



Guidelines to Developing Emergency Action Plans for All-Hazard Emergencies in High-Rise Office Buildings



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FOREWORD

The management of building occupants within high-rise buildings is a primary concern during emergencies. While procedures for fire evacuation have been developed and adopted by major fire and emergency services throughout North America, there remains considerable variation in practice in the field.

With the increased recognition of the need to prepare and respond to non-fire threats such as extreme weather, workplace violence, and utility disruptions in the high-rise environment, the traditional building fire safety plan and organization are a logical starting point. In fact, the Advisory Committee members recommend that a single, integrated plan and preparedness and response organization be utilized to assist building management and emergency responders in an all-hazard approach to building emergencies.

The Committee recognizes that while there is a considerable body of practice in this area, research into and evaluation of these methods and policies are limited. This document is an attempt to fill that void and to inspire AHJs and building management to embrace the challenge.

We understand that there must be close coordination between local emergency services and building management in the development and implementation of all-hazard Emergency Action Plans. We hope that this guide will be useful to both building managers and emergency services as they move toward incorporating an all-hazard approach into their existing fire-centric plans.

— *High-Rise Building Safety Advisory Committee (2013)*

For more information on high-rise building safety, go to www.nfpa.org/highrise.



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STATEMENT OF PURPOSE

This guide recommends that the Authority Having Jurisdiction (AHJ) adopt standards, procedures, and requirements for the orderly evacuation of occupants from any high-rise building, including evacuations necessitated by fire, explosions, or biological, chemical, or hazardous material incidents or releases, either within the facility or in the adjacent area; natural disasters; other emergencies; or the threat thereof, and to assist building management and tenants in developing an Emergency Action Plan (EAP) for the building.

The existing procedures for limited evacuations in the event of a fire in a high-rise office building (evacuation of fire floors and floors above and below the fire) have proved effective in protecting building occupants in ordinary emergencies. Evaluation shows that the need for additional life safety procedures, other than those for fire, are required to protect the occupants of buildings in the event of an All-Hazard Emergency.

This guide is intended to assist in the orderly evacuation of people and in the management of the incident, but it cannot completely address or protect against certain extraordinary events that are unpredictable or extreme.

This guide recommends that owners of buildings develop procedures for fires and for All-Hazard Emergencies. Actions for such events include remain-in-place (no evacuation) and partial and total building evacuations. The guide grants owners broad latitude in developing plans, which is necessary given the site-specific nature of such plans, but it does set forth specific guidelines and recommendations for the form and the content of the EAP.

SUMMARY

The NFPA *Guidelines to Developing Emergency Action Plans for All-Hazard Emergencies in High-Rise Office Buildings* has been developed with input from the high-rise community as represented on NFPA's High-Rise Building Safety Advisory Committee. This committee was appointed by the NFPA Standards Council to identify existing needs and emerging issues within the high-rise building environment; produce recommendations as to how NFPA can provide a leadership role on such issues; and ensure that the NFPA Codes and Standards development process includes current subject matter on high-rise building safety, emerging technologies, and other matters that affect those who work in, live in, or manage high-rise buildings.

The NFPA *Guidelines to Developing Emergency Action Plans for All-Hazard Emergencies in High-Rise Office Buildings* was developed in response to the need for guidance in preparing staff and occupants of high-rise office buildings for evacuation. This guide provides guidance for those parties responsible for executing the evacuation, as well as information on various evacuation strategies that should be considered. With the increased presence of both human-made and natural disasters, the guide was written to be applicable to both fire and all-hazard emergencies. The guide addresses the criteria and the minimum information necessary to integrate proper evacuation components into a comprehensive evacuation planning strategy appropriate for occupants of a high-rise office building.

This guide can be downloaded free of charge from the NFPA website, www.nfpa.org.

OVERVIEW

Every owner, manager, and tenant of a high-rise building should, in cooperation with the AHJ, establish, implement, maintain, and update an Emergency Action Plan (EAP) for the building.

An EAP describes the procedures that occupants should follow in an emergency situation, an emergency evacuation, or a drill. Each EAP should have a procedure for total-building evacuation.

An EAP should specify, in detail, the evacuation roles and duties of the designated personnel, including the names of the Fire and Life Safety Director (FLSD) and the Deputy Fire and Life Safety Director (DFLSD) and their in-house and cellular telephone numbers.

The FLSD, with the approval of the AHJ, should establish as part of every EAP a location where the FLSD, the DFLSD, and other selected personnel are to report during an emergency incident. The FLSD should also assign a responsible person to meet and direct the emergency first responders to the location of the emergency incident. This location could be an Emergency Command Center, a lobby, or a safe refuge area outside the building.

Requirements for occupants with disabilities should be incorporated into the EAP and should include a current list of the names and usual locations of occupants who have voluntarily, in writing, self-identified their need for assistance and the type of aid they would require to exit the building during an emergency. One or more places of refuge or rescue should be designated in the EAP along with a method to safely



remove occupants with disabilities from the building. The EAP should include the appropriate number of personnel designated to assist those occupants during an emergency evacuation or fire drill.

All building occupants should be instructed annually on the procedures to be followed in case of a fire or other emergency and participate in mandatory drills. Documentation of the occupant instructions should be maintained by the FLSD for inspection by the AHJ. These instructions should also be made available to all new occupants within 14 days of their assuming occupancy in the building.

After being approved by the AHJ, the emergency evacuation plan, procedures, and signage should be posted. Evacuation signs should be located in every elevator lobby, adjacent to doorways leading to exit stairs, and in other conspicuous floor locations as required by the AHJ. All plans, procedures, and signs should be properly maintained.

Copies of the approved EAP should be filed in the management office of the building, at the security desk, and in the vicinity of the Emergency Command Center (or in an identifiable location approved by the AHJ). The plan should be readily available to the building staff and emergency responders at all times.

Section 1 DEFINITIONS

1.1 All-Hazard Drill. A training exercise in which building occupants are familiarized with and/or practice the procedures for remain-in-place, in-building relocation, partial building evacuation, and total building evacuation, in accordance with an EAP.

1.2 All-Hazard Emergency. Events that require implementation of a building's EAP to help provide for the safety of the building occupants. Such events can be due to natural forces, including earthquakes, wind-related hazards (hurricanes, tornadoes, windstorms), fire-related hazards (community-scale fires in the wildland-urban interface, building fires), and water-related hazards (storm surge, flood, tsunami); to human-made hazards (accidental, criminal, or terrorist in nature); or to a declaration of emergency by a lawful authority.

