plans
- (4) Security vulnerability assessment (SVA)
- (5) National infrastructure protection plan (NIPP)
- (6) Integrated contingency plan (ICP)
- (7) Facility response plan (FRP)

### **C.9.4 Physical Elements and Site Considerations.**

**C.9.4.1 General.** Pre-incident plans should address each of the following situations individually and note their criticality and the impact their loss would have on the entire facility:

- (1) Industrial occupancies that occupy a large tract of land with numerous site-specific hazards
- (2) Separate, stand-alone buildings that either provide physical pre-incident plan support functions (e.g., steam generation) or supply materials in various stages of development to other buildings on-site as part of overall pre-incident plan processes (e.g., chemical reactor processes, raw material conveyor processes, and general assembly operations)

**C.9.4.2 Construction.** The pre-incident plan should note the following features:

- (1) Buildings with walls or panels designed to relieve pressure in the event that an explosion occurs
- (2) Reactors and other process vessels that incorporate relief mechanisms into their design

**C.9.4.3 Utilities.** The pre-incident plan should address the decision-making process for shutting off utilities, because their interruption can have catastrophic consequences.

**C.9.4.4 Access.** The pre-incident plan should note operating features, such as the following, that can hinder access to a facility:

- (1) Rack storage
- (2) Rolling stock
- (3) Railroad sidings
- (4) Trucking
- (5) Container storage
- (6) Automatic rack storage retrieval systems
- (7) Fences or caged-in areas (e.g., aerosols)
- (8) Furnaces (e.g., molten metal)
- (9) Plating operations (e.g., caustic or acidic solutions)

**C.9.5 Occupant Considerations.** The pre-incident plan should note the total number of people present at an industrial facility and indicate how that number varies, depending on time of day, time of year, and level of automation. Occupant load will vary with the operations conducted. Personnel might work in remote locations; for example, in outside buildings, overhead cranes, and boiler rooms.

**C.9.5.1** The extent to which nonemployees (e.g., contractors, delivery personnel) are used should be noted.

**C.9.5.2** If the facility has implemented an accountability system, the details of that system should be included in the pre-incident plan to assist emergency responders in carrying out their life safety priority actions.

**C.9.5.3** Building pre-incident plans should be used to assist in evaluating the location and appropriateness of areas of refuge that utilize fire walls and other rated separation. Depending on the magnitude of the incident and the hazard potential, many large industrial facilities will not have a need for total evacuation due to compartmentation.

**C.9.5.4** The pre-incident plan should be coordinated with the emergency action pre-incident plan (EAP) for the facility, because the EAP will detail the employee evacuation pre-incident plan and often designate the individuals responsible for various aspects of the plan, as well as detailing the capabilities of the facility. Smaller facilities might list their pre-incident plan of action to include total evacuation of the building. A local emergency contact can be listed, along with a designated meeting area, to account for personnel after an evacuation. Larger facilities might list in their action pre-incident plan an emergency response team that has responsibility for controlling an emergency incident until responding personnel arrive. Other sections of the pre-incident plan could note the availability of subject matter experts, authorized personnel, procedures for shutting down processes, and procedures to follow in the event of civil disturbances.

**C.9.5.5** The pre-incident plan should provide details of the time involved in shutting down a process, because some processes require manual shutdown procedures, and decisions have to be made by the emergency responders regarding the evacuation of the process operators.

Some processes can require an extended period of time for proper shutdown. When the shutdown procedures are performed manually, depending on the location of the emergency incident, such a shutdown could expose the process operators to potentially hazardous conditions from the surrounding area.

**C.9.5.6** If special arrangements for personnel evacuation are necessary due to the location or physical challenges of the personnel, the pre-incident plan should document those ar-





rangements, including considerations for alternative means of evacuation or rescue.

Personnel could be located in overhead cranes, on upper floors of a multiple-story building, or in critical control centers where standard means of evacuation might not be applicable.

**C.9.6 Protection Systems and Water Supplies.** Where a facility utilizes a wide variety of fire and special protection systems that can be very complex, the pre-incident plan should note the type, location, and coverage of each system. Special protection systems include explosion suppression systems, local application and total-flooding gaseous systems, fixed-foam systems, and dry chemical systems, as well as inerting and vapor-mitigating and recovery systems. Personnel should have a basic understanding of the system operational features, potential hazards involved, and availability of reserve agent supplies.

