NFPA®

1620

Standard for Pre-Incident Planning

2020

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NFPA® 1620

Standard for

Pre-Incident Planning

2020 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 November 4, 2019, with an effective date of November 24, 2019, and supersedes all previous editions.

This edition of NFPA 1620 was approved as an American National Standard on November 24, 2019.

Origin and Development of NFPA 1620

In 1987, following a report of a large loss fire in 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 address the problem cooperatively. 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 featured 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 addressed the pre-incident planning 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 were provided.

In the 2014 edition, the committee provided greater clarity for an all-hazards and all emergency services approach to pre-incident planning. Some definitions were modified to align with other NFPA standards. New sections were added to address combustible dusts and vacant and abandoned structures. In the annex, case studies were updated and information was provided on building marking systems and the national grid system to show the importance of using technology with pre-incident planning.

At the time of the first draft meeting in San Antonio, Texas, in April 2013, two major events occurred. On April 15, 2013, in Boston two bombs exploded near the finish line of the Boston Marathon. On April 17, 2013, there was a large explosion at a fertilizer plant in West, Texas. The committee discussed these events and included information to the standard on mass gatherings and hazardous materials.

This edition was the final edition under the leadership of Chairman John Welling. The committee extended gratitude and appreciation to Chairman Welling for his many years of leadership and vision.

The 2020 edition of NFPA 1620 incorporates a number of technical changes and a substantial rewrite for clarity. In particular, the committee addressed the relationship between pre-fire plans for buildings under construction and pre-incident plans. Pre-fire plans for buildings under construction are typically developed by those in charge of the facility or site. Pre-incident plans are typically developed by emergency response departments once a building is occupied. A great deal of the safety information in the pre-fire plan, when developed in accordance with NFPA 241, *Standard for Safeguarding Construction, Alteration, and Demolition Operations,* can be beneficial to the emergency response departments and used in their pre-incident plans.

The specialized requirements for hazardous materials, buildings under construction, and mass gathering events were moved to a revised Chapter 8, Special Considerations. As a result, the standard now has a better flow, starts with requirements that apply to all pre-incident plans, and gathers the specialized requirements in a single chapter. Guidance relating to transportation has been added. References were added to applicable NFPA standards for supplemental specialized preplanning information.

Finally, the committee revised Chapter 9, Incident Operations, and Chapter 10, Pre-Incident Plan Maintenance. Conflicting and duplicative requirements were removed, and the role of an on-site emergency representative contrasted with a site liaison was clarified.

The committee also engaged in multiple efforts to have NFPA 1620 referenced in a number of other applicable NFPA standards.

The goals of this effort are to represent NFPA 1620 across the entire library of NFPA standards and to emphasize the benefits of pre-incident planning to users.

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

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

Committee Scope: This Committee shall have primary responsibility for documents on the site-specific pre-incident planning for response to fires and other types of emergencies.

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Standard for

Pre-Incident Planning

2020 Edition

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

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

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

Chapter 1 Administration

1.1* Scope. This standard 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.

1.2* Purpose. The purpose of this standard is to identify a process for the development of pre-incident plans that will assist personnel in effectively managing incidents and events for the protection of occupants, responding personnel, property, and the environment.

1.3 Application.

1.3.1 The AHJ determines the location(s) to be pre-incident planned, data to be collected, and extent of documentation and training appropriate for the jurisdiction.

1.3.2 The AHJ applies 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 AHJ sets a date or dates for achieving compliance with the requirements of this standard.

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

1.3.5* Policies and procedures are required to ensure the protection of proprietary or sensitive information.

N **1.4 Units and Formulas.**

N **1.4.1 SI Units.** Units of measurement in this standard are in accordance with the modernized metric system known as the International System of Units (SI).

N **1.4.2 Primary Values.** The inch-pound value for a measurement, and the SI value given in parentheses, shall each be acceptable for use as the primary value units for satisfying the 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 130, *Standard for Fixed Guideway Transit and Passenger Rail Systems,* 2020 edition.

NFPA 170, *Standard for Fire Safety and Emergency Symbols,* 2018 edition.

NFPA 241, *Standard for Safeguarding Construction, Alteration, and Demolition Operations,* 2019 edition.

NFPA 303, *Fire Protection Standard for Marinas and Boatyards,* 2016 edition.

NFPA 424, *Guide for Airport/Community Emergency Planning,* 2018 edition.

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

NFPA 502, *Standard for Road Tunnels, Bridges, and Other Limited Access Highways,* 2020 edition.

2.3 Other Publications.

2.3.1 U.S. Government Publications. U.S. Government Publishing Office, 732 North Capitol Street, NW, Washington, DC 20401-0001.

Title 29, Code of Federal Regulations, 1910.146, "Permit-Required Confined Spaces."

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®, Life Safety Code®,* 2018 edition.

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

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

NFPA 1500™, *Standard on Fire Department Occupational Safety, Health, and Wellness Program,* 2018 edition.

Chapter 3 Definitions

3.1 General. The definitions contained in this chapter shall apply to the terms used in this standard. Where terms are not defined in this chapter or within another chapter, they shall be defined using their ordinarily accepted meanings within the context in which they are used. *Merriam-Webster's Collegiate Dictionary,* 11th edition, shall be the source for the ordinarily accepted meaning.

3.2 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. An NFPA Standard, the main text of which contains only mandatory provisions using the word "shall" to indicate requirements and that is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions are not to be considered a part of the requirements of a standard and shall be located in an appendix, annex, footnote, informational note, or other means as permitted in the NFPA Manuals of Style. When used in a generic sense, such as in the phrase "standards development process" or "standards development activities," the term "standards" includes all NFPA Standards, including Codes, Standards, Recommended Practices, and Guides.

3.3 General Definitions.

3.3.1 Abandoned Building. A building that is unoccupied/unused with no intention of re-occupying and reusing.

3.3.2 Access/Convenience 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.

3.3.3 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.

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

3.3.5 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,*** 2018]

3.3.6* 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.

3.3.7 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,*** 2018]

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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 3.7 m (12 ft) in storage height.

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

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

3.3.11 Combustible Dust. A finely divided combustible particulate solid that presents a flash fire hazard or explosion hazard when suspended in air or the process-specific oxidizing medium over a range of concentrations.