1.3 Assembly Area. A designated area inside or outside a building to which building occupants are directed to report as part of an evacuation.

1.4 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.

1.5 Building Emergency Response Team (BERT). The individuals identified in an EAP as responsible for the implementation of the plan, including, but not limited to, the Fire and Life Safety Director, the Deputy Fire and Life Safety Director, Fire and Life Safety Floor Wardens, Deputy Fire and Life Safety Floor Wardens, and members of the Life Safety Response Team.

1.6 Building Liaison. The individual responsible for the coordination of activities within a building.

1.7 Building Occupants. All persons in the building, including office employees, building personnel, and visitors.

1.8 Competent Person. A person who is qualified by education, training, and experience and who is provided with the necessary instructions to be able to carry out the required life safety task(s) and/or response to threats to the building and its occupants.

1.9 Deputy Fire and Life Safety Director (DFLSD). Competent person designated by the owner to perform the duties of the position. An EAP may call for more than one DFLSD for a building. (See definitions of *Competent Person* and *Owner*.)

1.10 Drill. An exercise involving a credible simulated emergency that requires personnel to perform emergency response operations for the purpose of evaluating the effectiveness of the training and education programs and the competence of personnel in performing required response duties and functions. [1081, 2012]

1.11 EAP Drill. A training exercise by which Life Safety staff are familiarized with and/or practice the procedures for remaining-in-place, in-building relocation, partial evacuation, or total evacuation, in accordance with an EAP.

1.12 Emergency Action Plan (EAP). A plan of designated actions by employers, employees, and other building occupants to provide for their safety from fire and other emergencies.

1.13 Fire and Life Safety Director (FLSD). Competent person designated by the owner to perform the duties of the position. (See definitions of *Competent Person* and *Owner*.)

1.14 Fire and Life Safety Floor Warden. A building staff member or a tenant trained to perform assigned duties on a building floor in the event of an emergency.

1.15 High-Rise Building. A building where the floor of an occupied story is greater than 75 ft (23 m) above the lowest level of fire department vehicle access.

1.16 In-Building Relocation. The controlled movement of building occupants from an endangered area of a building to a relocation area within the same building, as designated by the AHJ, in response to an All-Hazard Emergency.

1.17 In-Building Relocation Area (INBRA). A designated area within a building to which building occupants can be relocated in accordance with the EAP (as approved by the AHJ).

1.18 Incident Commander (IC). The individual responsible for all incident activities, including the development of strategies and tactics and the ordering and release of resources. [472, 2013]

1.19 Neighboring Buildings. Buildings subject to the provisions of this plan that are located on either side of a city street, unless separated by a barrier to movement, such as a restricted access roadway, railway, and so forth.

1.20 Outside Safe Refuge Area. See *Assembly Area*.

1.21 Owner. The owner or lessee of the building or other person or entity having charge thereof.

1.22 Partial Building Evacuation. The emptying of a building of some but not all building occupants in response to an All-Hazard Emergency as designated by the AHJ.

1.23 Personal Emergency Evacuation Plan. An individual's evaluation of his or her own evacuation capabilities and the effect on building evacuation.

1.24 Regular Business Hours. Times of the day and days of the week during which a building is normally occupied and business is conducted and in all circumstances when the building is occupied by more than 100 persons above or below the street level or more than a total of 500 persons in the entire building.

1.25 Remain-in-Place. The precaution of directing building occupants to remain inside the building, at their work locations, in a heightened state of readiness and alertness, and in which there is no evacuation of building occupants in response to an All-Hazard Emergency as designated by the AHJ.

1.26 Situation Awareness. The perception of the elements in the environment within a volume of time and space, the comprehension of their meaning, and the projection of their status in the near future. [101, 2012]

1.27 Situation Status Report. Updated information provided to building occupants with information that is relevant to the emergency situation. Reports should be made at intervals of 15 to 20 minutes or as directed by the Incident Commander.

1.28 Support Members. Personnel assigned to the EAP Response Team to perform specific duties, including those people who have specific technical knowledge or skills or who have been given specific assignments that indirectly support the efforts to mitigate an All-Hazard Emergency.

1.29 Total Building Evacuation. The emptying of a building of all occupants in response to an All-Hazard Emergency.

Section 2 RESPONSIBILITIES

2.1 Owner.

2.1.1 General.

2.1.1.1 The owner of a building should cause an Emergency Action Plan (EAP) to be prepared for the building and periodically reviewed and amended, in accordance with the provisions and subdivisions of the EAP. The EAP should include a Pre-Incident/Building Information Card similar to those shown in Annex E.

Any changes or updates to an EAP, including essential building personnel and emergency contact telephone numbers, should be submitted to the local Fire Department [or the Authority Having Jurisdiction (AHJ)] within 10 days of the change.

2.1.1.2 The owner of a building should consult with the owners of neighboring buildings in connection with the preparation of the building's EAP, when a Partial Building Evacuation or Total Building Evacuation drill is to be conducted, or when such a drill would evacuate onto a public street.

2.1.2 Appointment of Building Emergency Response Team.

2.1.2.1 The owner of a building should appoint a Building Emergency Response Team (BERT) consisting of a Fire and Life Safety Director (FLSD), Deputy Fire and Life Safety Directors (DFLSDs), Fire and Life Safety Floor Wardens, Deputy Fire and Life Safety Floor Wardens, and support response team members to respond when an All-Hazard Emergency occurs. All members should be designated in the EAP, with the authority, duties, and qualifications set forth therein.

2.1.2.2 The FLSD and the DFLSD should be present on-site during normal business hours.

2.1.2.3 Building Emergency Response teams should practice allocated tasks and duties pertaining to the evacuation of building occupants.

2.1.3 EAP Plan Filing, Acceptance, Training, and Recordkeeping.

2.1.3.1 The owner of a building should file an EAP with the AHJ and obtain approval from the AHJ.

2.1.3.2 The owner of a building should cause educational materials to be distributed and EAP drills to be conducted in accordance with the provisions of the EAP. All building emergency response personnel who could be required to assist with the evacuation of staff or visitors should be given appropriate training and suitable resources to carry out the task.

