NFPA® 1072

Standard for Hazardous Materials/ Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications

2017

NFPA®

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NFPA® 1072

Standard for

Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications

2017 Edition

This edition of NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications*, was prepared by the Technical Committee on Hazardous Materials Response Personnel and released by the Correlating Committee on Professional Qualifications. It was issued by the Standards Council on November 11, 2016, with an effective date of December 1, 2016.

This edition of NFPA 1072 was approved as an American National Standard on December 1, 2016.

Origin and Development of NFPA 1072

The 2017 edition is the first edition of NFPA 1072. The initial request for a document focusing on a hazardous materials/weapons of mass destruction professional qualification was submitted by the North American Fire Training Directors and a recommendation of the fire and emergency services professional qualifications workshop in Dallas/Fort Worth, Texas, in April 2011 to the NFPA Standards Council. The Technical Committee for Hazardous Materials Response Personnel welcomed the opportunity to develop this standard. NFPA 1072 identifies the minimum job performance requirements (JPRs) for personnel at the scene of a hazardous materials/weapons of mass destruction (WMD) incident, including the following levels: awareness, operations, operations mission-specific, hazardous materials technician, and incident commander.

Dedication

The Technical Committee on Hazardous Materials Response Personnel dedicates this project to Mr. Charles J. Wright, one of the original members of the Technical Committee. Charlie's leadership, dedication, and collective contributions over the last 30 years were critical elements of all the Committee's projects, especially NFPA 1072. The greatest comment that we can make is but a simple one: "Charlie Wright was a guy who made a difference." We will miss you!

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Committee Scope: This Committee shall have primary responsibility for documents on the requirements for professional qualifications, professional competence, training, procedures, and equipment for emergency responders to hazardous materials/weapons of mass destruction incidents.

Contents

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Standard for

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

A reference in brackets [ ] following a section or paragraph indicates material that has been extracted from another NFPA document. As an aid to the user, the complete title and edition of the source documents for extracts in mandatory sections of the document are given in Chapter 2 and those for extracts in informational sections are given in Annex E. Extracted text may be edited for consistency and style and may include the revision of internal paragraph references and other references as appropriate. Requests for interpretations or revisions of extracted text shall be sent to the technical committee responsible for the source document.

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

Chapter 1 Administration

1.1* Scope. This standard identifies the minimum job performance requirements (JPRs) for personnel at the scene of a hazardous materials/weapons of mass destruction (WMD) incident at the following levels: awareness, operations, operations mission-specific, hazardous materials technician, and incident commander.

1.2 Purpose. The purpose of this standard is to specify the minimum JPRs for service at the scene of a hazardous materials/weapons of mass destruction incident at the following levels: awareness, operations, operations mission-specific, hazardous materials technician, and incident commander.

1.2.1 This standard shall define personnel at the scene of a hazardous materials/weapons of mass destruction incident at the following levels: awareness, operations, operations mission-specific, hazardous materials technician, and incident commander.

1.2.2 The intent of this standard shall be to ensure that personnel at the scene of a hazardous materials/weapons of mass destruction incident at the levels of awareness, operations, operations mission-specific, hazardous materials technician, and incident commander are qualified.

1.2.3* This standard shall not address organization or management responsibility.

1.2.4 It is not the intent of this standard to restrict any jurisdiction from exceeding or combining these minimum requirements.

1.2.5 JPRs for each level and position are the tasks personnel shall be able to perform to carry out the job duties.

1.2.6* Personnel at the scene of a hazardous materials/weapons of mass destruction incident at the levels of awareness, operations, operations mission-specific, hazardous materials technician, and incident commander shall remain current with the general knowledge and skills and JPRs addressed for each level or position of qualification.

1.3 Application. The application of this standard is to specify which requirements within the document shall apply to personnel at the scene of a hazardous materials/weapons of mass destruction incident at the following levels: awareness, operations, operations mission-specific, hazardous materials technician, and incident commander.

1.3.1 The JPRs shall be accomplished in accordance with the requirements of the authority having jurisdiction (AHJ) and all applicable NFPA standards.

1.3.2 It shall not be required that the JPRs be mastered in the order in which they appear. The AHJ shall establish instructional priority and the training program content to prepare personnel to meet the JPRs of this standard.

1.3.3* Performance of each requirement of this standard shall be evaluated by personnel approved by the AHJ.

1.3.4 The JPRs for each level or position shall be completed in accordance with recognized practices and procedures or as defined by law or by the AHJ.

1.3.5 Personnel assigned the duties at the awareness level shall meet all the requirements defined in Chapter 4 prior to being qualified. Personnel assigned the duties at the operations level shall meet all the requirements defined in Chapter 5 prior to being qualified. Personnel assigned the duties at the technician level shall meet all the requirements defined in Chapter 7 prior to being qualified. Personnel assigned the duties of incident commander shall meet all the requirements defined in Chapter 8 prior to being qualified.

1.3.5.1 Personnel qualified at the operations level who are assigned mission-specific duties of personal protection equipment (PPE), mass decontamination, technical decontamination, evidence preservation and sampling, product control, detection, monitoring, and sampling, victim rescue and recovery, and illicit laboratory incidents shall meet all the require-

ments defined in the applicable subsection within Chapter 6 prior to being qualified.

1.3.6 The AHJ shall provide personal protective clothing and the equipment necessary to conduct assignments.

1.3.7 JPRs involving exposure to products of combustion shall be performed in approved PPE.

1.3.8 Prior to training to meet the requirements of this standard, personnel shall meet the following requirements:

(1) Educational requirements established by the AHJ
(2) Age requirements established by the AHJ
(3) Medical requirements established by the AHJ
(4) Job-related physical performance requirements established by the AHJ

1.3.9 Wherever in this standard the terms *rules*, *regulations*, *policies*, *procedures*, *supplies*, *apparatus*, or *equipment* are referred to, it is implied that they are those of the AHJ.

1.4 Units. In this standard, equivalent values in SI units shall not be considered as the requirement, as these values can be approximate. *(See Table 1.4.)*

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 704, *Standard System for the Identification of the Hazards of Materials for Emergency Response*, 2017 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.

Emergency Response Guidebook, Pipeline and Hazardous Materials Administration, U.S. Department of Transportation, 2016.

Title 18, U.S. Code, Section 2332a, "Use of Weapons of Mass Destruction."

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 51, *Standard for the Design and Installation of Oxygen–Fuel Gas Systems for Welding, Cutting, and Allied Processes*, 2013 edition.

NFPA 70®, *National Electrical Code®* , 2017 edition.

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

NFPA 1000, *Standard for Fire Service Professional Qualifications Accreditation and Certification Systems*, 2017 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.

Table 1.4 U.S.–SI Conversion Factors

Quantity	U.S. Unit/Symbol	SI Unit/Symbol	Conversion Factor
Length	inch (in.) foot (ft)	millimeter (mm) meter (m)	1 in. = 25.4 mm 1 ft = 0.305 m
Area	square foot (ft^2)	square meter (m^2)	1 ft^2 = 0.0929 m^2
Volume	gallon (gal) quart (qt)	liter (L) liter (L)	1 gal = 3.785 l 1 qt = 0.9463 l
Weight	pound (lb)	gram (g)	1 lb = 453.6 g
Pressure	atmosphere (atm) inches of mercury (in. Hg) inches of water (in. H_2O) pounds per square inch (psi) pounds per square inch (psi) pounds per square inch (psi)	millimeters of mercury (mm Hg) millimeters of mercury (mm Hg) millimeters of mercury (mm Hg) millimeters of mercury (mm Hg) bar pascal (Pa)	1 atm = 760 mm Hg 1 in. Hg = 25.4 mm Hg 1 in H_2O = 1.87 mm Hg 1 psi = 51.7 mm Hg 1 psi = 0.068 bar 1 psi = 6894.8 Pa
Radiation	rad rem curie (Ci)	gray (Gy) sievert (Sv) becquerel (Bq)	100 rad = 1 Gy 100 rem = 1 Sv 1 Bq = 2.7×10^{-11} Ci

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

3.2.4 Shall. Indicates a mandatory requirement.

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

3.2.6 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* Allied Professional. That person who possesses the knowledge, skills, and technical competence to provide assistance in the selection, implementation, and evaluation of tasks at a hazardous materials/weapons of mass destruction (WMD) incident.

3.3.2 Analyze. To identify a hazardous materials/weapons of mass destruction (WMD) problem and determine likely behavior and harm within the training and capabilities of the emergency responder.

3.3.3 Assignment. A job, task, role, or function to be performed that can come from a supervisor or other established authority as determined by the authority having jurisdiction (AHJ) (e.g., hazardous materials technician, allied professional, emergency response plans, or standard operating procedures).

3.3.4 Awareness Level Personnel. Personnel who, in the course of their normal duties, could encounter an emergency involving hazardous materials/weapons of mass destruction (WMD) and who are expected to recognize the presence of the hazardous materials/WMD, protect themselves, call for trained personnel, and secure the scene.

3.3.5 CANUTEC. The Canadian Transport Emergency Centre, operated by Transport Canada, that provides emergency response information and assistance on a 24-hour basis for responders to hazardous materials/weapons of mass destruction (WMD) incidents.