3.3.12 Combustible Particulate Solid. Any solid material composed of distinct particles or pieces, regardless of size, shape, or chemical composition, that presents a fire hazard.

3.3.13 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,** 2017]

Δ **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 or 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. [**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* 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 similar uses, wherein two or more tenants have a main entrance into the covered mall.

3.3.17 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.

3.3.18* 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.

3.3.19* 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.

3.3.20* 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.

3.3.21 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*,** 2018]

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

N **3.3.23 Emergency Power Supply (EPS).** An electric power source of the capacity and quality required for an EPS system.

3.3.24 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.

3.3.25* 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.

Δ **3.3.26 Event.** A planned nonemergency activity (e.g., sporting event, concert, parade, mass gathering).

3.3.27 Facility. Permanent, semi-permanent, or temporary commercial or industrial property such as a building, plant, or structure, built, established, or installed for the performance of one or more specific activities or functions including all processes performed therein.

3.3.28* 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.

3.3.29 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.

3.3.30* 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.

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

3.3.32 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.

3.3.33* 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.

3.3.34* 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.

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

3.3.36 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,** 2018]

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

3.3.38 Key Box. See 3.3.40, Lock Box.

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

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

3.3.41 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.

N **3.3.42* Mass Gatherings.** An event expected to be attended by a sufficient number of people to strain the planning and response resources of the hosting community, state, province, nation, or region where it is being held.

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

N **3.3.44 On-Site Emergency Representative.** The person responsible for coordinating and implementing the site emergency action plan during an incident.

3.3.45 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]

3.3.46 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, participants, responding personnel, property, and the environment.

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

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

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

3.3.50* 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.

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

Δ **3.3.52 Safety Data Sheet (SDS).** Formatted information provided by chemical manufacturers and distributors of hazardous products that contains information about chemical composition, physical and chemical properties, health and safety hazards, emergency response, and waste disposal of the material. [**472,** 2018]

3.3.53 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.

3.3.54 Scissor Stair. Two interlocking stairways providing two separate paths of egress located within one stairwell enclosure.

3.3.55* 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.

N **3.3.56 Site Liaison.** An individual who has in-depth operating knowledge of the site or facility.

3.3.57 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.

3.3.58* 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.

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

3.3.60 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.

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

3.3.62 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.

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

3.3.64 U.S. National Grid (USNG). An alphanumeric point reference system that has been overlaid on the Universal Transverse Mercator (UTM) numerical grid. Every modest-size home in a discrete area (city) can be described using 8 digits (e.g., 1234 5678). By adding a two-letter prefix (e.g., XX 1234 5678), the location is uniquely identified regionally (statewide). The U.S. National Grid is functionally identical to the Military Grid Reference System (MGRS) used by the U.S. military and NATO since 1949.

3.3.65 Vacant Building. A building that is currently unoccupied/unused and for which there is intention to reoccupy and reuse in the future.

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 AHJ.

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 When multiple responding agencies are involved, roles and responsibilities shall be identified in the pre-incident plan.

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 AHJ for the pre-incident plan.

4.3.1.1* The data shall be collected by consulting with knowledgeable personnel involved with one of the following:

(1) Site maintenance or operations
(2) Facility development

Δ **4.3.1.2*** The data collected 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 AHJ shall determine a format that presents the pre-incident plan details in the most concise manner for the user(s).

4.4.1 The pre-incident plan shall be created from the data collection document(s).

Δ **4.4.2*** A standardized pre-incident plan document shall be utilized throughout the AHJ's response area.

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4.4.3 The AHJ shall consider if it is necessary to modify operational procedures to reflect unique site conditions found during preplanning data collection and include those procedures in the pre-incident plan.

Δ **4.4.4** Electronic versions of the pre-incident plan document shall be permitted if the following three conditions are met:

(1) The electronic connection is considered reliable by the AHJ.
(2) The electronic connection is secured against unauthorized users.
(3) The electronic version is protected from unauthorized changes.

4.5* Pre-Incident Plan Sketches. The symbols provided in NFPA 170 shall be utilized on pre-incident plan sketches for consistency among pre-incident plan users.

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

4.7* 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.

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

4.9 Post-Incident.

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

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

Chapter 5 Physical and Site Considerations

Δ **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 (*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 on the following items shall be recorded:

(1)* Wall construction and insulation
(2)* Roof construction
(3)* Floor construction
(4)* Other pertinent building features
(5) Floor plan with room identifier and occupancy and use of each room
(6)* Location, types, and construction of access features
(7)* Areas where fire, products of combustion, or other contaminants could spread due to a lack of structural barriers
(8)* Atriums
(9)* Structural integrity of walls, roofs, and floors
(10)* Storage arrangements
(11) Fire command center location, access, and fire rating of the area fire walls

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

5.3.1* Emergency Contact Information. 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.

Δ **5.3.2* Electrical Components, Power Supplies, and Energy Sources.**

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

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

5.3.2.3* Alternative Energy Sources. The location of alternative energy sources shall be recorded in the pre-incident plan.

Δ **5.3.2.4 Emergency Power Supply.**

N **5.3.2.4.1*** The following features of the emergency power supply (EPS) shall be identified and recorded in the pre-incident plan:

(1) Location
(2) Fuel supplies
(3) Areas served
(4) Equipment served
(5) Duration
(6) Isolation

N **5.3.2.4.2** An EPS requiring manual action shall be recorded in the pre-incident plan.

N **5.3.2.4.3** The location of the EPS' disconnecting means shall be recorded in the pre-incident plan.

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

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

5.3.2.7* Steam. The location of steam lines and boilers and associated equipment, as well as 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 fuel pumps, tanks, regulating equipment, and shutoff valves shall be recorded in the pre-incident plan.

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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.

5.4.1.1 The location of key/lock box for rapid access shall be recorded on the pre-incident plan.

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.

Δ **5.5* Internal and External Security.**

N **5.5.1 Security Measures.**

N **5.5.1.1*** Internal and external security measures shall be recorded in the pre-incident plan.

N **5.5.1.2** The pre-incident plan shall include the location of and access to keys, fobs, and RFID cards to enter secure areas.

N **5.5.1.3** The pre-incident plan shall document the performance of access control systems if primary power is lost.

Δ **5.5.2* Security Animals.** The use of security animals shall be noted in the pre-incident plan.

5.5.3 Security Systems.

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

5.5.3.2* Data regarding an on-site security service 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 General Overall Condition.