**C.9.7 Special Hazards.** Special hazards that should be noted in the pre-incident plan include those specified in C.7.6(1) through (10).

Containers that could hold materials that present special hazards include the following:

- (1) Rail cars
- (2) Tank trucks
- (3) Van trailers
- (4) Intermediate bulk containers
- (5) Hazardous materials and hazardous waste storage lockers
- (6) Construction trailers
- (7) Gas cages and gas lines
- (8) Flammable liquid dispensing containers
- (9) Emergency generator tanks
- (10) Treatment chemical tanks (e.g., acid- and base-neutralizing chemicals)

#### **C.9.7.1 Controlled Environments.**

**C.9.7.1.1** Cleanrooms, freezers, and other environmentally controlled areas should be noted in the pre-incident plan.

**C.9.7.1.2** Procedures for entering controlled environments during an incident should be reviewed with facility personnel and noted on the pre-incident plan.

**C.9.7.2 Commodity Combustibility and Hazards.** Commodity combustibility and hazards should be noted in the pre-incident plan, taking the following into account:

- (1) The commodity could have hazardous properties or be unstable under fire conditions.
- (2) Facilities could have some quantity of flammable liquids, most in the form of solvents and cleaning chemicals.
- (3) Dedicated storage of flammable liquids might be inside or outside.
- (4) Outside storage of flammable or toxic gases might be in separate buildings or bunkers.
- (5) Some materials can be reactive with air or water.
- (6) Air or water contamination can take place if a hazardous release occurs, regardless of whether water is used.

**C.9.7.3 Fueling Facilities.** The pre-incident plan should note the hazards posed by powered industrial vehicles using a variety of fuels.

**C.9.7.4 Treatment Pre-Incident plants.** The hazards posed by on-site treatment pre-incident plants that present their own hazards, including storage of chemicals such as chlorine,

other oxidizers, and corrosives, should be noted in the pre-incident plan.

**C.9.7.5 Process Hazards.** The pre-incident plan should identify any process hazards that could involve hazardous materials and operations.

**C.9.7.6 Radiological Hazards.** The pre-incident plan should identify all radiological hazards, both ionizing and contaminating.

**C.9.8 Emergency Operation.** Where an industrial facility maintains its own emergency response team with varying degrees of training and areas of expertise, discussions should take place with the on-site emergency response team coordinator to determine the level of response and resources available from the site team.

The level of involvement with on-site emergency response teams should include periodic drills that involve scenarios such as rescue, process shutdown, sheltering in place, and so forth.

Teams or resources, or both, for hazardous materials response, confined space rescue, high-angle rescue, and emergency medical services can be included. Note that different standards are used for fire response and hazardous materials response training. Consequently, a fire brigade is not necessarily a hazardous materials team, nor is a hazardous materials team a fire brigade. Where a facility has its employees respond to emergency releases of hazardous materials, government standards regulate emergency response pre-incident plans and the training requirements for a hazardous materials team.

#### **C.10 Warehouses and Storage Occupancies.**

**C.10.1 Administration.** For warehouse fire-fighting operations to be successful, the pre-incident plan should be developed with a full knowledge of the design and capabilities of the sprinkler systems within the warehouse.

**C.10.1.1** Pre-incident planning in a warehouse occupancy should involve not only emergency responders but also administrators, owners, the maintenance director or building engineer(s), and tenants.

**C.10.1.2** Warehouses pose one of the greatest challenges to fire control for both automatic fire suppression systems and manual fire fighting. Manual fire suppression cannot take the place of a properly designed, installed, and functioning sprinkler system in a warehouse. If the warehouse is not protected by automatic sprinklers designed for the commodities stored and the configuration in which they are arranged, there is little chance of controlling a fire. Likewise, it must be recognized that even the best designed sprinkler system might not extinguish a warehouse fire, and manual fire suppression can be required to effect final extinguishment.

**C.10.2 Pre-Incident planning Process.** Special considerations might be necessary for the pre-incident planning process, depending on the types and quantities of materials stored in warehouse and storage occupancies.