2.1.3.3 The owner of a building should cause recordkeeping to be maintained in accordance with the provisions of the EAP.

2.1.3.4 Under the direction of the building owner, all building occupants and employers of building occupants should comply with the directions of the FLSD and the Building Emergency Response Team upon implementation of the EAP and otherwise fulfill their obligations in accordance with the provision of 2.1.3.



2.2 Building Occupants and Employers.

2.2.1 Building Occupants.

2.2.1.1 Building occupants should comply with the directions of the FLSD and Life Safety Staff upon an announcement that the building EAP has been activated, including a fire evacuation or an all-hazard evacuation such as Remain-in-Place, In-Building Relocation, Partial Building Evacuation, and Total Building Evacuation.

2.2.1.2 Building occupants should familiarize themselves with the requirements of the building EAP pertaining to their responsibilities, cooperate with the Building Emergency Response Team, and participate in EAP drills.

2.2.1.3 Building occupants should familiarize themselves with the building's fire and life safety equipment and systems in the building.

2.2.1.4 Building occupants should request an exemption from the FLSD if participation in an EAP drill might cause injury or serious hardship.

2.2.1.5 Building occupants should report any incident or suspicious activity that could affect the health, safety, or security of any building occupants or damage to building property.

2.2.1.6 Building occupants with disabilities should have the option to identify themselves via a Personal Emergency Evacuation Plan.

2.2.2 Employers.

2.2.2.1 Employers of building occupants should promptly, upon employment, provide orientation training sessions and distribute to building employees materials regarding the pertinent portions of the building EAP provided to the employer by the owner.

2.2.2.2 Employers of building occupants should comply with the provisions of the building EAP and instruct their employees who are building occupants to do so.

2.2.2.3 Employers of building occupants should assign responsible employees to serve as Fire and Life Safety Floor Wardens, Deputy Fire and Life Safety Floor Wardens, and members of the Building Emergency Response Team and require such employees to conscientiously perform their duties under the building EAP.

2.2.2.4 Employers of building occupants should establish and maintain a system of assigning responsibility for accounting for employees present in the building, consistent with the EAP.

2.2.2.5 Employers of building occupants should establish incident reporting and investigation procedures for any building-related issue that should be reported to the building owner.

2.3 Fire and Life Safety Director (FLSD) and Deputy Fire and Life Safety Director (DFLSD).

2.3.1 Duties.

2.3.1.1 An FLSD should be on duty during regular business hours or when it is expected that the building will be occupied by more than a total of 500 persons in the entire building. When the FLSD is not on duty, the DFLSD should perform the FLSD duties.

2.3.1.2 When an All-Hazard Emergency occurs, the FLSD should communicate the nature of the emergency to building occupants. Specific instructions should be given for a particular type of emergency evacuation mode. (Describe the type of incident, e.g., “Police action,” “Unknown odor exterior to the building,” “At this time we are shutting down the building’s air intake vent.”)

2.3.1.3 The FLSD should be given sufficient stated authority, powers of sanction, and resources to take responsibility for the day-to-day safety management of the building and to make certain that essential repairs or maintenance are carried out, such as, but not limited to, the following:

- (1) Maintaining access and egress routes
- (2) Monitoring routine maintenance, testing of emergency fire protection systems in accordance with NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*
- (3) Monitoring changes to the building (alterations and new construction projects) to confirm that effective temporary life safety measures are in place
- (4) Providing supervision of, monitoring of, and instruction to construction contractors and subcontractors on the premises
- (5) Monitoring construction, alteration, and demolition projects for welding, cutting, and burning and issuing building Hot Work permits
- (6) Ensuring compliance with local building and fire codes

2.3.1.4 The FLSD/DFLSD should be a liaison with the responding Incident Commander (IC) in the following ways:

- (1) Provide a briefing to the IC of the current situation awareness upon the IC’s arrival to the incident
- (2) Establish a working location at the Emergency Command Center (ECC)
- (3) Attend planning meetings as required
- (4) Provide input on the building resources
- (5) Cooperate fully with the IC and ECC staff on the building involvement at the incident
- (6) Oversee the well-being and safety of the Life Safety staff assigned to the incident
- (7) Advise the IC of any building needs or requirements

2.3.1.5 At a minimum, the building owner should maintain at the building ECC the following items to assist the FLSD, DFLSD and First Responders:

- (1) A Pre-Incident/Building Information Card
- (2) Building master keys
- (3) Current as-built drawings
 - (a) Floor layout
 - (b) Fire wall separations
 - (c) Stair configuration
 - (d) Sprinkler and standpipe risers
 - (e) Fire extinguishing systems
 - (f) HVAC zones
 - (g) Electrical
 - (h) Plumbing
- (4) Fire pumps list and location of building occupants with disabilities

2.3.1.6 Pre-Incident/Building Information Cards, in the format set forth in NFPA 1620, *Standard for Pre-Incident Planning*, should be maintained at the building's ECC and at the local AHJ dispatch communications center, with the capability of being transmitted in an electronic format so as to provide First Responders with critical building information on their initial response and to further support an incident action plan.

2.3.1.7 The FLSD/DFLSD is responsible for the training of building emergency response staff.

2.3.1.8 The FLSD should provide an initial situation status report and updated situation awareness information to the IC relevant to the situation at hand.

2.3.1.9 A voice communication through the public address system should be made at appropriate intervals as directed by the IC.

2.3.2 Certification Program for Fire and Life Safety Director/Deputy Fire and Life Safety Director.

2.3.2.1* A Fire and Life Safety Director/Deputy Fire and Life Safety Director Certification should be issued by the AHJ to a qualified applicant for a designated building, to certify that the holder has completed the necessary and appropriate training relevant to the duties and responsibilities of the FLSD/DFLSD pursuant to this section and has demonstrated knowledge of the designated building, its systems, and its occupants necessary to perform the duties of the FLSD/DFLSD at such building.

2.3.2.2 Applicants for a Fire and Life Safety Director/Deputy Fire and Life Safety Director Certification should take and pass a required examination as mandated by the AHJ. The examination should be conducted at the building to demonstrate candidates' skills sets for which the certificate is being issued.

2.4 Fire and Life Safety Floor Wardens and Deputy Fire and Life Safety Floor Wardens.

2.4.1 The tenant or tenants of each floor should, upon request of the owner or person in charge of the building, make responsible and dependable employees available for designation as support members for the positions of Life Safety Floor Warden and Deputy Life Safety Floor Warden.