3.3.6 CHEMTREC. A public service of the American Chemistry Council that provides emergency response information and assistance on a 24-hour basis for responders to hazardous materials/weapons of mass destruction (WMD) incidents.

3.3.7 Competence. Possessing knowledge, skills, and judgment needed to perform indicated objectives.

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

3.3.9 Container. A receptacle, piping, or pipeline used for storing or transporting material of any kind; synonymous with "packaging" in transportation.

3.3.9.1 ***Bulk Transportation Containers.*** Containers, including transport vehicles, having a liquid capacity of more than 119 gal (450 L), a solids capacity of more than 882 lb (400 kg), or a compressed gas water capacity of more than 1001 lb (454 kg) that are either placed on or in a transport vehicle or vessel or are constructed as an integral part of the transport vehicle, including the following:a. cargo tanks including nonpressure tanks — MC-306/DOT-406 or equivalent, low-pressure tanks — MC-307-DOT-407 or equivalent, corrosive liquid tanks — MC-312/DOT-412 or equivalent, high-pressure tanks — MC-331 or equivalent, and cryogenic tanks — MC-338 or equivalent, compressed gas tubes trailers, and dry bulk cargo tanks; b. portable tanks such as intermodal tanks, including nonpressure tanks, pressure tanks, cryogenic tanks, and tube modules; c. tank cars including nonpressure tank cars, pressure tanks cars, and cryogenic tank cars; and d. ton containers.

3.3.9.2 ***Facility Storage Tanks.*** Atmospheric and low-pressure storage tanks; pressurized storage tanks; and cryogenic storage tanks.

3.3.9.3 ***Intermediate Bulk Containers (IBCs).*** Pressure, nonpressure, and cryogenic rigid or flexible portable containers, other than cylinders or portable tanks, designed for mechanical lifting.

3.3.9.4 ***Nonbulk Containers.*** Containers, including bags, boxes, carboys, cylinders, drums, and Dewar flasks for cryogenic liquids, having a liquid capacity of 119 gal (450 L) or less, a solids capacity of 882 lb (400 kg) or less, or a compressed gas water capacity of 1001 lb (454 kg) or less.

3.3.9.5 ***Pipeline.*** A length of pipe including pumps, valves, flanges, control devices, strainers, and/or similar equipment for conveying fluids. [**70:**427.2]

3.3.9.6 ***Piping.*** Assemblies of piping components used to convey, distribute, mix, separate, discharge, meter, control, or snub fluid flows. Piping also includes pipe-supporting elements but does not include support structures, such as building frames, bents, foundations, or any other equipment excluded from this standard. [**51,** 2013]

3.3.9.7* ***Radioactive Materials Containers.*** Excepted packaging, industrial packaging, Type A, Type B, and Type C packaging for radioactive materials.

3.3.10 Contaminant. A hazardous material, or the hazardous component of a weapon of mass destruction (WMD), that physically remains on or in people, animals, the environment, or equipment, thereby creating a continuing risk of direct injury or a risk of exposure.

3.3.11 Contamination. The process of transferring a hazardous material, or the hazardous component of a weapon of mass destruction (WMD), from its source to people, animals, the environment, or equipment, which can act as a carrier.

3.3.11.1 ***Cross Contamination.*** The process by which a contaminant is carried out of the hot zone and contaminates people, animals, the environment, or equipment.

3.3.12 Control. The procedures, techniques, and methods used in the mitigation of hazardous materials/weapons of mass destruction (WMD) incidents, including containment, extinguishment, and confinement.

3.3.12.1 ***Confinement.*** Those procedures taken to keep a material, once released, in a defined or local area.

3.3.12.2 ***Containment.*** The actions taken to keep a material in its container (e.g., to stop a release of the material or reduce the amount being released).

3.3.12.3 ***Extinguishment.*** To cause to cease burning.

3.3.13* Control Zones. The areas at hazardous materials/weapons of mass destruction (WMD) incidents within an established perimeter that are designated based upon safety and the degree of hazard.

3.3.13.1 ***Cold Zone.*** The control zone of hazardous materials/weapons of mass destruction (WMD) incidents that contains the incident command post and such other support functions as are deemed necessary to control the incident.

3.3.13.2 ***Decontamination Corridor.*** The area usually located within the warm zone where decontamination is performed.

3.3.13.3 ***Hot Zone.*** The control zone immediately surrounding hazardous materials/weapons of mass destruction (WMD) incidents, which extends far enough to prevent adverse effects of hazards to personnel outside the zone and where only personnel who are trained, equipped, and authorized to do assigned work are permitted to enter.

3.3.13.4* ***Warm Zone.*** The control zone at hazardous materials/weapons of mass destruction (WMD) incidents where personnel and equipment decontamination and hot zone support takes place.

3.3.14 Coordination. The process used to get people who might represent different agencies to work together integrally and harmoniously in a common action or effort.

3.3.15* Decontamination. The physical and/or chemical process of reducing and preventing the spread and effects of contaminants to people, animals, the environment, or equipment involved at hazardous materials/weapons of mass destruction (WMD) incidents.

3.3.15.1* ***Emergency Decontamination.*** The process of immediately reducing contamination of individuals in potentially life-threatening situations with or without the formal establishment of a decontamination corridor.

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

3.3.15.3* ***Mass Decontamination.*** The physical process of reducing or removing surface contaminants from large numbers of victims in potentially life-threatening situations in the fastest time possible.

3.3.15.4* ***Technical Decontamination.*** The planned and systematic process of reducing contamination to a level that is as low as reasonably achievable.

3.3.16 Degradation. A chemical action involving the molecular breakdown of a protective clothing material or equipment due to contact with a chemical.

3.3.17* Demonstrate. To show by actual performance.

3.3.18 Describe. To explain verbally or in writing using standard terms recognized by the hazardous materials/weapons of mass destruction (WMD) response community.

3.3.19 Detection and Monitoring Equipment. Instruments and devices used to detect, classify, or quantify materials.

3.3.20 Dispersal Device. Any weapon or combination of mechanical, electrical, or pressurized components that is designed, intended, or used to cause death or serious bodily injury through the release, dissemination, or impact of toxic or poisonous chemicals or their precursors, biological agent, toxin or vector, or radioactive material.

3.3.21 ***Emergency Response Guidebook*** **(ERG).** The reference book, written in plain language, to guide emergency responders in their initial actions at the incident scene, specifically the *Emergency Response Guidebook* from the U.S. Department of Transportation, Transport Canada, and the Secretariat of Transport and Communications, Mexico.

3.3.22 Endangered Area. The actual or potential area of exposure associated with the release of a hazardous materials/weapons of mass destruction (WMD).

3.3.23 Evaluate. To assess or judge the effectiveness of a response operation or course of action within the training and capabilities of the emergency responder.

3.3.24 Evidence Preservation. Deliberate and specific actions taken with the intention of protecting potential evidence from contamination, damage, loss, or destruction.

3.3.25 Example. An illustration of a problem serving to show the application of a rule, principle, or method (e.g., past incidents, simulated incidents, parameters, pictures, and diagrams).

3.3.26* Exposure. The process by which people, animals, the environment, property, and equipment are subjected to or come in contact with a hazardous material/weapon of mass destruction (WMD).

3.3.27 Exposures. The people, animals, environment, property, and equipment that might potentially become exposed at a hazardous materials/weapons of mass destruction (WMD) incident.

3.3.28 Field Screening. A set of procedures, to include at a minimum nondestructive field testing to identify the presence of explosive devices, radiological materials, flammable materials, volatile organic compounds (VOC), strong oxidizers, fluorides, or corrosives, that serves as a protective safety measure prior to collection, transportation, and laboratory analysis.

3.3.29* Fissile Material. Material whose atoms are capable of nuclear fission (capable of being split).

3.3.30 Harm. Adverse effect created by being exposed to a hazard.

3.3.31 Hazard. Capable of causing harm or posing an unreasonable risk to life, health, property, or environment.

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

3.3.33* Hazardous Materials Branch/Group. The function within an overall incident management system (IMS) that deals with the mitigation and control of the hazardous materials/weapons of mass destruction (WMD) portion of an incident.

3.3.34* Hazardous Materials Officer. The person who is responsible for directing and coordinating all operations involving hazardous materials/weapons of mass destruction (WMD) as assigned by the incident commander (IC).

3.3.35* Hazardous Materials Response Team (HMRT). An organized group of trained response personnel operating under an emergency response plan and applicable standard operating procedures who perform hazardous material technician level skills at hazardous materials/weapons of mass destruction (WMD) incidents.

3.3.36* Hazardous Materials Safety Officer. The person who works within an incident management system (IMS) (specifically, the hazardous materials branch/group) to ensure that recognized hazardous materials/weapons of mass destruction (WMD) safe practices are followed at hazardous materials/WMD incidents.

3.3.37* Hazardous Materials Technician. Person who responds to hazardous materials/weapons of mass destruction (WMD) incidents using a risk-based response process to analyze a problem involving hazardous materials/WMD, plan a response to the problem, implement the planned response, evaluate progress of a planned response and adjust as needed, and assist in terminating the incident.