#### **C.10.3 Physical Elements and Site Considerations.**

**C.10.3.1 Construction Features.** The construction of the building, information on whether internal walls are fire rated and constructed as fire walls or fire barriers, and the rating of the wall assembly should be noted on the pre-incident plan.

**C.10.3.1.1** The protection of openings in fire walls and fire barriers should also be noted on the pre-incident plan.

**C.10.3.1.2** The adequacy of maintenance for fire doors should be evaluated to determine their probable performance in a fire.

**C.10.3.2 Building Access.** The following building access factors should be considered and noted in the pre-incident plan, where applicable:

- (1) Warehouses are generally built with limited access and increased security measures for inventory control.
- (2) In addition to building construction barriers, operating features can hinder access.

Stock stored in the aisles; internal control barriers, such as wire cages in bonded warehouses or aerosol storage; or trucks parked at the loading dock can contribute to building access problems. Storage racks hundreds of feet long, without cross aisles, can reduce access to the interior of the building and dictate the use of exterior doors located only at the rack ends for manual fire suppression operations.

**C.10.3.3 Controlled Environments.** The presence of large freezers and a controlled atmosphere should be noted, and the following also should be considered:

- (1) Special care might be required before entering these areas.
- (2) It might also be necessary to identify persons or procedures for shutting down.

**C.10.4 Occupant Considerations.** The impact of the following on life safety considerations, on-site emergency action pre-incident plans, and the safety of emergency responders should be considered and noted in the pre-incident plan, where applicable:

- (1) Storage configuration
- (2) Seasonal variations in stock
- (3) Material-handling devices

#### **C.10.5 Protection Systems and Water Supply.**

##### **C.10.5.1 Automatic Sprinklers.**

**C.10.5.1.1 Sprinkler System Design.** The presence of automatic sprinkler systems and the systems' designs should be noted, along with any special design features, such as in-rack systems, large-drop sprinklers, early suppression fast-response (ESFR) sprinklers, sprinkler control valves, and hydraulic placard information.

**C.10.5.1.2 Design Deficiency.** Sprinkler system design deficiencies can occur where the water supply is not adequate to support the system design, or where the system design is not appropriate for the commodity stored or its arrangement, and those deficiencies should be noted on the pre-incident plan.

##### **C.10.5.2 Water Supply.**

**C.10.5.2.1** A sprinkler system's water supply should be capable of meeting not only the sprinkler demand, but also the demand for hose streams.

**C.10.5.2.2** The water supply should be evaluated to determine if it is adequate for the sprinkler system design, storage, and configuration and the warehouse occupancy class.

##### **C.10.5.3 Products of Combustion or Contaminants and Heat Venting.**

**C.10.5.3.1** The pre-incident plan should note how venting of products of combustion or contaminants and hot gases can be

accomplished and the location of any manual or automatic controls.

**C.10.5.3.2** Control of products of combustion or contaminants is important in warehouse occupancies due to the large volume of combustible commodities stored within them.

Proper venting of products of combustion or contaminants and hot gases minimizes property damage and increases responding personnel effectiveness and safety.

**C.10.5.3.3** Automatic venting details should be noted in the pre-incident plan, because such venting could affect fire behavior.

**C.10.5.3.3.1** The power supply to fans and ventilation equipment should be investigated to determine if it is reliable enough to remain in service during a fire.

**C.10.5.3.3.2** The fan components should be able to withstand the heat of a fire if they are to be of value during a fire.

#### **C.10.6 Special Hazards.**

**C.10.6.1 Storage.** The commodity class should be recorded on the pre-incident plan and changed when a change in classifications occurs.

**C.10.6.2 High Hazard Items.** Storage of high hazard items, such as plastics, toxic materials, aerosols, or flammable or combustible liquids, can test the limits of protection, even in a fully sprinklered warehouse. New commodities can be introduced or moved within the warehouse. If the commodity changes, existing protection might be inadequate.

**C.10.6.3 Storage Configuration.** Storage configuration and the use of any floor-marking system should be recorded.

**C.10.6.3.1 Storage and Fire Fighting Operations.** Some commodities require extensive manual fire-fighting operations. All interior operations should be conducted with full knowledge that the stored commodity might not be stable and that fire fighters are at risk from collapsing commodity storage. Stock can be stored in bulk or palletized piles, in racks, or on shelves. Fire behavior of a given material can vary with such factors as storage height, shelving, presence or absence of vertical flue and aisle spaces, and pile stability.