2.4.2 Each floor of a building should be under the direction of a designated Life Safety Floor Warden for the evacuation of occupants in the event of fire or other emergency. Life Safety Floor Wardens should be assisted in their duties by Deputy Life Safety Floor Wardens. A Deputy Life Safety Floor Warden should be provided for each tenancy. Where the floor area of a tenancy exceeds 7500 square feet, a Deputy Life Safety Floor Warden should be assigned for each 7500 square feet or part thereof.

2.5 Building Emergency Response Team.

2.5.1 The EAP should designate the members of a Building Emergency Response Team (BERT). The BERT should consist of the following persons: building property manager, chief engineer, elevator mechanic, director of security, or, in their absence, their qualified designees, and other building personnel, office employees, or other building occupants designated to assist in the implementation of the EAP, including persons assigned to assist building occupants who require assistance to participate in the plan. The FLSD and the DFLSD should not be designated as BERT members.

2.5.2 All BERT members should receive training in the EAP from the FLSD. Such training should consist of not less than an initial 2-hour training session and an annual 1-hour refresher session thereafter.

2.5.3 BERT members should perform their designated assignments as set forth in the EAP or as directed by the FLSD.

2.5.4 In the event of an All-Hazard Emergency, BERT members should report immediately to the designated locations set forth in the EAP or as directed by the FLSD and be ready to undertake their designated assignments.

2.6 Authority Having Jurisdiction (AHJ).

2.6.1 The AHJ should establish an FLSD Certification Program that consists of training as to the proper duties and responsibilities of an FLSD and to prepare candidates for the qualifying examinations necessary to obtain an FLSD Certificate of Qualification.

2.6.2 The FSLD Certificate of Qualification is a document issued by the AHJ that is premises-related and states that the certificate holder is trained, has met certain requirements, and has passed specific examinations that qualify the FSLD to perform certain functions and skills in a specific building.



2.6.3 The AHJ should establish an authorized FLSD training course for candidates to meet certain minimum qualifications as listed below:

(1) All-Hazard Emergencies

- (a)** AHJ to establish the minimum number of hours required to conduct an FLSD certification program for all-hazard emergencies
- (b)** AHJ to conduct a premises-related on-site FLSD skills set acceptance test as to a candidate's knowledge as set forth in 2.3.1, Duties, of the Fire and Life Safety Director (FLSD) and Deputy Fire and Life Safety Director (DFLSD)

(2) Recertification

- (a)** AHJ to establish when a Certificate of Qualification expires and a process for renewal
- (b)** AHJ to establish the minimum number of hours required to conduct an FLSD recertification program for all-hazard emergencies

Section 3

SUGGESTED RESPONSES TO ALL-HAZARD BUILDING EMERGENCIES

3.1 General.

In addition to a fire emergency, Emergency Action Plans (EAPs) should consider human-caused threats, building incidents, and natural disasters that could impact the life safety of building occupants.

3.1.1 Human-Caused Incidents.

Human-caused incidents include, but are not limited to, the following:

- (1) Bombs and bomb threats
- (2) Weapons of mass destruction
 - (a) Chemical
 - (b) Biological
 - (c) Radiological/nuclear
- (3) Workplace violence

3.1.2 Building Incidents.

Building incidents include, but are not limited to, the following:

- (1) Building system failures
- (2) Elevators
- (3) Emergency power systems
- (4) Flooded areas
- (5) Medical emergency
- (6) Utility disruptions
- (7) Adjacent building fire

3.1.3 Natural Disasters.

Natural disasters include, but are not limited to, the following:

- (1) Earthquakes
- (2) Hurricanes
- (3) Tornadoes
- (4) Tsunamis

- (5) Volcanoes
- (6) Flash flooding
- (7) Snow and ice storms
- (8) Extreme heat

3.2 Specific Procedures.

The AHJ or local emergency response organizations should be contacted for specific procedures relative to emergency protocols for the incidents. Common protocols should include notifying the proper authorities, 9-1-1 (or local emergency number), the FLSD, and building management.

Section 4 OCCUPANT EVACUATION STRATEGIES

4.1 General.

4.1.1 Various potential threats to a building may require best practice emergency management so as not to delay moving people to a safe area. This includes provision for an effective means of initiating, monitoring, and managing the evacuation of a high-rise building, where a large number of people could be at risk.

4.1.2 The evacuation of occupants in a building’s exit stairs should be monitored to facilitate effective management of egress capacity, including prioritization of egress for those occupants in greater danger.

4.1.3 Different parts of a building can be evacuated in controlled phase sequences, with the original incident floor and/or zone affected being evacuated first. The FLSD should announce a directive message as to which type of evacuation mode will be used. The types of sequenced evacuation are shown in Table 4.1.3.

Table 4.1.3 Occupant Evacuation Strategies

| Extent of Evacuation | Extent of Management | |
|-----------------------------|---|---|
| | Managed Sequence | Unmanaged Sequence |
| No evacuation | No movement — remain in place upon direction | No movement — remain in place per prior instruction |
| Partial evacuation | Managed or controlled partial evacuation In-building relocation on same floor In-building relocation to different floors Occupants of some floors leave building | Unmanaged or uncontrolled partial evacuation |
| Total evacuation | Managed or controlled total evacuation | Unmanaged or uncontrolled total evacuation |

Source: NFPA 101, 2012

4.2 All-Hazard Evacuations.

4.2.1 Remain-in-Place (No Evacuation).

4.2.1.1 The Remain-in-Place provisions of the EAP should be based on an analysis of the circumstances in which such action would best provide for the safety of building occupants and the manner in which that action could best be implemented in the building.

4.2.1.2 The EAP should set forth the actions that would be taken in the event of a Remain-in-Place, including, but not necessarily limited to, those in regard to the following building components or systems:

- (1) Access to and egress from the building, including entrances, exits, and stairwells
- (2) Elevator operation
- (3) Ventilation system operation, including air-handling equipment; heating, ventilation, and air conditioning equipment; and smoke-management systems
- (4) Windows that open
- (5) Interior doors, including fire doors
- (6) Electrical, natural gas, steam, and other utility operations
- (7) Fuel oil storage systems and associated pumps and piping

4.2.2 In-Building Relocation.

4.2.2.1 The in-building relocation provisions of the EAP should be based on an analysis of the circumstances in which such action would best provide for the safety of building occupants and the manner in which that action could best be implemented in the building.