5.7.1 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.

5.7.2* Environmental Impact. Information shall be collected on potential environmental contaminants. (*See Sections 8.2.4 through 8.2.10.1.*)

5.8* Communications.

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

5.8.2* Data regarding the functionality of radio communications shall be recorded in the pre-incident plan.

5.9 Geospatial Position.

5.9.1 Standard Coordinates. Geospatial Positioning System [e.g., U.S. National Grid (USNG)] coordinates shall be utilized to record and specify locations of the facilities, structures, assets, utility components, water supplies, and so forth.

Δ Chapter 6 Occupancy Considerations

6.1 Occupancy. The pre-incident plan shall document the occupancy type and use. (*See Annex C.*)

6.2 Life Safety Considerations.

6.2.1 General.

6.2.1.1 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 self-evacuation limits
(5)* Strategies for protecting facility occupants, other than evacuation

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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 AHJ.

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.

Δ **7.2.4 Static Water Supply Sources.**

N **7.2.4.1** Static water sources, such as ponds, lakes, rivers, tanks, and cisterns, shall be recorded in the pre-incident plan.

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

7.2.4.3 The method of drafting from the water source 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.

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7.2.6* 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. 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. 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. Fire pump(s), 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). Fire department connection(s) (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. Non-water-based fire protection system(s) 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. Fire alarm systems 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. A smoke management system(s) 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. Smoke and heat vents shall be recorded in the pre-incident plan, including location and type of activation (manual or automatic).

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Chapter 8 Special Considerations

N **8.1 General.** The pre-incident plan shall identify and document special considerations in accordance with this chapter.

Δ **8.2* Hazardous Materials.**

N **8.2.1 General.** The pre-incident plan shall identify and document hazardous materials recognized by the AHJ that present life safety challenges, operations challenges, or other challenges to emergency responders.

8.2.1.1 Pre-incident plans for hazardous materials shall include the specifications of Sections 8.2.4 through 8.2.10.1.

8.2.2* Transient Conditions. Where hazardous materials exist intermittently, the AHJ 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.

8.2.3* 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.

8.2.4 Explosives. The use or storage of explosive materials in an occupancy shall require preplanning as determined by the AHJ.

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

8.2.4.2* Materials that have the potential to explode upon exposure to fire, heat, and pressure shall be documented on the pre-incident plan.

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

Δ **8.2.5* Flammable and Combustible Liquids.** Where the AHJ 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 agents, such as indicated product-specific requirements

8.2.6 Toxic or Biological Agents.

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

8.2.6.2 The impact of toxic or biological agents on neighboring or downwind occupancies shall be evaluated.

8.2.7* Radioactive Materials.

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

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

8.2.8* Reactive Chemicals and Materials.

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

8.2.8.2 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.

Δ **8.2.9* Combustible Dusts.** Operations that generate, collect, or store combustible dusts shall be recorded in the pre-incident plan.

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8.2.10* 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.

8.2.10.1 The pre-incident plan shall identify special agents or procedures for emergency response to hazardous material (e.g., metal dusts and water reactive metals).

N **8.3 Vacant and Abandoned Structures.**

N **8.3.1* General.** The pre-incident plan shall identify and document any vacant and abandoned structures recognized by the AHJ that present life safety challenges, operations challenges, or other challenges to emergency responders.

N **8.3.2 Temporary Conditions.** Where vacant and abandoned structures exist temporarily, the AHJ 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.

N **8.3.3 Physical and Site Considerations.** In addition to the building characteristics identified in Chapter 5, the following details shall be considered as part of the pre-incident plan for vacant and abandoned structures:

(1) Last known type of occupancy
(2) Open shafts
(3) Pits and holes due to removal of equipment
(4) Structural degradation due to weather and vandalism
(5) Exposed structural members
(6) Penetrations in barriers such as walls, floors, and ceilings that allow abnormal fire travel
(7) Combustible contents
(8) Maze-like configuration
(9) Blocked, damaged, or missing stairs

N **8.3.4 Potential Hazards.** The following potential hazards shall be considered as part of the pre-incident plan for vacant and abandoned structures:

(1) Unstable structure
(2) Fall and trip hazards
(3) Standing water in basement
(4) Vermin
(5) Unexpected occupancy
(6) Ongoing criminal activity
(7) Rapid fire growth potential
(8) Status of utilities (e.g., active, inactive, unknown)
(9) Holes and penetrations in floors, walls, and roofs
(10) Fire escape access
(11) Maze-like configuration
(12) Previous fires in building
(13) Unsecured structure

N **8.3.5* Structure Markings.** The presence of structural markings shall be noted in the pre-incident plan.

N **8.4 Buildings Under Construction.**

N **8.4.1 General.** A pre-incident plan shall be developed for buildings under construction as determined by the AHJ.

N **8.4.2 Temporary Conditions.**

N **8.4.2.1*** Where construction features exist temporarily, the AHJ shall determine the need to identify and record relevant information for the following:

(1) Each hazard present
(2) Length of time the hazard is expected to be present

N **8.4.2.2** The AHJ shall make a determination as to the frequency of visits and the pre-incident plan updating required for buildings under construction.

N **8.4.3* Pre-Fire Plans.** The pre-incident plan shall include and reference the fire safety measures found in the pre-fire plan when developed in accordance with NFPA 241.

N **8.4.4 Building Completion.** Once the building is completed and occupied, the pre-incident plan shall be updated.

N **8.5 Mass Gatherings.**

N **8.5.1 General.** A pre-incident plan shall be developed for mass gatherings recognized by the AHJ that present life safety challenges, operations challenges, or other challenges to emergency responders.

N **8.5.1.1** The AHJ shall identify the need for, and level of detail for, addressing mass gatherings in the pre-incident plan.

N **8.5.2 Incident Management System.** The pre-incident plan shall address the implementation of an incident management system (IMS) for the duration of the event.