**C.10.6.3.2 Storage Configuration Variations.** The pre-incident plan should note the possibility of storage configuration variations due to daily, weekly, monthly, or seasonal changes that, in turn, could lead to arriving or departing shipments being double stacked on the rack level, or stored temporarily in access aisles, despite efforts to prevent excessive storage heights or storage in aisles.

**C.10.6.4 Material-Handling Operations.** The number, availability, and operation of the material-handling equipment should be investigated.

Personnel using lift trucks powered by batteries or internal combustion engines remain the most common means of moving stock in warehouses. Some high-capacity warehouses use specialized equipment such as computerized stackers. In high-rack warehouses, storage height can reach over 30.5 m (100 ft). In such situations, the custom stackers provide the only practical means of gaining quick access to the racks for suppression, rescue, or overhaul. Personnel with special training will be required to operate the equipment. Full-scale fire tests in warehouse storage arrangements have shown that overhaul and final extinguishment of fires occurring in warehouses require personnel trained and equipped for manual fire sup-

pression operations. Such personnel could be members of the public fire department, the pre-incident plant fire brigade, or a combination of both. The scope of final extinguishing operations is usually vastly underestimated. In a warehouse, these operations are generally conducted while the sprinkler system is operating. Moving pallets of burning or smoldering materials out of the warehouse, where they can be broken open and overhauled, requires the use of lift trucks and other material-handling equipment. Equipment drivers will probably have to wear protective clothing and equipment, including self-contained breathing apparatus. Training personnel in these skills must be accomplished before the fire. Likewise, in high-rack storage facilities that use computerized stacking and retrieval systems, emergency response will require skilled equipment operators. Depending on the location of the control center, the operators might have to wear protective clothing and equipment, including self-contained breathing apparatus. Procedures for operating the fire protection equipment under such conditions can be practiced before an incident occurs.

**C.10.6.5 Fueling Facilities.** Fueling stations and fuel storage areas should be identified in the pre-incident plan.

**C.10.6.6 Hazards.** Electrical battery-charging stations pose a personnel hazard due to corrosive materials, as well as to the off-gassing of hydrogen during charging operations. LP-Gas cylinders for forklifts introduce a boiling liquid expanding vapor explosion (BLEVE) hazard. As with any LP-Gas cylinder, cylinders used for fueling stations, installed on powered indus-

trial trucks commonly known as forklifts, or kept in storage awaiting installation on powered industrial trucks present the potential for a sudden increase in fire intensity or for the occurrence of a BLEVE.

**C.10.6.7 Environmental Considerations.** The pre-incident plan should make note of commodities that contribute to air or water pollution during an emergency.

**C.10.6.8 Outside Storage.** Outside storage that reduces accessibility or creates a fire exposure hazard to the facility should be recorded on the pre-incident plan.

**C.10.6.8.1** Outside storage is often an integral part of warehouse operations and sometimes includes hazardous commodities, such as idle pallets and cylinders of flammable gases.

**C.10.6.8.2** Toxic and flammable liquids are often segregated from a main building and located in the open or in separate small structures that are usually unprotected.

## **Annex D Sample Pre-Incident Plan Field Collection Card and Facility Data Record**

*This annex is not a part of the requirements of this NFPA document but is included for informational purposes only.*

**D.1 Sample Forms.** Figure D.1(a) shows a blank pre-incident plan field collection card, and Figure D.1(b) shows a completed pre-incident plan facility data record.



(FD Logo)

## ANYTOWN FIRE DEPARTMENT PRE-INCIDENT PLAN FIELD COLLECTION CARD

Address: \_\_\_\_\_

AKA Name: \_\_\_\_\_

Primary entrance / Side: \_\_\_\_\_ Secondary entrance / Side: \_\_\_\_\_

Type of Occupancy: ☐ Assembly ☐ Business ☐ Education ☐ Factory ☐ High-Hazard  
☐ Institution ☐ Mercantile ☐ Residential ☐ Storage ☐ Multi-Occupancy

---

**FIREGROUND** (*Exposures: If a building give height, construction & type of occupancy — A = attached / S = separate + distance*)