3.3.38 Identify. To select or indicate verbally or in writing using standard terms to establish the fact of an item being the same as the one described.

3.3.39 Incident. An emergency involving the release or potential release of hazardous materials/weapons of mass destruction (WMD).

3.3.40 Incident Analysis. The process of analyzing the risk at an incident by identifying the materials and containers involved, predicting the likely behavior of each container and its contents, and estimating the potential harm or outcomes associated with that behavior.

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

3.3.42 Incident Command System (ICS). A component of an incident management system (IMS) designed to enable effective and efficient on-scene incident management by integrating organizational functions, tactical operations, incident planning, incident logistics, and administrative tasks within a common organizational structure.

3.3.43* Incident Management System (IMS). A process that defines the roles and responsibilities to be assumed by personnel and the operating procedures to be used in the management and direction of emergency operations to include the incident command system (ICS), unified command, multiagency coordination systems, training, and management of resources.

3.3.44* Job Performance Requirement (JPR). A written statement that describes a specific job task, lists the items necessary to complete the task, and defines measurable or observable outcomes and evaluation areas for the specific task. [**1000,** 2017]

3.3.45 Match. To provide with a counterpart.

3.3.46 Objective. A goal that is achieved through the attainment of a skill, knowledge, or both, that can be observed or measured.

3.3.47 Penetration. The movement of a material through a suit's closures, such as zippers, buttonholes, seams, flaps, or other design features of chemical-protective clothing, and through punctures, cuts, and tears.

3.3.48 Permeation. A chemical action involving the movement of chemicals, on a molecular level, through intact material.

3.3.49* Personal Protective Equipment (PPE). The protective clothing and respiratory protective equipment provided to shield or isolate a person from the hazards encountered at hazardous materials/weapons of mass destruction (WMD) incident operations.

3.3.50 Plan.

3.3.50.1* ***Emergency Response Plan (ERP).*** A plan developed by the authority having jurisdiction (AHJ) with the cooperation of all participating agencies and organizations, including a jurisdiction with emergency responsibilities and those outside the jurisdiction who have entered into response/support agreements, that identifies goals and objectives for that emergency type, agency roles, and overall strategies

3.3.50.2* ***Incident Action Plan (IAP).*** An oral or written plan approved by the incident commander (IC) containing general objectives reflecting the overall strategy for managing an incident for a specific time frame and target location.

3.3.50.3* ***Site Safety and Control Plan.*** A site-specific safety document used within the incident command system (ICS) to organize information important to hazardous materials response operations.

3.3.51* Planned Response. The incident action plan, with the site safety and control plan, consistent with the emergency

response plan and/or standard operating procedures for a specific hazardous materials/weapons of mass destruction (WMD) incident.

3.3.52 Predict. To estimate or forecast the future behavior of a hazardous materials/weapons of mass destruction (WMD) container and/or its contents within the training and capabilities of the emergency responder.

3.3.53* Protective Clothing. Equipment designed to protect the wearer from thermal hazards, hazardous materials, or the hazardous component of a weapon of mass destruction (WMD) contacting the skin or eyes.

3.3.53.1 ***Ballistic Protective Clothing (BPC).*** An item of personal protective equipment (PPE) that provides protection against specific ballistic threats by helping to absorb the impact and reduce or prohibit penetration to the body from bullets and steel fragments from handheld weapons and exploding munitions.

3.3.53.2* ***Chemical-Protective Clothing (CPC).*** The ensemble elements (garment, gloves, and footwear) provided to shield or isolate a person from the hazards encountered during hazardous materials/WMD incident operations.

3.3.53.2.1* ***Liquid Splash–Protective Ensemble.*** Multiple elements of compliant protective clothing and equipment products that when worn together provide protection from some, but not all, risks of hazardous materials/WMD emergency incident operations involving liquids.

3.3.53.2.2* ***Vapor-Protective Ensemble.*** Multiple elements of compliant protective clothing and equipment that when worn together provide protection from some, but not all, risks of vapor, liquid-splash, and particulate environments during hazardous materials/WMD incident operations.

3.3.53.3* ***High Temperature–Protective Clothing.*** Protective clothing designed to protect the wearer for short-term high temperature exposures.

3.3.53.4* ***Structural Fire-Fighting Protective Clothing.*** The fire-resistant protective clothing normally worn by fire fighters during structural fire-fighting operations, which includes a helmet, coat, pants, boots, gloves, PASS device, and a fire-resistant hood to cover parts of the head and neck not protected by the helmet and respirator facepiece.

3.3.54 Public Safety Sampling. The detection, monitoring, or collection of a material for the purposes of determining the hazards present and to guide public safety response decisions.

3.3.55 Qualified. Having knowledge of the installation, construction, or operation of apparatus and the hazards involved.

3.3.56* Respiratory Protection. Equipment designed to protect the wearer from the inhalation of contaminants.

3.3.57* Response. That portion of incident management in which personnel are involved in controlling hazardous materials/weapons of mass destruction (WMD) incidents.

3.3.58 Risk The probability or threat of suffering a harm or loss.

3.3.59 Risk-Based Response Process. Systematic process by which responders analyze a problem involving hazardous materials/weapons of mass destruction (WMD), assess the hazards, evaluate the potential consequences, and determine appropriate response actions based upon facts, science, and the circumstances of the incident.

3.3.60* Safety Data Sheet (SDS). Formatted information, provided by chemical manufacturers and distributors of hazardous products, about chemical composition, physical and chemical properties, health and safety hazards, emergency response, and waste disposal of the material.

3.3.61* Sampling. The process of selecting materials to analyze.

3.3.62 SETIQ. The Emergency Transportation System for the Chemical Industry in Mexico that provides emergency response information and assistance on a 24-hour basis for responders to emergencies involving hazardous materials/weapons of mass destruction (WMD).

3.3.63 Stabilization. The point in an incident when the adverse behavior of the hazardous material, or the hazardous component of a weapon of mass destruction (WMD), is controlled.

3.3.64 Standard Operating Procedure (SOP). A written directive that establishes specific operational or administrative methods to be followed routinely for the performance of a task or for the use of equipment.

3.3.65 Surrounding Conditions. Conditions to be taken into consideration when identifying the scope of a hazardous materials/WMD incident, including but not limited to topography; land use, including utilities and fiber-optic cables; accessibility; weather conditions; bodies of water, including recharge ponds; public exposure potential; patient presentation; overhead and underground wires and pipelines; storm and sewer drains; possible ignition sources; adjacent land use such as rail lines, highways, and airports; and the nature and extent of injuries.

3.3.66 Termination. That portion of incident management after the cessation of tactical operations in which personnel are involved in documenting safety procedures, site operations, hazards faced, and lessons learned from the incident and include specifications for debriefing, post-incident analysis, and critique in a specific sequence.

3.3.66.1 ***Debriefing.*** An element of incident termination that focuses on the following: (1) informing responders exactly what hazmat they were (possibly) exposed to and the signs and symptoms of exposure; (2) identifying damaged equipment requiring replacement or repair; (3) identifying equipment or supplies requiring specialized decontamination or disposal; (4) identifying unsafe work conditions; (5) assigning information-gathering responsibilities for a post-incident analysis.

3.3.66.2 ***Post-Incident Analysis.*** An element of incident termination that includes completion of the required incident reporting forms, determining the level of financial responsibility, and assembling documentation for conducting a critique.

3.3.66.3 ***Critique.*** An element of incident termination that examines the overall effectiveness of the emergency response effort and develops recommendations for improvement.

3.3.67* UN/NA Identification Number. The four-digit number assigned to a hazardous material/weapon of mass

destruction (WMD)that is used to identify and cross-reference products in the transportation mode.

3.3.68* Weapon of Mass Destruction (WMD). (1) Any destructive device, such as any explosive, incendiary, or poison gas bomb, grenade, rocket having a propellant charge of more than 4 oz (113 grams), missile having an explosive or incendiary charge of more than 0.25 oz (7 grams), mine, or similar device; (2) any weapon involving toxic or poisonous chemicals; (3) any weapon involving a disease organism; or (4) any weapon that is designed to release radiation or radioactivity at a level dangerous to human life.

3.3.68.1* ***Radiological Weapons of Mass Destruction.***

3.3.68.1.1* ***Improvised Nuclear Device (IND).*** An illicit nuclear weapon that is bought, stolen, or otherwise obtained from a nuclear state (that is, a national government with nuclear weapons), or a weapon fabricated from fissile material that is capable of producing a nuclear explosion.

3.3.68.1.2* ***Radiation Exposure Device (RED).*** A deviceintended to cause harm by exposing people to radiation without spreading radioactive material.

3.3.68.1.3* ***Radiological Dispersal Device (RDD).*** A device designed to spread radioactive material through a detonation of conventional explosives or other means.

3.4 Operations Level Responder Definitions.

3.4.1 Mission-Specific Competencies. The knowledge, skills, and judgment needed by operations level responders who have completed the operations level competencies and who are designated by the authority having jurisdiction (AHJ) to perform mission-specific tasks, such as decontamination, victim/hostage rescue and recovery, evidence preservation, and sampling.