N **8.5.3 Physical and Site Considerations.** Where the AHJ has determined that a pre-incident plan is required for mass gatherings, the following items shall be included in the pre-incident plan and coordinated with other applicable agencies:

(1) Unified command post
(2) Access and ingress/egress for the following:
  (a) Attendees
  (b) First responders
(3) Evacuation
(4) Weather
(5) Emergency medical services (e.g., routine and mass casualties)
(6) Security
(7) Traffic
(8) Crowd management
(9) Fire protection
(10) Food operations
(11) Pyrotechnics
(12) Aeronautical operations
(13) Communications
(14) Fuels (e.g., cooking equipment, internal combustion engines, hot air balloons)
(15) Safety data sheets (SDS) as determined by the AHJ
(16) Contingency plans
(17) Special operations (e.g. technical rescue, hazardous material)
(18) Temporary structures
(19) Other items as identified by the AHJ or mass gathering organizer that are necessary for an effective pre-incident plan

N **8.6 Transportation.**

N **8.6.1* Highways and Interchanges.** Pre-incident plans for highways, interchanges, road tunnels, and bridges shall be developed in accordance with NFPA 502.

N **8.6.2 Rail Lines, Locomotives, and Trains.** Pre-incident plans for rail lines, locomotives and trains shall be developed in accordance with Chapter 9 of NFPA 130.

N **8.6.3 Airports.** Pre-incident plans for airports shall be developed in accordance with NFPA 424.

N **8.6.4 Ports.** Pre-incident plans for ports shall be developed in accordance with NFPA 303.

N **8.6.5* Bakken Crude Oil Response and Emergencies.** Pre-incident plans for Bakken crude oil response and emergencies shall assess the potential impact on towns, communities, and facilities where products are moved or handled.

N **8.6.6 Flammable and Combustible Liquid Spills and Fires.** Pre-incident plans for flammable and combustible liquid spills and fires shall be developed in accordance with NFPA 472.

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Δ Chapter 9 Incident Operations

N **9.1* General.** The pre-incident plan shall address the response to an incident at the facility or site and additional resources as required.

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

9.3 Operation Resources.

9.3.1* The pre-incident plan shall indicate the facility's emergency response capabilities and incident management system.

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N **9.3.2*** The pre-incident plan developer shall consider the capabilities of initial public emergency response resources in managing emergencies for the protection of the occupants, responding personnel, property, and environment.

9.3.3 Where technical expertise from an outside agency, a building occupant, or a facility management representative is vital to successfully conduct emergency operations, the agency, occupant, or representative shall be considered an on-site emergency representative to the incident commander.

Δ **9.3.4** The on-site emergency representative shall be identified by name or job title in the pre-incident plan.

N **9.3.5** The contact information of the on-site emergency representative shall be included in the pre-incident plan.

9.3.6* Response to incidents that require additional agencies or organizations for other purposes shall be identified and included in the pre-incident plan.

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Δ Chapter 10 Pre-Incident Plan Maintenance

10.1 General. Pre-incident plans shall be reviewed and updated at a frequency determined by the AHJ.

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10.2 Pre-Incident Plan Update.

Δ **10.2.1*** Pre-incident plans shall be updated or revised whenever significant changes occur.

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

Δ **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.

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N **10.3 Site Liaison.**

N **10.3.1** The site liaison shall be responsible for providing site-specific information to the pre-incident plan developer.

Δ **10.3.2** The site liaison shall be identified in the pre-incident plan by name or job title, contact information, and who they represent.

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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.

N **A.1.1** Terms that might be used interchangeably with the term pre-incident planning as referenced and defined by this standard can include, but are not limited to, the following terms:

(1) Pre-incident
(2) Pre-plan/preplan
(3) Pre-fire/prefire
(4) Pre-fire/prefire plan
(5) Pre-fire/prefire planning
(6) Pre-emergency
(7) Preplanning
(8) Preplanned
(9) Prefire plan
(10) Fire plan
(11) Fire control plan
(12) Emergency action plan
(13) Emergency procedure plan
(14) Emergency planning
(15) Fire emergency plan

A.1.2 Pre-incident planning involves evaluating the protection systems, building construction, contents, and operating procedures that can impact incidents and events 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 AHJ or both.

A.1.3.3 The specific determination of the AHJ 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 AHJ. 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 AHJ. 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.

Δ **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 based on a balanced evaluation of economic factors, as well as public safety and personnel safety factors. The compliance schedule seeks to ensure that risk is objectively assessed and reasonable priorities are set in reaching compliance. Interim compensatory measures might be necessary 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.1.3.5 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.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.3.3.6 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.3.3.16 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.3.3.18 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.3.3.19 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.3.3.20 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.3.3.25 Evacuation Capability. NFPA *101* should be referred to for further explanation and methods of determining the evacuation capabilities of an occupancy.

A.3.3.28 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.3.3.30 Fire Barrier. A fire barrier might be vertically or horizontally aligned, such as a wall or floor assembly.

A.3.3.33 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.3.3.34 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.3.3.37 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 AHJ 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.3.3.40 Lock Box. Keys to open these containers are assigned only to selected individuals, such as representatives of the local fire department or police department.

N **A.3.3.42 Mass Gatherings.** Mass gatherings can include planned long-term or one-time events. They can occur at a fixed facility designed to have mass gatherings (e.g., a stadium) or at a location not designed for mass gatherings (e.g., a rally, a town fair, a dignitary visit).

A.3.3.43 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.3.3.48 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.3.3.50 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.3.3.51 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.3.3.55 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 localities, 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.3.3.58 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.3.3.63 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 standard 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 necessary forms and tools, so that all necessary occupancy information is recorded, items of concern are noted, and accurate sketches or diagrams are prepared.

Requisite Knowledge: Familiarity with 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 and organizations, 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.

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. Design professionals should submit construction documents to identify data for inclusion in the pre-incident plan.

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 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.

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).

Δ **A.4.4.2** The pre-incident plan document should be consistent and concise. Three manageable levels of building intelligence should be considered for a pre-incident plan.