4.2.2.2 The EAP should contain the following steps for an In-Building Relocation Area (INBRA):

- (1) Set forth the number of building occupants on each floor.
- (2) Designate the INBRA to which building occupants could be relocated and for each such INBRA identify the following:
 - (a) The type of area (such as interior office, conference room, file room, or mechanical room)
 - (b) The floor and the relocation area's exact location on that floor
 - (c) The type of protection the area offers
 - (d) The maximum number of building occupants each relocation area can accommodate
 - (e) Whether the area affords access to water, lavatories or other facilities, and equipment or supplies, including prepositioned equipment or supplies.
- (3) Designate the route by which building occupants would be directed to the INBRA, if such areas are on a different floor, and identify the stairwells and (if applicable) elevators to be utilized and their capacity.
- (4) Set forth the actions to be taken with respect to building components or systems in the event of an in-building relocation, including the building locations and systems.
- (5) Set forth the procedures by which employers of building occupants will account for their employees after an in-building relocation is complete.

4.2.3 Partial Evacuation and Total Evacuation.

4.2.3.1 The evacuation provisions of the EAP should be based on an analysis of the circumstances in which such action would provide for the safety of building occupants.

4.2.3.2 The EAP should identify the safest and most efficient means of evacuating persons from the building or designated floors or areas thereof. Priority should be given to building occupants on floors or other areas of the building most at risk of harm and, in the designation of exit routes, to the avoidance of congestion that would delay the movement of those with priority. The EAP should also ensure that prioritization is actually accomplished [e.g., by implementing provisions for exit stair monitoring, such as video systems, monitored from the Emergency Command Center (ECC)].

4.2.3.3 The EAP should encompass the following steps for both a partial and a total building evacuation:

- (1)** Set forth the number of building occupants on each floor, including an estimate of the number of visitors, if any, on a typical day.
- (2)** Identify the location of exits, stairwells, and (if to be utilized) elevators and their capacity.
- (3)** Set forth the actions that would be taken with respect to building components or systems in the event of a partial or total evacuation, including the building locations and systems.

4.2.3.4 The EAP should designate the following :

- (1)** Primary exit routes for the evacuation of each floor or other area of the building and alternative exit routes in the event that the primary routes cannot be used
- (2)** Whether building occupants will be directed to leave the area by any safe means (other than in circumstances that preclude such action, such as contamination) or directed to one or more assembly areas that have the following capabilities:
 - (a)** Are at a safe distance from the building (preferably a distance from the building not less than the height of the building)
 - (b)** Are sufficient in number and size to accommodate the building occupants that will be assigned to report to such assembly area
 - (c)** Allow for the continuous movement of building occupants away from the building to their assembly areas
 - (d)** Provide alternative locations in case the preferred assembly area has been compromised
- (3)** The procedures by which employers of building occupants will account for their employees after a partial evacuation or total evacuation has been completed

4.2.4 Accountability.

4.2.4.1 Tenants should consider establishing a post-incident communication plan with their staff that takes into account the following actions when building occupants gather in the Accountability Re-Assembly Area:

- (1) The floor warden verifies that the floor has been evacuated by all occupants.
- (2) Identified missing persons are reported to authorities.

4.2.4.2 Incident reporting and investigation should include the following:

- (1) Establishment of an incident debriefing and reporting system to be followed immediately after the all-clear for any emergency is given
- (2) Investigation to establish root causes and to create a lessons-learned document to help prevent a similar incident from occurring in the future

4.2.5 Accommodations for Persons with Disabilities.

4.2.5.1 The EAP should have procedures in place to address the evacuation of occupants with the following disabilities:

- (1) Mobility impairments
 - (a) Wheelchair users
 - (b) Ambulatory mobility disabilities
 - (c) Respiratory impairments
- (2) Visual impairments
- (3) Hearing impairments
- (4) Speech impairments
- (5) Cognitive impairments

4.2.5.2 The EAP should be developed to accommodate persons with disabilities in accordance with NFPA's *Emergency Evacuation Planning Guide for People with Disabilities*.

4.2.5.3 Development and review of the EAP should include participation by representatives of the five major disability groups (mobility impairments, vision impairments, hearing impairments, speech impairments, and cognitive impairments), preferably occupants of the building. If no occupants within one or more categories are available, a member(s) of the local community with the relevant disability should be asked to participate.

4.2.5.4 The EAP should provide for the secure storage in the ECC of copies of all the information listed in the chart in Annex C, including but not limited to all Personal Emergency Evacuation Plans completed by individuals with a disability for all spaces in a facility that those individuals commonly use. The chart in Annex C should include a list of the primary floor location for each regular occupant who has voluntarily self-identified as needing assistance and the type of assistance he or she requires to safely evacuate. This

information must be kept confidential and provided only to authorized building personnel and, in the event of an emergency requiring evacuation, to first responders upon their arrival at the building or as required by local law.

4.2.6 Building Reoccupation.

4.2.6.1 The plan should include means of reoccupying the building after clearance from the AHJ and the FLSD. The plan might need to include phased reoccupation consistent with building configuration and capacities.

4.2.6.2 During an emergency evacuation, the FLSD should track what floor(s) have been evacuated at the ECC and provide the situational awareness to the First Responders upon their arrival at the building. (*See Annex D.*)

Section 5 OCCUPANT BEHAVIOR

5.1 Behaviors.

Behaviors in emergencies can be understood as logical attempts to deal with a complex, rapidly changing situation in which minimal information as to how to act is available. The effective leadership provided by a Fire and Life Safety Director (FLSD) and a well-prepared Building Emergency Response Team (BERT) are effective mechanisms for dealing with such complex, rapidly changing situations.

5.2 Communication.

Timely and accurate communication with building occupants during emergencies can be useful in avoiding apprehension and reinforcing the perceived reliability of the BERT. Causes of false alarms and other system activations should be explained to occupants.

5.3 Informational Cues.

The EAP should include plans for how and when timely and appropriate updates of emergency and evacuation information will be provided to building occupants so they have adequate time to react to the emergency situation.