3.4.2* Operations Level Responders. Persons who respond to hazardous materials/weapons of mass destruction (WMD) incidents for the purpose of implementing or supporting actions to protect nearby persons, the environment, or property from the effects of the release.

3.4.3 Operations Level Responders Assigned to Perform Air Monitoring and Sampling. Persons, competent at the operations level, who are assigned to implement air monitoring and sampling operations at hazardous materials/weapons of mass destruction (WMD) incidents.

3.4.4 Operations Level Responders Assigned to Perform Evidence Preservation and Sampling. Persons, competent at the operations level, who are assigned to preserve forensic evidence, take samples, and/or seize evidence at hazardous materials/weapons of mass destruction (WMD) incidents involving potential violations of criminal statutes or governmental regulations.

3.4.5 Operations Level Responders Assigned to Perform Mass Decontamination. Persons, competent at the operations level, who are assigned to implement mass decontamination operations at hazardous materials/weapons of mass destruction (WMD) incidents.

3.4.6 Operations Level Responders Assigned to Perform Product Control. Persons, competent at the operations level, who are assigned to implement product control measures at hazardous materials/weapons of mass destruction (WMD) incidents.

3.4.7 Operations Level Responders Assigned to Perform Technical Decontamination. Persons, competent at the operations level, who are assigned to implement technical decontamination operations at hazardous materials/weapons of mass destruction (WMD) incidents.

3.4.8 Operations Level Responders Assigned to Perform Victim Rescue/Recovery. Persons, competent at the operations level, who are assigned to rescue and/or recover exposed and contaminated victims at hazardous materials/weapons of mass destruction (WMD) incidents.

3.4.9 Operations Level Responders Assigned to Respond to Illicit Laboratory Incidents. Persons, competent at the operations level, who, at hazardous materials/weapons of mass destruction (WMD) incidents involving potential violations of criminal statutes specific to the illegal manufacture of methamphetamines, other drugs, or weapon of mass destruction (WMD), are assigned to secure the scene, identify the laboratory/process, and preserve evidence.

3.4.10 Operations Level Responders Assigned to Use Personal Protective Equipment (PPE). Persons, competent at the operations level, who are assigned to use personal protective equipment at hazardous materials/weapons of mass destruction (WMD) incidents.

Chapter 4 Awareness

4.1 General.

4.1.1 Awareness personnel are those persons who, in the course of their normal duties, could encounter an emergency involving hazardous materials/weapons of mass destruction (WMD) and who are expected to recognize the presence of the hazardous materials/WMD, protect themselves, call for trained personnel, and secure the area.

4.1.2* Awareness personnel shall meet the job performance requirements defined in Sections 4.2 through 4.4.

4.1.3 General Knowledge Requirements. Role of awareness personnel at a hazardous materials/WMD incident, location and contents of the AHJ emergency response plan, and standard operating procedures for awareness personnel.

4.1.4 General Skills Requirements. (Reserved)

4.2* Recognition and Identification.

4.2.1 Recognize and identify the hazardous materials/WMD and hazards involved in a hazardous materials/WMD incident, given a hazardous materials/WMD incident, and approved reference sources, so that the presence of hazardous materials/WMD is recognized and the materials and their hazards are identified.

(A)* Requisite Knowledge. What hazardous materials and WMD are; basic hazards associated with classes and divisions; indicators to the presence of hazardous materials including container shapes,NFPA 704 markings,globally harmonized system (GHS) markings, placards, labels, pipeline markings, other transportation markings, shipping papers with emergency response information, and other indicators; accessing information from the *Emergency Response Guidebook* (ERG)

(current edition) using name of the material, UN/NA identification number, placard applied, or container identification charts; and types of hazard information available from the ERG, safety data sheets (SDS), shipping papers with emergency response information, and other approved reference sources.

(B)* Requisite Skills. Recognizing indicators to the presence of hazardous materials/WMD; identifying hazardous materials/WMD by name, UN/NA identification number, placard applied, or container identification charts; and using the ERG, SDS, shipping papers with emergency response information, and other approved reference sources to identify hazardous materials/WMD and their potential fire, explosion, and health hazards.

4.3* Initiate Protective Actions.

4.3.1 Isolate the hazard area and deny entry at a hazardous materials/WMD incident, given a hazardous materials/WMD incident, policies and procedures, and approved reference sources, so that the hazard area is isolated and secured, personal safety procedures are followed, hazards are avoided or minimized, and additional people are not exposed to further harm.

(A)* Requisite Knowledge. Use of the ERG, SDS, shipping papers with emergency response information, and other approved reference sources to identify precautions to be taken to protect responders and the public; policies and procedures for isolating the hazard area and denying entry; and the purpose of and methods for isolating the hazard area and denying entry.

(B)* Requisite Skills. Recognizing precautions for protecting responders and the public; identifyingisolation areas, denying entry, and avoiding minimizing hazards.

4.4 Notification.

4.4.1 Initiate required notifications at a hazardous materials/WMD incident, given a hazardous materials/WMD incident, policies and procedures, and approved communications equipment, so that the notification process is initiated and the necessary information is communicated.

(A) Requisite Knowledge. Policies and procedures for notification, reporting, and communications; types of approved communications equipment; and the operation of that equipment.

(B) Requisite Skills. Operating approved communications equipment and communicating in accordance with policies and procedures.

Chapter 5 Operations

5.1 General.

5.1.1 Operations level responders are those persons who respond to hazardous materials/weapons of mass destruction (WMD) incidents for the purpose of implementing or supporting actions to protect nearby persons, the environment, or property from the effects of the release.

5.1.2 Operations level responders shall meet the job performance requirements defined in Sections 4.2 through 4.4.

5.1.3 Operations level responders shall meet the job performance requirements defined in Sections 5.2 through 5.6.

5.1.4 Operations level responders shall have additional competencies that are specific to the response mission and expected tasks as determined by the AHJ.

5.1.5 General Knowledge Requirements. Role of operations level responders at a hazardous materials/WMD incident; location and contents of AHJ emergency response plan and standard operating procedures for operations level responders, including those response operations for hazardous materials/WMD incidents.

5.1.6 General Skills Requirements. (Reserved)

5.2* Identify Potential Hazards.

5.2.1 Identify the scope of the problem at a hazardous materials/WMD incident, given a hazardous materials/WMD incident, an assignment, policies and procedures, and approved reference sources, so that container types, materials, location of any release, and surrounding conditions are identified, hazard information is collected, the potential behavior of a material and its container is identified, and the potential hazards, harm, and outcomes associated with that behavior are identified.

(A)* Requisite Knowledge. Definitions of hazard classes and divisions; types of containers; container identification markings, including piping and pipeline markings and contacting information; types of information to be collected during the hazardous materials/WMD incident survey; availability of shipping papers in transportation and of safety data sheets (SDS) at facilities; types of hazard information available from and how to contact CHEMTREC, CANUTEC, and SETIQ, governmental authorities, and manufacturers, shippers, and carriers; how to communicate with carrier representatives to reduce impact of a release; basic physical and chemical properties, including boiling point, chemical reactivity, corrosivity (pH), flammable (explosive) range [LFL (LEL) and UFL (UEL)], flash point, ignition (autoignition) temperature, particle size, persistence, physical state (solid, liquid, gas), radiation (ionizing and nonionizing), specific gravity, toxic products of combustion, vapor density, vapor pressure, and water solubility; how to identify the behavior of a material and its container based on the material's physical and chemical properties and the hazards associated with the identified behavior; examples of potential criminal and terrorist targets; indicators of possible criminal or terrorist activity for each of the following: chemical agents, biological agents, radiological agents, illicit laboratories (i.e., clandestine laboratories, weapons labs, ricin labs), and explosives; additional hazards associated with terrorist or criminal activities, such as secondary devices; and how to determine the likely harm and outcomes associated with the identified behavior and the surrounding conditions.

(B)* Requisite Skills. Identifying container types, materials, location of release, and surrounding conditions at a hazardous materials/WMD incident; collecting hazard information; communicating with pipeline operators or carrier representatives; describing the likely behavior of the hazardous materials or WMD and its container; and describing the potential hazards, harm, and outcomes associated with that behavior and the surrounding conditions.

5.3* Identify Action Options.

5.3.1 Identify the action options for a hazardous materials/WMD incident, given a hazardous materials/WMD incident, an assignment, policies and procedures, approved reference sources, and the scope of the problem, so that

response objectives, action options, safety precautions, suitability of approved personal protective equipment (PPE) available, and emergency decontamination needs are identified.

(A)* Requisite Knowledge. Policies and procedures for hazardous materials/WMD incident operations; basic components of an incident action plan (IAP); modes of operation (offensive, defensive, and nonintervention); types of response objectives; types of action options; types of response information available from the *Emergency Response Guidebook* (ERG), safety data sheets (SDS), shipping papers with emergency response information, and other resources; types of information available from and how to contact CHEMTREC, CANUTEC, and SETIQ, governmental authorities, and manufacturers, shippers, and carriers (highway, rail, water, air, pipeline); safety procedures; risk analysis concepts; purpose, advantages, limitations, and uses of approved PPE to determine if PPE is suitable for the incident conditions; difference between exposure and contamination; contamination types, including sources and hazards of carcinogens at incident scenes; routes of exposure; types of decontamination (emergency, mass, and technical); purpose, advantages, and limitations of emergency decontamination; and procedures, tools, and equipment for performing emergency decontamination.