Level 1 Basic. Level 1 information is the initial information necessary for the first responding elements to initiate operations, and includes the following items:

(1) Address
(2) Location name
(3) Lock box location
(4) Construction type
(5) Dimensions (length, width, and height)
(6) Number of stories (including belowgrade levels)
(7) Primary and secondary entrances
(8) Exposures to the building
(9) Stairs (roof and belowgrade)
(10) Alternative power
(11) Fire protection systems, as follows:
    (a) Sprinkler/standpipe
    (b) FDC location
    (c) Fire alarm control panel (FACP)
(12) Special hazards
(13) A section for notes

Level 2 Intermediate. Level 2 information is detailed information intended for circumstances where a strategy to respond to an emergency within a unique facility is necessary. In addition to Level 1 components, it includes the following items:

(1) Fire flow
(2) Staging areas
(3) Compartmentation
(4) Critical shutoffs
(5) Emergency contacts
(6) HVAC
(7) Electrical
(8) Elevators (service and passenger)
(9) Fire command center
(10) Emergency communications
(11) Smoke management system
(12) Unique security
(13) Fire protection systems
(14) Generator sets (fuel supplies)
(15) Fire pumps
(16) Hazardous materials
(17) Sketches
(18) Date the information was obtained
(19) Date of plan

Level 3 Comprehensive. Level 3 information 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). In addition to Level 1 and Level 2 components, it includes the following items:

(1) Standpipe/sprinkler risers
(2) Plumbing risers
(3) Detailed tenant information
(4) Technical rescue
(5) Facility emergency plan
(6) Sky lobbies
(7) Hardened elevators
(8) Utility risers
(9) Chases
(10) Special hazards
(11) Areas of refuge
(12) Roof fixture/access
(13) Landing zones
(14) A/E floor plans
(15) Shafts
(16) Unique communication needs
(17) Interstitial spaces
(18) Additional applicable information from Chapter 5

A.4.5 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.4.7 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.4.8 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.

Δ **A.5.2.2.2(1)** Data regarding wall construction and insulation could include the following:

(1) Hourly fire rating of exterior and interior walls
(2) Metal panel walls
(3) Masonry walls
(4) Glass walls
(5) Wood frame walls
(6) Plastic wall components
(7) Combustible insulation

See NFPA 220 for additional information regarding building construction.

Δ **A.5.2.2.2(2)** Data regarding roof construction could include the following:

(1) Roof support components (e.g., joists, trusses, beams, 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 buildup thickness can affect fire-fighting tactics
(4) Roof shape or configuration (e.g., peaked, flat, dome, sawtooth)
(5) Availability of means for runoff drainage (e.g., trenches, drains, scuppers, slopes)

Δ **A.5.2.2.2(3)** Data regarding floor construction could include the following:

(1) Floor support components (e.g., joists, trusses, beams, girders), including the 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.5.2.2.2(4) Data regarding other pertinent 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.5.2.2.2(6) Data regarding the location, types, 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.5.2.2.2(7) The construction and fire rating of any fire or 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

Δ **A.5.2.2.2(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
(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.5.2.2.2(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.5.2.2.2(10) Storage arrangements could 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 (aboveground or underground) for electric power, multiple feeds, locations 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 cause the shutdown of agitators or other safety equipment that could result in an 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 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 Alternative energy sources should be documented in the pre-incident plan in order to identify potentially hazardous exposure to energized electrical sources. All sources of alternative electrical energy should be identified. The location of control circuitry, disconnection methods, lock out procedures, and isolation methods should be documented. Any special tools, information, responder training, and on-site contacts able to assist with rendering these systems safe should be contained in the planning documents. The location and method of storing the electrical energy produced should be documented. The location of the inverter system for converting the dc current to ac current should be identified. System voltages (dc and ac) should be documented.

N **A.5.3.2.4.1** Examples of emergency power supply (EPS) that should be recorded include, but are not limited to, generators, batteries, uninterruptible power supply systems, stored energy, and other sources.

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 (e.g., 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, but are not limited to, 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

N **A.5.5.1.1** Data relating to surveillance systems can include, but are not limited to, the following:

(1) Site plan showing exterior camera locations and angles of view
(2) Floor plan showing interior camera locations and angles of view
(3) Locations where surveillance camera images can be viewed
(4) Remote and wireless access to surveillance systems including URL/IP address and login credentials

A.5.5.2 Contact information should be obtained for the person(s) responsible for the security animals.

A.5.5.3.1 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.5.5.3.2 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.5.6 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.5.7.2 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.5.8 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

N **A.5.8.1** Data can include, but is not limited to, the following:

(1) Access points, coverage, capabilities, and limitations of systems and equipment for alerts, notifications, warnings, and communications
(2) Procedures and credentials for access and use of mass notification systems and smartphone messaging apps, including SMS communications

A.5.8.2 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.6.2.1.1(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.6.2.1.1(2) Information should be collected regarding the normal and maximum occupant loads, any anticipated variations, or potential crowding.

A.6.2.1.1(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.6.2.1.1(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.6.2.1.1(5) All areas utilizing the defend-in-place, 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 safety data sheet (SDS) 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 AHJ 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.

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

(1) Volume of water required for fire protection, including, but not limited to, the following:
   (a) Automatic sprinkler system demand *(see NFPA 13)*
   (b) Standpipe system requirements *(see NFPA 14)*
   (c) Outside hose line requirements for manual fire suppression efforts *(see NFPA 1, NFPA 13, and NFPA 1142)* and local fire department requirements
   (d) Other aqueous-based extinguishing system demands *(see NFPA 11and 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, but are not limited to, 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, but are not limited to, the following:

(1) Local fire department requirements
(2) Requirements in applicable fire protection standards, including, but not limited to, 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) residual (unless the water supply source is developed from a draft, then flow rate is the rate developed at the draft)

Care should be exercised in interpreting the test results, since 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 types of 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.7.2.4.2 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.7.2.5 The quantity of water stored in a tank might also 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 Various methods of obtaining water from a water storage tank include, but are not limited to, a fire hydrant, a fire hose valve, or a direct valved connection to the tank.

A.7.2.6 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, because 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_2), and clean agent.

Δ **A.8.2** 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

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

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 AHJ.

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) Notice FRL-5512-8, *The National Response Team's Integrated Contingency Pre-Incident Plan Guidance*
(6) NFPA 150
(7) *NFPA 70*
(8) Department of Homeland Security, *Chemical Facility Anti-Terrorism Standard*, Appendix A, Release Chemicals

Δ **A.8.2.2** Among the situations that could produce transient hazardous conditions are the following:

(1) Periodic maintenance or shutdowns
(2) Renovations and alterations
(3) Special manufacturing production runs
(4) Crop-handling or storage
(5) Material-handling facilities (e.g., loading docks, package sorting/transfer facilities)

A.8.2.3 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 AHJ 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.8.2.4.2 Ammonium nitrate has the potential to explode upon exposure to fire, heat, and pressure.

A.8.2.5 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.

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.

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 (gpm/ft^2 × area of design) as well as hose lines.