Side-A (street) \_\_\_\_\_ Side-C (rear) \_\_\_\_\_

Side-B (left) \_\_\_\_\_ Side-D (right) \_\_\_\_\_

No. of stories: \_\_\_\_\_ Build. const. type: ☐ I ☐ II ☐ III ☐ IV ☐ V

Length: \_\_\_\_\_ × Width \_\_\_\_\_ = \_\_\_\_\_ GPM per division

---

**WATER SUPPLY — Urban/Suburban Area**

Fire hydrant locations: Primary: \_\_\_\_\_ Size of main: \_\_\_\_\_  
Secondary: \_\_\_\_\_ Size of main: \_\_\_\_\_  
Private: \_\_\_\_\_ Size of main: \_\_\_\_\_

**Rural Area**

Main drafting water supply: ☐ Lake ☐ Pond ☐ River ☐ Pool

Location: \_\_\_\_\_

Water shuttle travel time (*main water supply to portable water tanks*): \_\_\_\_\_

**Private Area Coverage**

Water tank capacity: \_\_\_\_\_

Hydrant locations: Primary: \_\_\_\_\_ Secondary: \_\_\_\_\_

---

**BUILDING FIRE PROTECTION SYSTEMS**

FDC connections: ☐ Sprinkler (SPKR.) ☐ Standpipe (STDP.) ☐ Combination Sprinkler/Standpipe (C) ☐ N/A

FDC location(s): ☐ Side-A ☐ Side-B ☐ Side-C ☐ Side-D ☐ N/A

Fire pump(s): Side \_\_\_\_\_ Division # \_\_\_\_\_ GPM \_\_\_\_\_ ☐ N/A

**Sprinkler System:** ☐ Wet ☐ Dry ☐ Deluge ☐ Pre-Action ☐ Limited Area (20 SPKR. Heads) ☐ N/A

☐ Full building ☐ Partial building If, partial location: Side \_\_\_\_\_ Division # \_\_\_\_\_

Side \_\_\_\_\_ Division # \_\_\_\_\_ Side \_\_\_\_\_ Division # \_\_\_\_\_ Side \_\_\_\_\_ Division # \_\_\_\_\_

OS&Y Valves: ☐ Side-A ☐ Side-B ☐ Side-C ☐ Side-D

**Standpipe (STDP) & Hose System:** ☐ Class I ☐ Class II ☐ Class III ☐ N/A

Standpipe Riser & Hose Connections: Stair \_\_\_\_\_ Stair \_\_\_\_\_ Stair \_\_\_\_\_ Corridor \_\_\_\_\_ Corridor \_\_\_\_\_ Rack \_\_\_\_\_

STDP Riser Isolation Valves: Stair \_\_\_\_\_ Division # \_\_\_\_\_ Stair \_\_\_\_\_ Division # \_\_\_\_\_ Other \_\_\_\_\_ Division # \_\_\_\_\_

OS&Y Valves: ☐ Side-A ☐ Side-B ☐ Side-C ☐ Side-D

**Chemical Extinguishing Systems:** ☐ Clean Agent ☐ CO<sub>2</sub> ☐ Dry Chemical ☐ Halon ☐ Wet Chem. ☐ N/A

Side \_\_\_\_\_ Division # \_\_\_\_\_ Side \_\_\_\_\_ Division # \_\_\_\_\_ Side \_\_\_\_\_ Division # \_\_\_\_\_

**Fire Alarm System Main Panel Location:** Division # \_\_\_\_\_ Side \_\_\_\_\_ ☐ N/A

Remote FAS sub-panel(s): Division # \_\_\_\_\_ Side \_\_\_\_\_ Division # \_\_\_\_\_ Side \_\_\_\_\_ ☐ N/A

**Fire Wall(s):** Division # \_\_\_\_\_ Side \_\_\_\_\_ Division # \_\_\_\_\_ Side \_\_\_\_\_ ☐ N/A

**Fire Partition(s):** Division # \_\_\_\_\_ Side \_\_\_\_\_ Division # \_\_\_\_\_ Side \_\_\_\_\_ ☐ N/A

© 2009 National Fire Protection Association NFPA 1620 (p. 1 of 3)

FIGURE D.1(a) Blank Pre-Incident Plan Field Collection Card.