(B)* Requisite Skills. Identifying response objectives and action options based on the scope of the problem and available resources; identifying whether approved PPE is suitable for the incident conditions; and identifying emergency decontamination needs based on the scope of the problem.

5.4* Action Plan Implementation.

5.4.1 Perform assigned tasks at a hazardous materials/WMD incident, given a hazardous materials/WMD incident; an assignment with limited potential of contact with hazardous materials/WMD, policies and procedures, the scope of the problem,approved tools, equipment, and PPE, so that protective actions and scene control are established and maintained,on-scene incident command is described, evidence is preserved, approved PPE is selected and used in the proper manner; exposures and personnel are protected; safety procedures are followed; hazards are avoided or minimized; assignments are completed; and gross decontamination of personnel, tools, equipment, and PPE is conducted in the field.

(A)* Requisite Knowledge. Scene control procedures; procedures for protective actions, including evacuation and sheltering-in-place; procedures for ensuring coordinated communications between responders and to the public; evidence recognition and preservation procedures; incident command organization; purpose, importance, benefits, and organization of incident command at hazardous materials/WMD incidents; policies and procedures for implementing incident command at hazardous materials/WMD incidents; capabilities, limitations, inspection, donning, working in, going through decontamination while wearing, doffing approved PPE; signs and symptoms of thermal stress; safety precautions when working at hazardous materials/WMD incidents; purpose, advantages, and limitations of gross decontamination; the need for gross decontamination in the field based on the task(s) performed and contamination received, including sources and hazards of carcinogens at incident scenes; gross decontamination procedures for personnel, tools, equipment, and PPE; and cleaning, disinfecting, and inspecting tools, equipment, and PPE.

(B)* Requisite Skills. Establishing and maintaining scene control; recognizing and preserving evidence; inspecting, donning, working in, going through decontamination while wearing, and doffing approved PPE; isolating contaminated tools, equipment, and PPE; conducting gross decontamination of contaminated personnel, tools, equipment, and PPE in the field; and cleaning, disinfecting, and inspecting approved tools, equipment, and PPE.

5.5 Emergency Decontamination.

5.5.1 Perform emergency decontamination at a hazardous materials/WMD incident, given a hazardous materials/WMD incident that requires emergency decontamination; an assignment; scope of the problem; policies and procedures; and approved tools, equipment, and PPE for emergency decontamination, so that emergency decontamination needs are identified, approved PPE is selected and used, exposures and personnel are protected, safety procedures are followed, hazards are avoided or minimized, emergency decontamination is set up and implemented, and victims and responders are decontaminated.

(A) Requisite Knowledge. Contamination, cross contamination, and exposure; contamination types; routes of exposure; types of decontamination (emergency, mass, and technical); purpose, advantages, and limitations of emergency decontamination; policies and procedures for performing emergency decontamination; approved tools and equipment for emergency decontamination; and hazard avoidance for emergency decontamination.

(B) Requisite Skills. Selecting an emergency decontamination method; setting up emergency decontamination in a safe area; using PPE in the proper manner; implementing emergency decontamination; preventing spread of contamination; and avoiding hazards during emergency decontamination.

5.6* Progress Evaluation and Reporting.

5.6.1 Evaluate and report the progress of the assigned tasks for a hazardous materials/WMD incident, given a hazardous materials/WMD incident, an assignment, policies and procedures, status of assigned tasks, and approved communication tools and equipment, so that the effectiveness of the assigned tasks is evaluated and communicated to the supervisor, who can adjust the IAP as needed.

(A)* Requisite Knowledge. Components of progress reports; policies and procedures for evaluating and reporting progress; use of approved communication tools and equipment; signs indicating improving, static, or deteriorating conditions based on the objectives of the action plan; and circumstances under which it would be prudent to withdraw from a hazardous materials/WMD incident.

(B)* Requisite Skills. Determining incident status; determining whether the response objectives are being accomplished; using approved communications tools and equipment; and communicating the status of assigned tasks.

Chapter 6 Operations Mission-Specific

6.1 General.

6.1.1 Operations level responders assigned mission-specific responsibilities at hazardous materials/WMD incidents are those operations level responders designated by the AHJ to

perform additional tasks to support the AHJ's response mission, expected tasks, equipment, and training in the following areas:

(1) Personal protection equipment (PPE) *(see Section 6.2)*
(2) Mass decontamination *(see Section 6.3)*
(3) Technical decontamination *(see Section 6.4)*
(4) Evidence preservation and sampling *(see Section 6.5)*
(5) Product control *(see Section 6.6)*
(6) Detection, monitoring, and public safety sampling *(see Section 6.7)*
(7) Victim rescue and recovery *(see Section 6.8)*
(8) Illicit laboratory incidents *(see Section 6.9)*

6.1.2 Operations level responders assigned mission-specific responsibilities at hazardous materials/weapons of mass destruction (WMD) incidents shall meet the job performance requirements defined in Sections 4.2 through 4.4.

6.1.3 Operations level responders assigned mission-specific responsibilities at hazardous materials/WMD incidents shall meet the job performance requirements defined in Sections 5.2 through 5.6.

6.1.4 Operations level responders assigned mission-specific responsibilities at hazardous materials/WMD incidents shall have additional competencies that are specific to their response mission, expected tasks, equipment, and training as determined by the AHJ.

6.1.5* Qualification for operations level responders assigned mission-specific responsibilities at hazardous materials/WMD incidents is specific to a mission area. For qualification, operations mission-specific responders shall perform all the job performance requirements listed in at least one level of a specialty area (Sections 6.2 through 6.9). Operations mission-specific responders will be identified by their specialty.

6.1.6* Operations level responders assigned mission-specific responsibilities at hazardous materials/WMD incidents shall operate under the guidance of a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures.

6.1.7 General Knowledge Requirements. (Reserved)

6.1.8 General Skills Requirements. (Reserved)

6.2* Personal Protective Equipment.

6.2.1 Select, don, work in, and doff approved PPE at a hazardous materials/WMD incident, given a hazardous materials/WMD incident; a mission-specific assignment in an IAP that requires use of PPE; the scope of the problem; response objectives and options for the incident; access to a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures; approved PPE; and policies and procedures, so that under the guidance of a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures, approved PPE is selected, inspected, donned, worked in, decontaminated, and doffed; exposures and personnel are protected; safety procedures are followed; hazards are avoided or minimized; and all reports and documentation pertaining to PPE use are completed.

(A)* Requisite Knowledge. Policies and procedures for PPE selection and use; importance of working under the guidance of a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures when selecting and using PPE; the capabilities and limitations of and specialized donning, doffing, and usage procedures for approved PPE; components of an incident action plan (IAP); procedures for decontamination, inspection, maintenance, and storage of approved PPE; process for being decontaminated while wearing PPE; and procedures for reporting and documenting the use of PPE.

(B) Requisite Skills. Selecting PPE for the assignment; inspecting, maintaining, storing, donning, working in, and doffing PPE; going through decontamination (emergency and technical) while wearing the PPE; and reporting and documenting the use of PPE.

6.3* Mass Decontamination.

6.3.1 Perform mass decontamination for ambulatory and nonambulatory victims at a hazardous materials/WMD incident, given a hazardous materials/WMD incident that requires mass decontamination; an assignment in an IAP; scope of the problem; policies and procedures; approved tools, equipment, and PPE; and access to a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures, so that under the guidance of a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures, a mass decontamination process is selected, set up, implemented, evaluated, and terminated; approved PPE is selected and used; exposures and personnel are protected; safety procedures are followed; hazards are avoided or minimized; personnel, tools, and equipment are decontaminated; and all reports and documentation of mass decontamination operations are completed.

(A)* Requisite Knowledge. Types of PPE and the hazards for which they are used; advantages and limitations of operations and methods of mass decontamination; policies and procedures for performing mass decontamination; approved tools, equipment, and PPE for performing mass decontamination; crowd management techniques; and AHJ's mass decontamination team positions, roles and responsibilities; and requirements for reporting and documenting mass decontamination operations.

(B)* Requisite Skills. Selecting and using PPE; selecting a mass decontamination method to minimize the hazard; setting up and implementing mass decontamination operations in a safe location; evaluating the effectiveness of the mass decontamination method; and completing required reports and supporting documentation for mass decontamination operations.

6.4* Technical Decontamination.

6.4.1 Perform technical decontamination in support of entry operations and for ambulatory and nonambulatory victims at a hazardous materials/WMD incident, given a hazardous materials/WMD incident that requires technical decontamination; an assignment in an IAP; scope of the problem; policies and procedures for technical decontamination; approved tools, equipment, and PPE; and access to a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures, so that under the guidance of a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures, a technical decontamination method is selected, set up, implemented, evaluated, and terminated; approved PPE is selected

and used; exposures and personnel are protected; safety procedures are followed; hazards are avoided or minimized; personnel, tools, and equipment are decontaminated; and all reports and documentation of technical decontamination operations are completed.