A.8.2.5(1) Materials can flow directly to an environmental receptor or to a spill containment holding area.

A.8.2.5(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.8.2.7 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, irradia-

tors, or other areas or devices that could result in exposure to responders.

A.8.2.8 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 by-products 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.

Δ **A.8.2.9** Combustible dust can accumulate on any upward-facing surface. Fine dusts can even cling to vertical surfaces. A large amount of combustible dust often accumulates overhead on structural components or other surfaces where it is hard to notice or clean. Historically, these dust accumulations are associated with cascading secondary explosions that lead to major or total facility loss. The following standards provide guidance on combustible dusts:

(1) NFPA 654
(2) NFPA 655
(3) NFPA 664
(4) NFPA 61
(5) NFPA 484

The following fire-fighting operations can inadvertently increase the chance of a combustible dust explosion:

(1) Tactics that cause dust clouds to form or reach the explosive range
(2) Tactics that introduce air, creating an explosive atmosphere
(3) Application of incorrect or incompatible extinguishing agents
(4) Use of equipment or tools that can become an ignition source

OSHA 3644-04, "Firefighting Precautions at Facilities with Combustible Dust," can be referenced for additional guidance and operational considerations.

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A.8.2.10 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 fire-fighting
(6) Magnetic resonance imaging (MRI) quench gases

A.8.3.1 Vacant and abandoned buildings pose significant risk to responding emergency service delivery providers. These buildings have caused countless deaths and injuries to fire fighters who have responded to these locations for fires, gas leaks, or other emergencies. These facilities have many hidden dangers that must be recognized and preplanned by responders prior to emergencies. These structures are subject to deterioration, primarily from lack of maintenance, and illegal entrance. Pre-incident planning should be performed on these properties to reduce risk to emergency responders. *(See Section B.6.)*

A.8.3.5 Useful information on marking can be found in the FEMA Urban Search and Rescue (US&R) Response System and the fire fighter safety building marking system (*see Annex E in NFPA 1*).

N **A.8.4.2.1** Prior to the installation of the sprinkler or standpipe system, there is a greater risk of fire spread and a greater danger to occupants. When a temporary sprinkler or standpipe system is installed and made operational this hazard is reduced. Hence, the AHJ may wish to identify the period of time the building is without a sprinkler or standpipe system in their pre-incident plan.

N **A.8.4.3** A great deal of information found in the pre-fire plan when developed in accordance with NFPA 241 can provide useful information for the pre-incident plan.

N **A.8.6.1** See Annex F of NFPA 502 for a typical emergency response plan that can be used as the basis of a pre-incident plan.

N **A.8.6.5** The Pipeline and Hazardous Materials Safety Administration (PHMSA) Safety Alert by the International Association of Fire Chiefs (IAFC) provides guidance on elements that should be contained in a pre-incident plan.

Δ **A.9.1** 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, but not limited to, the following:

(1) NFPA 472
(2) NFPA 473
(3) NFPA 600
(4) *NFPA 1600*
(5) NFPA 1710
(6) NFPA 1720
(7) Notice FRL-5512-8, *The National Response Team's Integrated Contingency Pre-Incident Plan*

The pre-incident plan should identify the emergency response resources' availability and access. Documented agreements should be in place to ensure all organizations involved are committed to providing requested support.

Various national, state, and local laws define the roles, responsibilities, and authority of government agencies during specific emergency conditions. Some of these laws might also extend jurisdiction or responsibility to property owners or semi-government agencies. In order to provide for effective emergency operations, it is critical that a single incident action plan be developed and implemented. This action plan should be managed with an incident management system and, whether a unified or single command is utilized, the lines of authority and command should be clearly defined. In the event that competing action plans occur during an emergency, the action plan for the legally authorized agency should supersede all other action plans.

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 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.

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N **A.9.3.2** The pre-incident plan should not be developed without some basic understanding of the public emergency response resources that would probably be involved in mitigating an on-site incident. The capabilities of those responders can have a significant impact on the pre-incident plan assumptions and content. A pre-incident plan developed for a hazardous materials facility where a fully staffed Type I hazmat team is available within 10 minutes of an incident will probably look significantly different than a pre-incident plan for the same type of facility in a rural area where the closest hazmat team is four hours away from the facility.

N **A.9.3.6** Various other agencies or organizations might have legal authority at different intervals during an incident. It is important that these agencies and organization be notified of the incident, that their roles and responsibilities are clearly defined and understood, and that, as required by law, the agencies are given access or control of the incident.

An example would be where an incident occurs and an EMS response is dispatched to a person with burn injuries. Upon arrival, EMS finds the patient has self-evacuated from a fire and calls for the fire department. The fire department arrives, takes command of the incident, and extinguishes the fire. The fire department then requests a law enforcement agency to investigate the cause of the fire. The law enforcement agency determines the fire was caused by arson and takes control of the incident. Once the law enforcement agency completes its investigation, the building department is notified to determine how much structural damage has occurred and if the building is habitable. In this example, four different government agencies had legal authority at different phases of the emergency. To protect members of the public and investigate the fire, each agency collaborated within its authority and the transition between agencies was critical to the protection of public safety.

Δ **A.10.2.1** Significant changes can include impairments to fire protection systems and devices, including, but not limited to, fire hydrants, fire sprinkler systems, fire alarm systems, and smoke management systems when they are taken out of service for repairs or maintenance. While some repairs or maintenance might be completed in a short period of time, others might involve several days or weeks, depending on the scope of the maintenance or repairs and availability of parts.

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Annex B Case Histories

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

Δ **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 to the Siamese connection for 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.

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N **B.2 Warehouse Fire, West Virginia, 2017.** The warehouse — an approximately 39,019 m^2 (420,000 ft^2) building comprising many smaller warehouses, both new and old, renovated to form a single building — was responsible for storing various materials used in the manufacturing of plastics. There were many areas where two smaller buildings had been combined simply by closing up the space separating the two. Shortly after midnight on October 21, a fire broke out in an unknown location of a warehouse. The thick, black smoke covering the area began to impact the local communities almost immediately and could be smelled more than 160 km (100 mi) away. Local residents were instructed to shut down their HVAC systems, close all windows and doors, and shelter-in-place for fear of potential health risks associated with the smoke and falling particles. This resulted in the closing of schools and the cancelation of community events, and even sparked a local valet service to hand out free filtration masks to the public. The amount of calls from concerned citizens reporting a smell of smoke forced 911 dispatchers to require callers to report actually seeing flames before they would dispatch fire units.