5.4 External Resources.

Expert documents should be consulted during the planning for crowd management and the behavior of occupants under fire and emergency conditions. One or both of the following resources should be used when planning for the management of occupants in a building:

- (1) NFPA's *Fire Protection Handbook*, Section 4, "Human Behavior in Fire Emergencies"
- (2) SFPE Handbook of Fire Protection Engineering, 4th edition, Sections 3-11 and 3-12

Section 6

EAP DRILLS, EXERCISES, AND OCCUPANT EDUCATION

6.1 Purpose.

6.1.1 The purpose of drills and exercises is to instill in the minds of all occupants, including the Building Emergency Response Team (BERT), the correct procedures necessary to ensure safety of life and the joint testing of building emergency systems and staff duties.

6.1.2 The building owner should conduct EAP drills on a regular basis, during regular business hours, and in accordance with the requirements of this section, to familiarize all building occupants with the various procedures for total evacuation, partial evacuation, in-building relocation, and remaining-in-place and the reasons for implementing each type of action.

6.2 Types.

6.2.1 Instructional. Instructional exercises should serve to familiarize building occupants with the requirements and procedures of the EAP by means of informational sessions approved by the Fire and Life Safety Director (FLSD) and may include the use of video presentations or other educational materials. Such sessions should address implementation of the EAP both during regular business hours and at times when Life Safety Floor Wardens and other EAP staff may be absent from the building. Such sessions can be conducted by any qualified person and at any appropriate location, including, but not limited to, stairwell entrances and in-building relocation areas.

6.2.2 Stairwell Familiarization. Stairwell exercises serve to familiarize building occupants with the process of in-building relocation and building evacuation via the building's stairwells. A stairwell familiarization exercise should have building occupants enter a building stairwell and then be escorted down several levels, during which time stairwell safety features and safe evacuation procedures should be reviewed.

6.2.3 Evaluation. Tests should be conducted to evaluate the preparedness and capabilities of occupants and life safety staff (e.g., through "fire drills"). Stair monitoring system video recordings, especially of occupant use of exit stairs, if available, should be used to assess performance and attain realistic expectations of what can be accomplished in an actual emergency.

6.3 Frequency.

EAP drills should be conducted on a regular basis, as follows:

- (1)** At least two EAP drills should be conducted annually for the first 2 years after the date of the EAP acceptance, the first of which should be within 6 months of the date of acceptance. A rotation of the EAP drills within the first 2-year period can include a drill for Full-Building Evacuation, Partial-Building Evacuation, In-Building Relocation, and Remain-In-Place to familiarize the occupants with the various types of all-hazard emergency movement modes.

- (2) Beginning in the third year from the date of the EAP acceptance, an EAP drill should be conducted on each floor of the building at least once a year.
- (3) The number and type of EAP drills required to be conducted for a building will vary based upon jurisdiction requirements and the type of building. It is important that the BERT and all building occupants are aware of and understand what they are required to do in case of an emergency.
- (4) The building owner and the AHJ should jointly determine the efficacy of full-building or partial-building evacuation drills.

6.4 Participation.

All building occupants present on the affected floors at the time the EAP drill is conducted, including visitors, should be required to participate in the drill.

6.5 Conduct of Drills.

EAP drills may be conducted in conjunction with fire drills or as required by the local AHJ, provided the drills highlight the differences between responses required for each drill.

6.6 Notifications.

An owner undertaking a full-building evacuation drill should consider doing the following:

- (1) Notify the local AHJ not less than 72 hours in advance of any full building evacuation drill.
- (2) Notify the owners of neighboring buildings not less than 72 hours in advance of any full-building evacuation drill. The owner of a neighboring building, upon receipt of such a notification, should notify the occupants of such neighboring building of the drill, to prevent the evacuation from causing alarm. (See definition of *Neighboring Buildings* in Section 1.)
- (3) Provide not less than 72 hours' advance notification to the other AHJ departments of any full-building evacuation drill and make any necessary arrangements with those agencies for such a drill.

6.7 Building Visitors.

The obligations of owners of buildings and employers of building occupants pursuant to this section should not be construed to apply to building occupants who are visitors in the building, except that visitors should be required to participate in any EAP drill being conducted at the time of their visit.

Section 7 EAP TABLETOP EXERCISE

7.1* General.

7.1.1 A tabletop exercise/training drill that simulates an EAP all-hazard emergency incident should be conducted annually by the building owner. A tabletop exercise held in an informal, stress-free environment will elicit constructive discussion as participants examine and resolve problems based on existing types of All-Hazard Emergencies and identify where the EAP needs to be refined.

7.1.2 FEMA's *Unit 5: The Tabletop Exercise* is a good reference to use during the planning and conducting of a tabletop exercise.

7.2 Format.

7.2.1 The exercise should begin with the reading of a short narrative that sets the stage for the imaginary disaster. The facilitator then stimulates discussion by either or both of two approaches:

- (1) Problem statement to various participants, either individually or by agencies
- (2) Simulated messages, which are more specific than problem statements

7.2.2 Participants then discuss the action they might take in response to the problem statement or simulated message. In either instance, introduction of the problem should generate a discussion that focuses on roles, plans and coordination, the effect of the incident on other agencies, and the like.

7.3 Roles.

7.3.1 Facilitator. A facilitator should lead the tabletop discussion, decide who gets a message, call on others to respond, ask questions, and guide the participants toward sound decisions.

7.3.2 Participants. Depending on the objective, the tabletop exercise could involve many people or agencies, anyone who could learn from or contribute to the discussion as planned, or all agencies with a policy, planning, or response role. Participants should respond to simulated messages or problem statements as they would in a real emergency.

7.4 Facilities, Time, and Frequency.

7.4.1 Facilities. The exercise should be conducted in an area such as a large conference room where all participants can sit around a table. The use of maps, charts, and packets of materials will enhance the exercise.

7.4.2 Time. The exercise usually takes 1 to 2 hours but can go longer.

7.4.3 Frequency. The exercise should be conducted at least annually or at the direction of the AHJ.



Section 8 REVIEWING AND UPDATING THE EAP

8.1 Review.

The EAP should be reviewed and updated every 5 years or when required by the AHJ.

8.2 Updates.

In addition to the required reviews (see 8.1), the EAP should be reviewed and updated at times when any of the following conditions or events occurs:

- (1) Building alterations or renovations
- (2) Modifications to floor plans or associated building drawings
- (3) Significant changes to building occupancy classification or tenancy

Section 9 REFERENCED PUBLICATIONS

9.1 Referenced Publications.

NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*, 2014 edition.