(A)* Requisite Knowledge. Types of PPE and the hazards for which they are used; importance of working under the guidance of a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures; advantages and limitations of operations and methods of technical decontamination; technical decontamination methods and their advantages and limitations; policies and procedures for performing technical decontamination; approved tools, equipment, and PPE for performing technical decontamination; AHJ's technical decontamination team positions, roles, and responsibilities; and requirements for reporting and documenting technical decontamination operations.

(B)* Requisite Skills. Selecting and using PPE; selecting a technical decontamination procedure to minimize the hazard; setting up and implementing technical decontamination operations; evaluating the effectiveness of the technical decontamination process; and completing reporting and documentation requirements.

6.5* Evidence Preservation and Public Safety Sampling.

6.5.1 Perform evidence preservation and public safety sampling at a hazardous materials/WMD incident, given a hazardous materials/WMD incident involving potential violations of criminal statutes or governmental regulations, including suspicious letters and packages, illicit laboratories, a release/attack with a WMD agent, and environmental crimes; an assignment in an IAP; scope of the problem; policies and procedures; approved tools, equipment, and PPE; and access to a hazardous materials technician, an allied professional, including law enforcement personnel or others with similar authority, an emergency response plan, or standard operating procedures, so that under the guidance of a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures, hazardous materials/WMD incidents with a potential violation of criminal statutes or governmental regulations are identified; notify agency/agencies having investigative jurisdiction and hazardous explosive device responsibility for the type of incident are notified; approved PPE is selected and used; exposures and personnel are protected; safety procedures are followed; hazards are avoided or minimized; evidence is identified and preserved; public safety samples are collected, and packaged, and the outside packaging is decontaminated; emergency responders, tools, and equipment are decontaminated; and evidence preservation and public safety sampling operations are reported and documented.

(A) Requisite Knowledge. Types of PPE and the hazards for which they are used; importance of working under the guidance of a hazardous materials technician, an allied professionalincluding law enforcement personnel or others with similar authority, an emergency response plan, or standard operating procedures; unique aspects of a suspicious letter, a suspicious package or device, an illicit laboratory, or a release/attack with a WMD agent; potential violations of criminal statutes or governmental regulations; agencies having response authority to collect evidence and public safety samples; agencies having investigative law enforcement authority to collect evidence or public safety samples; notification procedures for agencies having investigative law enforcement authority and hazardous explosive device responsibility; chain-of-custody procedures; securing, characterization, and preservation of the scene and potential forensic evidence; approved documentation procedures; types of evidence; use and limitations of equipment to conduct field screening of samples to screen for corrosivity, flammability, oxidizers, radioactivity, volatile organic compounds (VOC), and fluorides for admission into the Laboratory Response Network or other forensic laboratory system; use of collection kits; collection and packaging of public safety samples; decontamination of outside packaging; prevention of secondary contamination; protection and transportation requirements for sample packaging; and requirements for reporting and documenting evidence preservation and public safety sampling operations.

(B) Requisite Skills. Identifying incidents with a potential violation of criminal statutes or governmental regulations; identifying the agency having investigative jurisdiction over an incident that is potentially criminal in nature or a violation of government regulations; operating field screening and sampling equipment to screen for corrosivity, flammability, oxidizers, radioactivity, volatile organic compounds (VOC), and fluorides; securing, characterizing, and preserving the scene; identifying and protecting potential evidence until it can be collected by an agency with investigative authority; following chain-of-custody procedures; characterizing hazards; performing protocols for field screening samples for admission into the Laboratory Response Network or other forensic laboratory system; protecting evidence from secondary contamination; determining agency having response authority to collect public safety samples; collecting public safety samples; packaging and labeling samples; decontaminating samples; determining agency having investigative law enforcement authority to collect evidence and public safety samples; decontaminating outside sample packaging; preparing samples for protection and transportation to a laboratory; and completing required reports and supporting documentation for evidence preservation and public safety sampling operations.

6.6* Product Control.

6.6.1 Perform product control techniques with a limited risk of personal exposure at a hazardous materials/WMD incident, given a hazardous materials/WMD incident with release of product; an assignment in an IAP; scope of the problem; policies and procedures; approved tools, equipment, control agents, and PPE; and access to a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures, so that under the guidance of a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures, approved PPE is selected and used; exposures and personnel are protected; safety procedures are followed; hazards are avoided or minimized; a product control technique is selected and implemented; the product is controlled; victims, personnel, tools, and equipment are decontaminated; and product control operations are reported and documented.

(A)* Requisite Knowledge. Types of PPE and the hazards for which they are used; importance of working under the guidance of a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures; definitions of control, confinement, containment, and extinguishment; policies and procedures; product control methods for controlling a release with limited risk of personal

exposure; safety precautions associated with each product control method; location and operation of remote/emergency shutoff devices in cargo tanks and intermodal tanks in transportation and containers at facilities, that contain flammable liquids and flammable gases; characteristics and applicability of approved product control agents; use of approved tools and equipment; and requirements for reporting and documenting product control operations.

(B)* Requisite Skills. Selecting and using PPE; selecting and performing product control techniques to confine/contain the release with limited risk of personal exposure; using approved control agents and equipment on a release involving hazardous materials/WMD; using remote control valves and emergency shutoff devices on cargo tanks and intermodal tanks in transportation and containers at fixed facilities; and performing product control techniques.

6.7* Detection, Monitoring, and Sampling.

6.7.1 Perform detection, monitoring, and sampling at a hazardous materials/WMD incident, given a hazardous materials/WMD incident; an assignment in an IAP; scope of the problem; policies and procedures; approved resources; detection, monitoring, and sampling equipment; PPE; and access to a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures, so that under the guidance of a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures, detection, monitoring, and sampling methods are selected; approved equipment is selected for detection, monitoring, or sampling of solid, liquid, or gaseous hazardous materials/WMD; approved PPE is selected and used; exposures and personnel are protected; safety procedures are followed; hazards are avoided or minimized; detection, monitoring, and sampling operations are implemented as needed; results of detection, monitoring, and sampling are read, interpreted, recorded, and communicated; personnel and their equipment are decontaminated; detection, monitoring, and sampling equipment is maintained; and detection, monitoring, and sampling operations are reported and documented.

(A)* Requisite Knowledge. Types of PPE and the hazards for which they are used; capabilities and limitations of approved PPE; importance of working under the guidance of a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures; approved detection, monitoring, and sampling equipment; policies and procedures for detection, monitoring, and sampling; process for selection of detection, monitoring, and sampling equipment for an assigned task; operation of approved detection, monitoring, and sampling equipment; capabilities, limitations, and local monitoring procedures, including action levels and field testing; how to read and interpret results; methods for decontaminating detection, monitoring, and sampling equipment according to manufacturers' recommendations or AHJ policies and procedures; maintenance procedures for detection, monitoring, and sampling equipment according to manufacturers' recommendations or AHJ policies and procedures; and requirements for reporting and documenting detection, monitoring, and sampling operations.

(B) Requisite Skills. Selecting and using PPE; field testing and operating approved detection, monitoring, and sampling equipment; reading, interpreting, and documenting the readings from detection, monitoring, and sampling equipment; communicating results of detection, monitoring, and sampling; decontaminating detection, monitoring, and sampling equipment; maintaining detection, monitoring, and sampling equipment according to manufacturers' specifications or AHJ policies and procedures; and completing required reports and supporting documentation for detection, monitoring, and sampling operations.

6.8* Victim Rescue and Recovery.

6.8.1 Perform rescue and recovery operations at a hazardous materials/WMD incident, given a hazardous materials/WMD incident involving exposed and/or contaminated victims; an assignment in an IAP; scope of the problem; policies and procedures; approved tools, equipment, including special rescue equipment, and PPE; and access to a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures, so that under the guidance of a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures, the feasibility of conducting a rescue or a recovery operation is determined; approved PPE is selected and used; exposures and personnel are protected; safety procedures are followed; hazards are avoided or minimized; rescue or recovery options are selected within the capabilities of available personnel, approved tools, equipment, special rescue equipment, and PPE; victims are rescued or recovered; victims are prioritized and patients are triaged and transferred to the decontamination group, casualty collection point, area of safe refuge, or medical care in accordance with the IAP; personnel, victims, and equipment used are decontaminated; and victim rescue and recovery operations are reported and documented.

(A)* Requisite Knowledge. Types of PPE and the hazards for which they are used; capabilities and limitations of approved PPE; importance of working under the guidance of a hazardous materials technician, an allied professional, an emergency response plan, or standard operating procedures; the difference between victim rescue and victim recovery; victim prioritization and patient triage methods; considerations for determining the feasibility of rescue or recovery operations; policies and procedures for implementing rescue and recovery; safety issues; capabilities and limitations of approved PPE; procedures, specialized rescue equipment required, and incident response considerations for rescue and recovery in the following situations: (1) line-of-sight with ambulatory victims, (2) line-of-sight with nonambulatory victims, (3) non-line-of-sight with ambulatory victims, (4) non-line-of-sight with nonambulatory victims, and (5) victim rescue operations versus victim recovery operations; AHJ's rescue team positions, roles, and responsibilities; and procedures for reporting and documenting victim rescue and recovery operations.