Fire fighters were met with problems early on, such as access restrictions from outside storage, an insufficient water supply to control the large volume of fire, and a lack of knowledge of what the warehouse contained. There were also questions as to

whether the building's fire suppression systems were operating correctly. The SDS sheets provided to fire fighters by company representatives were outdated and did not provide an accurate picture of what was inside; additionally, the company was also noncompliant with a law requiring it to submit an annual Tier II hazardous materials inventory list to multiple government agencies, including the local fire department. As a result, all documents that accurately reflected the building's inventory and its specifics at the time of the incident were lost in the fire. Though the fire was controlled within the first day, the fire burned for eight days overall and was declared an emergency disaster by the governor of West Virginia.

At the time of the incident, the last reported fire inspection conducted by the West Virginia Fire Department of Military Affairs and Public Safety was conducted in 2008, almost a decade prior, after two local volunteer fire chiefs filed letters of concern to the state fire marshal addressing their concerns about the facility, such as the lack of an adequate water supply, the lack of access to portions of the building and fire protection equipment, the lack of adequate sprinkler protection in various portions of the building, and the arrangement of storage that could jeopardize the safety of fire fighters.

The lack of established building codes paired with poor fire code enforcement resulted in a devastating fire that impacted the entire community and cost local and state governments millions. The lack of pre-incident planning information, such as accurate SDS sheets and a plan for accessing alternative water sources, forced fire fighters from over 30 different fire departments to control and extinguish a fire for which they were not properly prepared.

N **B.3 Ten Fire Fighter Fatalities at Fertilizer Plant, Texas, 2013.** The incident involved a 1115 m^2 (12,000 ft^2) fertilizer plant built in the 1960s with multiple additions to the building throughout the years following. The building did not have any fire suppression systems installed and was primarily constructed of wood and metal silos that stored, mixed, and sold various agricultural products used by the farming community. It also stored a large amount of hazardous materials — both raw and mixed — that were used to enhance farmers' crops, such as anhydrous ammonia and ammonium nitrate. Because it was planting season, the plant was maintaining an inventory of these hazardous materials in the thousands. On April 17, ten fire fighters and five civilians were killed when it exploded. In addition to those killed, five fire fighters were also injured in the blast.

Initial calls to the county's 911 center of visible smoke coming from the structure began at around 7:29 p.m., with the first fire department unit arriving on the scene 10 minutes later. Fire fighters found visible flames coming from the sliding doors of the seed room. Crews immediately initiated fire suppression operations as additional personnel were arriving on-scene in other fire apparatus and personally owned vehicles. Despite their efforts, fire fighters quickly realized the fire was gaining in intensity, likely due to wind. They also did not have a water supply established yet, so fire attack efforts were being supplied solely by tank water. The second arriving engine company dropped a 100 mm (4 in.) supply line from the closest hydrant, but they did not have enough hose to stretch the 488 m (1600 ft) from the hydrant to the attack engine. This resulted in fire fighters having to halt their suppression operations in an effort to establish a water supply through the use of the supply hose from their attack engine.

It was reported that a discussion was held between the fire chief, assistant chief, and a fire fighter who also worked as a manager of the facility as the incident was occurring. The chiefs were concerned that ammonium nitrate stored inside the building could explode and recommended that the fire fighters be pulled back farther from the structure. However, the fire fighter told them that the burning fertilizer would not explode. Approximately 12 minutes after the first engine company's arrival, the 36,288 to 54,431 kg (40 to 60 tons) of ammonium nitrate stored next to the seed room exploded. The explosion decimated the building, left a crater that measured 28 m (93 ft) in diameter and 3 m (10 ft) deep, and registered as a small-scale earthquake on the Richter scale. Investigators were unable to determine the cause of the fire.

Many factors contributed to this tragedy, including the fire department's lack of a formal pre-incident planning program established at the time of the explosion as well as a lack of formal training on how to respond to incidents involving ammonium nitrate. The lack of an adequate water supply within close proximity to the structure was also a problem. Had a pre-incident plan been in place to assist in organizing fireground efforts and facilitating the laying of supply lines early into the incident, fire fighters might have identified the hazards and established a water supply sooner.

N **B.4 Nine Fire Fighter Fatalities at Furniture Store, South Carolina, 2007.** The 38 m × 38 m (125 ft × 125 ft) furniture store was originally a grocery store in the 1960s. The structure consisted of masonry walls with a flat metal roof supported by steel bar joists and large glass windows lining the storefront. Over time, the showroom in the main building was expanded with the construction of a 18 m × 37 m (60 ft × 120 ft) pre-engineered metal building on each end, a 37 m × 40 m (120 ft × 130 ft) warehouse was added in the rear, and a 204 m^2 (2200 ft^2) loading dock area that connected the warehouse to the main building was constructed. The building did not originally meet the requirements to be sprinklered, however the additions to the loading dock area without permits along with the installation of unprotected openings and separation walls that were not fire rated changed that. Since permits were never obtained for the changes, the requirement for sprinklers was never enforced.

On June 18, nine fire fighters were killed in the line of duty after being overrun by a rapidly progressing fire in the building that produced an enormous amount of heat. The fire originated in the trash on the exterior of the loading dock. The flames then traveled up the wall and into the loading dock's attic space. An employee attempted to extinguish the fire, but stopped once the smoke conditions intensified and he heard one of the roll-up fire doors close. As the fire intensified, initial investigations into the store's showroom revealed no signs of any smoke or flame. When a fire fighter opened the door leading to the loading dock, the massive rush of fresh air leaving the showroom area sucked the door out of the hands of the fire fighter, but it was quickly closed by another fire fighter. Fire fighters took defensive positions inside the showroom at the doorway and believed they were protected by the masonry block fire wall. They were unaware of the penetrations that were made through the wall over time that allowed the smoke and heat to travel throughout the void overhead between the acoustical ceiling and the roof. The heat intensified significantly due to the burning furniture in the loading dock area that eventually began banking down into the showroom. Fire fighters became disoriented as visibility was reduced to zero;

they attempted to transmit distress signals over the radio, but the heat was too intense for those outside to attempt a rescue.