NFPA 72[®], *National Fire Alarm and Signaling Code*, 2013 edition.

NFPA 101[®], *Life Safety Code*[®], 2012 edition.

NFPA 472, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, 2013 edition.

NFPA 1081, *Standard for Industrial Fire Brigade Member Professional Qualifications*, 2012 edition.

NFPA 1620, *Standard for Pre-Incident Planning*, 2010 edition.

NFPA *Emergency Evacuation Planning Guide for People with Disabilities*.

NFPA *Fire Protection Handbook*, Section 4, “Human Behavior in Fire Emergencies.”

SFPE Handbook of Fire Protection Engineering, 4th edition, Sections 3-11 and 3-12.

FEMA Unit 5: The Tabletop Exercise, training.fema.gov/emiweb/downloads/is139unit5.doc.

9.2 Informational References.

NFPA 1600[®], *Standard on Disaster/Emergency Management and Business Continuity Programs*, 2010 edition.

NFPA 1620, *Standard for Pre-Incident Planning*, 2010 edition.

National Fire Code of Canada, 2010 edition.

City of Los Angeles, <http://emergency.lacity.org/index.htm>.

City of New York, <http://www.nyc.gov/html/oem/html/home/home.shtml>.

City of Portland (Oregon), <http://www.portlandoregon.gov/pbem/>.

City of San Francisco, <http://sfdem.org/>.

City of Denver, <http://www.denvergov.org/Default.aspx?alias=www.denvergov.org/oem>.

City of Jersey City (New Jersey), <http://www.cityofjerseycity.com/emergency.aspx?id=5988>.

City of Austin, <http://austintexas.gov/department/homeland-security-and-emergency-management>.

City of Cincinnati, <http://www.hamiltoncountyohioema.org/>.



BS9999:2008, Code for practice for fire safety in the design, management and use of buildings.

National Organization on Disability,

http://nod.org/disability_resources/emergency_preparedness_for_persons_with_disabilities/

Lynn E. Davis et al., “Individual Preparedness and Response to Chemical, Radiological, Nuclear, and biological Terrorist Attacks,”

http://www.rand.org/content/dam/rand/pubs/monograph_reports/MR1731/MR1731.pref.pdf.

SFPE Handbook of Fire Protection Engineering, 4th edition.

NFPA Fire Protection Handbook, 20th edition.

<http://www.ready.gov/business/other/library.html>.

ANNEX A

A.2.3.2.1 The National Incident Management System (NIMS) course on Incident Command System (ICS 100) serves as a baseline training program that primarily discusses the preparedness roles within the National Response Framework (NRF) for government agencies and the private sector. This training provides a consistent nationwide framework and approach that enable both the public sector (federal, state, and local) and the private sector (building owners, businesses, etc.) to work together to prepare for, prevent, respond to, recover from, and mitigate the effects of an incident regardless of the incident's cause, size, location, or complexity.

By integrating the NIMS liaison role into their emergency preparedness plan, the private sector will be able to provide real-time building information to First Responders during an emergency incident and be able to better understand their role within the NIMS command structure.

To learn more about ICS 100 training for the emergency preparedness role, to obtain the ICS-100 course materials, or to take the course online, go to <http://www.training.fema.gov/EMIWeb/IS/is100.asp>.

A.3.2 For additional information regarding responses to all-hazard emergencies, see <http://www.ready.gov/business/other/library.html>.

A.7.1 An EAP tabletop exercise is a simulated interactive exercise that helps to test the capacity of an organization to respond to a simulated event. The exercise tests multiple functions of an organization's operational plan. It is a coordinated response to a situation in a time-pressured, realistic simulation that involves several agencies.

Tabletop exercises lend themselves to low-stress discussion of coordination and policy. They provide a good environment for problem-solving coordination, as well as an opportunity to acquaint key public sector and response personnel with one another in their mutual responsibilities. Designed to encourage discussion and problem solving, the success of a tabletop exercise is largely measured by the group participation. A well-conducted tabletop exercise is good preparation for a function exercise.

A tabletop exercise focuses on the coordination, integration, and interaction of the organization's policies, procedures, roles, and responsibilities before, during, or after the simulated event. It emphasizes communication among the agencies participating in the exercise. This type of exercise requires more planning, preparation, and coordination than other types of exercises.

The value and the benefit of a tabletop exercise come from representatives from all the agency roles being brought together to participate in the exercise.

For additional information on tabletop exercises, refer to *NFPA 1600[®], Standard on Disaster/Emergency Management and Business Continuity Programs[®]*, 2010 edition.

ANNEX B

Sample of Open Letter to Tenants

TO: Occupants of [insert name or address of building]

RE: ALL-HAZARD EMERGENCIES for [insert name or address of building]

We are providing you with a Building Emergency Package to assist with emergency procedures for [name and address of building]. The effectiveness of the building Emergency Action Plan (EAP) depends on your being familiar with the emergency procedures for fire incidents; all-hazard emergencies for human-caused incidents, such as utility disruptions, bomb threats, workplace violence, and medical emergencies; and natural incidents, such as hurricanes, tornadoes, earthquakes, and flash flooding.

For those reasons, periodic EAP drills will be conducted. It is not necessary in all drills to actually evacuate, but one evacuation drill should be conducted annually to give experience to the building occupants.

In the following material, you will find a description of the emergency equipment, systems, warning devices, and evacuation procedures as well as specific evacuations for the various All-Hazard Emergencies.

On each floor level near the elevators, there is a floor layout denoting locations and routes for accessing exits off the floor. Posted at each stairwell are the names of the Life Safety Floor Wardens, who will assist you during an emergency evacuation. As with any building fire and/or all-hazard emergency, you will be directed by the Fire and Life Safety Director.

Please provide the following information:

Name of Company: _____

Floor(s) Occupied: _____

Name of Primary Contact Person: _____

Telephone: _____ Email: _____

The number of employees on the floor during the following times:

8:00 AM to 5:00 PM _____

5:00 PM to Midnight _____

Midnight to 8:00 AM _____

Weekends _____

NOTE: We encourage every employee with a disability that could affect emergency response to contact the Fire and Life Safety Director at [insert phone number or contact information] to let us know how we can best assist him/her during an evacuation.

Please return the information requested within 10 working days of receiving this letter. If you have any questions, please contact me at [insert phone number or other contact information].