(B) Requisite Skills. Identifying both rescue and recovery situations; victim prioritizing and patient triaging; selecting proper rescue or recovery options; using available specialized rescue equipment; selecting and using PPE for the victim and the rescuer; searching for, rescuing, and recovering victims; and completing required reports and supporting documentation for victim rescue and recovery operations.

6.9* Response to Illicit Laboratories.

6.9.1 Perform response operations at an illicit laboratory at a hazardous materials/WMD incident, given a hazardous materials/WMD incident involving an illicit laboratory; an assignment in an IAP; scope of the problem; policies and procedures;

approved tools, equipment, and PPE; and access to a hazardous materials technician, an allied professional including law enforcement agencies or others having similar investigative authority, an emergency response plan, or standard operating procedures, so that under the guidance of a hazardous materials technician, an allied professionalincluding law enforcement agencies or others having similar investigative authority, an emergency response plan, or standard operating procedures, the scene is secured; the type of laboratory is identified; potential hazards are identified; approved PPE is selected and used; exposures and personnel are protected; safety procedures are followed; hazards are avoided or minimized; control procedures are implemented; evidence is identified and preserved; personnel, victims, tools, and equipment are decontaminated; and illicit laboratory operations are reported and documented.

(A)* Requisite Knowledge. Types of PPE and the hazards for which they are used; importance of working under the guidance of a hazardous materials technician, an allied professional including law enforcement personnel or others with similar authority, an emergency response plan, or standard operating procedures; types of illicit laboratories and how to identify them; operational considerations at illicit laboratories; hazards and products at illicit laboratories; booby traps often found at illicit laboratories; law enforcement agencies or others having similar investigative authority and responsibilities at illicit laboratories; crime scene coordination with law enforcement agencies or others having similar investigative authority; securing and preserving evidence; procedures for conducting a joint hazardous materials/hazardous devices assessment operation; procedures for determining atmospheric hazards through detection, monitoring, and sampling; procedures to mitigate immediate hazards; safety procedures and tactics; factors to be considered in the selection of decontamination, development of a remediation plan, and in decontaminating tactical law enforcement personnel, weapons, and law enforcement canines; procedures for decontaminating potential suspects; procedures for going through technical decontamination while wearing PPE; and procedures for reporting and documenting illicit laboratory response operations.

(B) Requisite Skills. Implementing scene control procedures; selecting and using PPE; selecting detection, monitoring, and sampling equipment; implementing technical decontamination for personnel; securing an illicit laboratory; identifying and isolating hazards; identifying safety hazards; conducting a joint hazardous materials/hazardous devices assessment operation; decontaminating potential suspects, tactical law enforcement personnel, weapons and law enforcement canines; and completing required reports and supporting documentation for illicit laboratory response operations.

Chapter 7 Hazardous Materials Technician

7.1 General.

7.1.1 Hazardous materials technicians are those persons who respond to hazardous materials/weapons of mass destruction (WMD) incidents using a risk-based response process by which they analyze a problem involving hazardous materials/WMD, plan a response to the problem, implement the planned response, evaluate progress of the planned response, and assist in terminating the incident.

7.1.2 Hazardous materials technicians shall meet the job performance requirements defined in Sections 4.2 through 4.4.

7.1.3 Hazardous materials technicians shall meet the job performance requirements defined in Sections 5.2 through 5.6.

7.1.4 Hazardous materials technicians shall meet the job performance requirements defined in Sections 7.2 through 7.6.

7.1.5 Hazardous materials technicians shall have additional competencies that are specific to the response mission and expected tasks as determined by the AHJ.

7.1.6 General Knowledge Requirements. (Reserved)

7.1.7 General Skills Requirements. Written and verbal communication skills.

7.2 Analyze the Incident.

7.2.1* Detection, Monitoring, and Sampling. Classify hazardous materials/WMD and verify the presence and concentrations of hazardous materials through detection, monitoring, and sampling at a hazardous materials/WMD incident, given a hazardous materials/WMD incident with released identified and unidentified hazardous materials; an assignment in an incident action plan (IAP); policies and procedures; approved resources; detection and monitoring equipment; and personal protective equipment (PPE), so that PPE is selected and used; hazardous materials/WMD are classified by their basic hazard categories; the presence of hazardous materials is verified; the concentrations of hazardous materials in the atmosphere are determined; signs of exposure in victims and responders are recognized and identified; samples of solids, liquids, and gases are collected; results of detection and monitoring equipment are read, interpreted, recorded, and communicated; exposures and personnel are protected; safety procedures are followed; hazards are avoided or minimized; personnel using the detection, monitoring, and sampling equipment, as well as the equipment, are decontaminated; detection, monitoring, and sampling equipment is maintained according to manufacturers' recommendations; and detection, monitoring, and sampling operations are reported and documented.

(A)* Requisite Knowledge. Basic hazard categories,including biological, corrosivity, energy (explosivity, radioactivity, reactivity), flammability, oxygen concentration, thermal (heat and cold), and toxicityand their definitions; policies and procedures; detection, monitoring, and sampling technologies; analysis process for classifying basic hazard categories of identified solid, liquid, and gaseous materials and unidentified contaminants in the atmosphere; types of detection, monitoring, and sampling equipment [colorimetrics (e.g., tubes, chips, papers, strips, reagents); electrochemical cells (e.g., toxic gas sensors), flammable gas/LEL, noncontact thermal detection device, oxygen concentration, photoionization detector (PID), biological detection, and radiation detection and monitoring]; process for determining radiation dose rates from radioactive material labels; determining background, dose rate; determining if a radioactive materials container is leaking/breached by comparing meter readings to Transportation Index (TI); process for monitoring lighter-than-air gases and vapors, heavier-than-air gases and vapors in a confined area, and heavier-than-air gases and vapors in an unconfined area; capabilities and limiting factors of detection, monitoring and sampling equipment; detection, monitoring, and sampling equipment required to classify the basic hazard categories; recognition and identification of signs of exposure in victims and responders; methods for collecting samples of solids, liquids, and gases; reading, interpreting, recording, and communicating test

results of detection and monitoring, and sampling equipment; and field maintenance and testing procedures for approved detection, monitoring, and sampling equipment.

(B)* Requisite Skills. Selecting and using PPE; determining radiation dose rates from radioactive material labels; using each of the following types of detection, monitoring, and sampling equipment [colorimetrics (e.g., tubes, chips, papers, strips, reagents); electrochemical cells (e.g., toxic gas sensors), flammable gas/LEL, noncontact thermal detection device, oxygen concentration, photoionization detector (PID), and radiation detection and monitoring devices] to either classify hazardous materials by basic hazard categories, verify the presence of hazardous materials or determine the concentration of hazardous materials; collect samples of gases, liquids, and solids; monitoring, reading, interpreting, recording, and communicating readings from detection, monitoring, and sampling equipment according to the manufacturers' specifications and recommendations; and completing required reports and supporting documentation for detection, monitoring, and sampling operations.

7.2.2* Hazard and Response Information Collection and Interpretation. Collect and interpret hazard and response information at a hazardous materials/WMD incident, given a hazardous materials/WMD incident, an assignment in an IAP, policies and procedures, approved reference sources, and approved tools and equipment, so that hazard and response information is collected, interpreted, and communicated.

(A) Requisite Knowledge. Types, advantages, and limitations of hazard and response information available from approved reference sources; significance and application of hazard and response terms, including chemical and physical properties, radiation terms, exposure terms (air reactivity, autorefrigeration, boiling point, catalyst, chemical change, chemical interactions, compound and mixture, concentration, corrosive (acids, bases, alkaline), critical temperature and pressure, cryogenic liquid heat transfer processes (conduction, convection, radiation, and direct contact), dose, dose response, endothermic, evaporization, exothermic, expansion ratio, half-life, inhibitor, maximum safe storage temperature (MSST), melting point and freezing point, miscibility, odor, odor threshold, organic and inorganic, pH, physical change, radioactivity, reactivity, relative density, self-accelerating decomposition temperature (SADT), solubility, solution and slurry, strength, sublimation, temperature of product, and volatility, as well as a higher level of understanding of operations level terms: boiling point, fire point, flammable range (LFL and UFL) and explosive range (LEL and UEL), flash point, ignition (autoignition) temperature, persistence, physical state (solid, liquid, gas), polymerization, specific gravity, toxic products of combustion, vapor density, and vapor pressure); principles of heat transfer associated with cryogenic liquid spills; signs and symptoms and target organ effects of exposure to hazardous materials/WMD; methods for determining the pressure and amount of lading in bulk containers and facility containers; and hazard and response information to be communicated.