A pre-incident plan of the building had been conducted multiple times throughout the years. However, it was not referred to until late into the incident. The magnitude of the fire load and the dangers of the building's construction were also not communicated adequately within the document. Though walkthroughs were conducted by fire crews in the past, proper life-saving fire code enforcement had not occurred since 1998.

N **B.5 Church Roof Collapse, Indiana, 2011.** On June 15, an Indiana fire fighter was killed by a structural roof collapse while fighting a working fire in a church. Reports of heavy smoke coming from the roof of a church began pouring in to the local dispatch center at around 3:49 p.m. Though there were many 911 calls reporting the incident, no one was able to provide the dispatchers with an actual address, which meant fire fighters had to search a wide general area for the fire. Eight minutes after the initial call, the first fire department unit arrived on-scene to find visible smoke and flames coming from a 390 m^2 (4200 ft^2) church built on a concrete slab and constructed of a wood frame and veneer masonry walls.

Smoke and flames became increasingly apparent to fire fighters operating on the exterior of the structure, but interior crews experienced only light smoke conditions. Because of the church sanctuary's open design and elevated ceilings, the fire intensified within the attic space while fire fighters struggled to gain access to it. Once fire fighters were able to open the ceiling, they realized the extent of the fire progression and prepared for retreat. It was at this time that the roof began to collapse, forcing a significant amount of smoke, heat, and debris onto the fire fighters below. As the roof collapse began, fire fighters aided each other as they scrambled to exit. Fire fighters desperately searched in zero visibility for any window or doorway through which they could escape. All exiting fire fighters immediately reported to the command post, where it was determined that one fire fighter was missing. Though additional arriving companies were tasked with search and rescue, the complete collapse of the roof made efforts impossible. The fire fighter was located in the structure by a news helicopter almost one hour after he went down.

Proper pre-incident planning had not been conducted for this structure, so its layout and design were not readily known to incident commanders during the incident. The structure was also located in a rural area with no fire hydrants within the vicinity, a problem that was not identified until after initial units had arrived on-scene and started mutual aid units for water tenders. A pre-incident plan could have identified this problem sooner and resulted in responders starting water tenders sooner. A neighbor of the church also called 911 advising them of a pond available on her property for use as a water source. The pre-incident plan also could have identified such alternative water supplies within the area and planned for their use.

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^2, 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^2, 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 lightweight 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 might 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 preplan 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 preplan, 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

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

Δ **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 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.

Δ **C.3.3.1** Health care facilities typically plan and train for emergencies. The information in the health care facility's fire or disaster plan should be incorporated into the pre-incident 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 Independencies. 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, isofluorane, 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 performed 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. 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.

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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.

Δ **C.4.2.4 Inmate/Staff Relations.** Movement of inmates is an issue that requires consideration, therefore planning should include developing a close working relationship with the facility staff.

Δ **C.4.3 Physical Elements and Site Considerations.** Facilities can be small, stand-alone buildings or can be located as part of another occupancy (e.g., in high-rise buildings, 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 or use conditions. 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 classifications defined in NFPA *101*.

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 origin.

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 practical 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.

Δ **C.4.4.3 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 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.4.4.3.1 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.4.4.3.2 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.

Δ **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 13D or NFPA 13R will likely not have sprinklers in attics.

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.

Δ **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.

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.

Δ **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 13D or NFPA 13R will likely not have sprinklers in attics.

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.

Δ **C.7.2.1.2** Specific items that should be noted on the pre-incident plan for strip mall shopping center occupancies or rows of attached mercantile occupancies 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 have large, undivided areas and unprotected openings between floors include, but are not limited to, 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.

Δ **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 plan areas 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.

Δ **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 support functions (e.g., steam generation) or supply materials in various stages of development to other buildings on site as part of overall processes (e.g., chemical reactor processes, raw material conveyor processes, 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.

Δ **C.9.5.4** The pre-incident plan should be coordinated with the emergency action plan (EAP) for the facility because the EAP will typically detail the employee evacuation plan, designate the individuals responsible for various aspects of the plan, and detail the capabilities of the facility. Smaller facilities' plans include total evacuation of the building. A local emergency contact can be listed, along with a designated meeting area for personnel to gather after an evacuation. Larger facilities' plans might identify an emergency response team that has responsibility for controlling an incident until responding personnel arrive. Other sections of the EAP 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 arrangements, 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 C.7.6(6).

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

(1) Railcars
(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.
(7) Combustible dusts might be present.

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 Plants. The hazards posed by on-site treatment plants, 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.

Δ **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 over-

haul and final extinguishment of fires occurring in warehouses require personnel trained and equipped for manual fire suppression operations. Such personnel could be members of the public fire department, the 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 industrial 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.

Δ **D.1 Sample Forms.** Figure D.1(a) through Figure D.1(c) are sample pre-incident cards that can be used as models for pre-incident planning. Three manageable levels for a building pre-incident plan are provided.

BUILDING INFORMATION

Date of Pre-Incident Plan: 04/03/2018

Address: 1212 Hudson Street

Location Name: Ellson Building

Lock Box Location: Side-A

Construction Type: Ordinary

Length × Width × Height: 30.5 m × 15.2 m × 22.9 m (100 ft × 50 ft × 75 ft)

No. of Stories: 7

Occupancy Type: Residential

Primary Entrance: Side-A

Secondary Entrance: Side-D

EXPOSURES TO BUILDING

Side-A: Hudson Street

Side-C: Yard

Side-B: 6-story/ordinary const./attached

Side-D: 2½-story/wood frame const./detached 4.6 m (15 ft)

STAIRS

Roof Access: Off Stair-A

Belowgrade Access: Off Stair-B

WATER SOURCE

Fire Hydrant Locations

Primary: 1216 Hudson St.

Size of main: 12 in. (305 mm)

Secondary: 236 13th St.

Size of main: 8 in. (203 mm)

FIRE PROTECTION SYSTEMS

Combination Sprinkler/Standpipe System

FDC Location(s): Side-A

Standpipe Riser Hose Connection: Stair-B

Fire Alarm Control Panel (FACP): Main lobby

SPECIAL HAZARDS

Structural Members: Truss roof and floor levels

Alternative Power: Flat solar panels/roof level/Side-C

NOTE SECTION

Blueprints and interior photographs available in FACP

Δ **FIGURE D.1(a) Level 1 Basic Building Data Record.**