Sincerely,

[Name of Fire and Life Safety Director]

cc: Property Management



ANNEX D

Occupant Tracking Table

| Occupancy Floor & Load | Floor Evacuation Status |
|------------------------|-------------------------|
| 20 TH / 200 | ✓ |
| 19 TH / 150 | ✓ |
| 18 TH / 100 | ✓ |
| 17 TH / 125 | ✓ |
| 16 TH / 100 | ✓ |
| 15 TH / 55 | ✓ |
| 14 TH / 100 | ✓ |
| 12 TH / 75 | ✓ |
| 11 TH / 135 | ✓ |

LINE SAFETYOccupancy Load: Low Moderate HighStair(s): Open Enclosed Side-A Side-B Side-C Side-D Center CoreExterior fire escape / stair: Side-A Side-B Side-C Side-D N/A

Roof access off stair _____ Below grade off stair _____ Access stair levels: _____

Person(s) with Disability Location: _____ Area(s) of Rescue Assistance: _____

BUILDING DATAKey box location: _____ Side: _____ N/ARoofing Structural Members: Truss (Metal Wood / Light Heavyweight) Cold-formed galvanized steel
 Poured concrete / Re-bar Solid wood rafter Wooden 'T' beams Steel 'I' beamsAttic / cockloft access: Top floor (corridor area or interior room) Side _____ Side _____ N/ARoof vent(s): Automatic Manual Side _____ Side _____ N/AFlooring Structural Members: Truss (Metal Wood / Light Heavyweight) Cold-formed galvanized steel
 Poured concrete / Re-bar Solid wood joist Wooden 'T' beams Steel 'I' girderFloor Decking: Concrete (pre-cast poured) Wood (plank plywood composition)Basement: Full dimensions of building Partial If partial, Side _____ N/ABasement Access: Interior: Side _____ Exterior: Side _____ N/ACrawl Space Access: Interior: Side _____ Exterior: Side _____ N/A

Elevator Banks: Elevator key location: _____

Elevator No. _____

Floors Served _____

Elevator Mach. Rm. Floors _____

Heating System: Electric Gas Oil Combination gas/oil Other: _____

Emergency Shut-Off: Division # _____ Side _____ Roof level _____ Side _____

Location: Within room Area On-unit Side: _____Fuel tank location: Above ground Below ground Division #: _____ Side: _____ Fuel tank capacity: _____ N/AHVAC Controls: Division # _____ Side _____ Roof level _____ Side _____ N/A

Division # _____ Side _____ Division # _____ Side _____ Division # _____ Side _____

Smoke Management System: Purge: _____ Automatic Manual N/AAir in-take locations: Division # _____ Roof level _____ Side _____ N/AMechanical Equipment Rm. (MER) Division # _____ Side _____ Division # _____ Side _____ N/AUtility Main Shut-Offs: Emergency Generator: _____ Division # _____ Side _____ N/AELECTRIC Division # _____ Side _____ LP/GAS Division # _____ Side _____ N/AWATER Division # _____ Side _____ NATURAL GAS Division # _____ Side _____ N/A**HAZMAT**MSDSs location: Level 'C' (low) Level 'B' (moderate) Level 'A' (high) N/ARight To Know facility: Yes No SARA facility: Yes NoHazmat locations: Interior Division # _____ Side _____ Division # _____ Side _____ Exterior Division # _____ Side _____ Division # _____ Side _____**EMERGENCY CONTACT INFORMATION**

Emergency Contact Person(s) Business Telephone Mobile Telephone

Property Manager/Superintendent _____

Chief Engineer _____

Safety/Security Director _____

Date: _____ Company #: _____ Officer: _____

FIGURE E Continued



Battalion No.: _____

PRE-INCIDENT PLAN / BUILDING INFORMATION CARD — Detailed Information

No. of stories: A **whole number** represents the number of stories with a flat roof, a **whole number plus a half** ($\frac{1}{2}$) number indicates the number of stories with a sloping/pitch roof. If all four sides of the building do not have the same equal number of stories indicate the sides of the building that have different division levels (i.e., side-A (3)/side-C (4).)

Building Construction Types:

- I. **Fire-resistive:** Structural members, walls, columns, beams, and divisions are fire-rated 2–4 hours with non-combustible materials.
- II. **Non-combustible:** Metal frame, metal-clad, concrete-block with unprotected metal truss joist.
- III. **Ordinary/Combustible:** Exterior bearing walls are non-combustible, while the interior framing, roof and divisions are constructed of wood or unprotected steel.
- IV. **Heavy timber:** The structural members are heavy wooden columns and beams. The construction materials are non-combustible.
- V. **Wood frame:** Balloon (vertical openings between exterior wall studs from basement level to attic) or platform construction (floor joist and assembly are placed on top of the exterior bearing wall studs).

L _____ \times **W** _____ = the needed fire flow (**GPM**) per (div.) floor. — 1st multiply L \times W and divided by 3 = to get the total GPM per (div.) floor involvement (i.e., 100 feet \times 30 feet = 3000 square feet then divide by 3 to get the total GPM per floor = 1000 GPM).

- If less than a total floor reduce accordingly, (i.e., 25% of the fire floor involved = 250 GPM).
- If more than one floor, increase the fire flow accordingly. And for each exposure add 50% of the 100% involvement figure.

Exposures: Describe the exposures to the 4 sides of the building, if the side is a structure give type of occupancy, height, and whether the building is attached or separated by circling **A** if attached building or **S** if a separated building + distance away:

Side A — Hoboken Avenue

Side C — vacant lot

Side B — garage / 1 story – **A**

Side D — multi-family / 3 stories – **S** + 20 ft.

Fire Protection System:

Standpipe Classification:

- **Class I** 2½" thread (firefighter use)
- **Class II** 1½" thread (occupant use)
- **Class III** Combination 2½" thread with a 1½" reducer cap (firefighter/occupant use)

Hazardous Materials:

- Right to Know (**RTK**) and/or Superfund Amendments and Reauthorization Act (**SARA**) facility.
Rank HAZMAT levels A, B, or C so that they are compatible with standard hazardous materials incidents.
- **Other:** List small Hazardous Materials quantities on premises that are not covered by RTK or SARA (i.e., building maintenance shop – flammable/combustible liquids). If Asbestos is present verify with local Hazmat Team or Building Dept.

FIGURE E Continued