(B)* Requisite Skills. Collecting and interpreting hazard and response information; identifying signs and symptoms of exposure to hazardous materials/WMD, including target organ effects of exposure to hazardous materials/WMD; and determining radiation exposure rates from labels attached to radioactive materials containers.

7.2.3* Assessing Container Condition. Assess the condition of a container and its closures at a hazardous materials/WMD incident, given an incident involving hazardous materials/WMD; an assignment in an IAP; policies and procedures; the scope of the incident; identity of material(s) involved and their hazards, including results of detection, monitoring, and sampling; a container with required markings; and approved resources and PPE, so that PPE is selected and used; the container and its closures are inspected; the type of damage to the container and closures is identified; the type of stress on the container is identified; the level of risk associated with container and closure damage and stress is identified; safety procedures are followed; hazards are avoided or minimized; personnel, tools, and equipment are decontaminated; and a description of the condition of the container and its closures is communicated.

(A)* Requisite Knowledge. Process for assessing container condition; basic design and construction features, including closures for bulk, intermediate bulk, and nonbulk containers, facility containers, radioactive materials containers, and piping and pipelines; types of damage and their level of risk; types of stress; specification markings; and methods for determining the pressure and quantity of lading remaining in containers and indicators of an increase in container pressure.

(B) Requisite Skills. Assessing the condition of the container and its closures, identifying the type of damage and level of risk associated with the damage, identifying stress(es) on the container, and communicating the condition of the container and its closures and the level of risk associated with that condition.

7.2.4* Predicting Behavior. Predict the behavior of the hazardous materials/WMD involved in a hazardous materials/WMD incident, given an incident involving multiple hazardous materials/WMD; an assignment in an IAP; policies and procedures; physical and chemical properties of the materials involved; results of detection, monitoring, and sampling; condition of the container (damage and stress); surrounding conditions; and approved reference sources, so that the behavior of each hazardous materials/WMD container and its contents is identified, the reactivity issues and hazards of the combined materials are identified, and a description of the likely behavior of the hazards is communicated.

(A)* Requisite Knowledge. Process for predicting behavior, resources that indicate the reactivity issues of mixing various hazardous materials/WMD, impact of fire and safety features on the behavior of products at facilities, heat transfer processes that occur as a result of a cryogenic liquid spill, and methods for communicating the results of predicting behavior.

(B)* Requisite Skills. Using the process to predict likely behavior of materials and their containers when multiple materials are involved, identifying reactivity issues associated with mixing various hazardous materials, and communicating the predicted behavior.

7.2.5* Estimating Outcomes. Estimate the potential outcomes at a hazardous materials/WMD incident, given a hazardous materials/WMD incident, an assignment in an IAP, policies and procedures, the likely behavior of the container and its contents, and approved resources and equipment, so that the concentrations of materials within the endangered area are measured or predicted; physical, health, and safety hazards within the endangered area are identified; areas of

potential harm in the endangered area are identified; potential outcomes within the endangered area are identified; and potential outcomes are communicated.

(A) Requisite Knowledge. Methods for determining concentrations of materials within the endangered area; methods for identifying physical, health, and safety hazards within the endangered area; health hazard terms and exposure values,including Acute Exposure Guideline Levels for airborne chemicals (AEGLs), counts per minute, kilocounts per minute, immediately dangerous to life and health, incapacitating concentration (IC_{50}), incubation period, infectious dose (ID), lethal concentrations (LD_{50}), lethal dose (LD), parts per billion, parts per million, permissible exposure limit (PEL), radiation absorbed dose (rad), gray (Gy), roentgen equivalent man (rem), millirem (mrem), microrem (μrem), sievert (Sv), millisievert (mSv), microsievert (μSv), curie (Ci), becquerel (Bq), threshold limit value ceiling, threshold limit value short-term exposure limit, threshold limit value time weighted average, and their significance in the analysis process; methods for identifying areas of potential harm within the endangered area; methods for identifying potential outcomes in the areas of potential harm within the endangered area; and procedures for communicating potential outcomes.

(B) Requisite Skills. Using approved resources and equipment; determining concentrations of materials within the endangered area; identifying the physical, health, and safety hazards within the endangered area; identifying the areas of potential harm in the endangered area; estimating the potential outcomes in the endangered area; and communicating the potential outcomes.

7.3 Response Planning.

7.3.1 Response Objectives and Options. Develop and recommend to the incident commander or hazardous materials officer response objectives and action options at a hazardous materials/WMD incident, given a hazardous materials/WMD incident; an assignment in an IAP; results of the incident analysis, including incident-related information, life safety risks, environmental risks, and property risks; available resources; and policies and procedures, so that response objectives are identified for the incident and action options are identified for each response objective.

(A) Requisite Knowledge. Steps for developing response objectives and steps for identifying action options for each response objective.

(B) Requisite Skills. Developing response objectives for a hazardous materials incident and identifying action options for each response objective.

7.3.2* Personal Protective Equipment (PPE)Selection. Select the PPE ensemble required for a given response option at a hazardous materials/WMD incident, given a hazardous materials/WMD incident, results of the incident analysis, response objectives and options for the incident, approved references, and policies and procedures, so that required PPE is identified for each response option.

(A)* Requisite Knowledge. Identify the PPE available for response based on NFPA PPE standards and certification levels; levels of PPE (A, B, C, and D); advantages of using certified PPE; types of PPE available for various hazards, including thermal, radiological, asphyxiation, chemical, etiological, and mechanical (TRACEM); factors to be considered in selecting respiratory protection; factors to be considered in selecting chemical-protective clothing (CPC); significance of degradation, penetration, and permeation on the selection of protective clothing; indications of material degradation of protective clothing; advantages and limitations of the different designs of liquid splash–protective ensembles and vapor-protective ensembles; types, advantages, and limitations of cooling measures for cooling personnel wearing PPE; information provided on chemical compatibility charts; and effects of physiological and psychological stresses on users of PPE.

(B)* Requisite Skills. Selecting PPE ensemble for a specified response option based on all hazards identified and determining the effectiveness of protective clothing based on its uses and limitations.

7.3.3 Decontamination Method Selection. Select the decontamination method for a given response option at a hazardous materials/WMD incident, given a hazardous materials/WMD incident, results of the incident analysis, response objectives and options for the incident, available resources, and policies and procedures, so that a decontamination method to minimize the hazards for each response option is identified and the equipment required to implement the decontamination method is identified.

(A)* Requisite Knowledge. Decontamination methods including absorption, adsorption, chemical degradation, dilution, disinfecting, evaporation, isolation and dispersal, neutralization, solidification, sterilization, vacuuming, and washing; advantages and limitations of decontamination methods; reference sources for determining applicable decontamination operations and methods; methods for accessing these resources; and equipment required to implement specified decontamination operations and methods.

(B) Requisite Skills. Selecting decontamination procedures (operations and methods) and identifying the equipment required to implement decontamination procedure (operations and methods).

7.3.4* Action Plan Development. Develop a plan of action for a hazardous materials/WMD incident, given a hazardous materials/WMD incident, an assignment in an IAP, results of the incident analysis, response objectives and options for the given incident, available resources, and policies and procedures, so that the tasks and resources required to meet the response objectives are identified, specified response objectives and response options are addressed, plan is consistent with the emergency response plan and policies and procedures, and plan is within the capability of available personnel, PPE, and control equipment.

(A)* Requisite Knowledge. Components of an IAP and subplans; definitions of control, confinement, containment, and extinguishment; purpose of, procedures for, required tools and equipment for, and safety precautions for various techniques for hazardous materials/WMD (product) control; components of a safety briefing; atmospheric and physical safety hazards associated with hazardous materials/WMD in confined spaces; pre-entry tasks to be performed; and procedures, equipment, and safety precautions for preserving and collecting legal evidence.

(B) Requisite Skills. Preparing an action plan, identifying site safety and control components, identifying points for a safety briefing, identifying pre-entry tasks, identifying atmospheric

and physical safety hazards when incident involves a confined space, and preserving and collecting legal evidence.

7.4 Action Plan Implementation.

7.4.1 Performing Assigned IMS/ICS Duties. Perform assigned hazardous materials branch or group functions within the incident command system (ICS) at a hazardous materials/WMD incident, given a hazardous materials/WMD incident; an assignment in an IAP; results of the incident analysis; policies and procedures, including an emergency response plan and standard operating procedures; the IAP; and approved resources, so that the assigned functions within the hazardous materials branch or group are completed.

(A)* Requisite Knowledge. Organizational structure of the hazardous materials branch or group; duties and responsibilities of hazardous materials branch or group functions; resources available to complete assigned functions; reporting structure; and procedures for communicating with the hazardous materials branch or group supervisor, ICS operations section chief, or IC.

(B) Requisite Skills. Performing the duties and responsibilities of an assigned function in the hazardous materials branch or group organization;and communicating observations to hazardous materials branch director/group supervisor, ICS operations section chief, or IC.

7.4.2* Personal Protective Equipment Use. Don, work in, and doff PPE at a hazardous materials/WMD incident, given a hazardous materials/WMD incident, an assignment in an IAP, policies and procedures, results of the incident analysis, response objectives and options for the incident, and PPE ensembles as identified in the IAP, so that PPE is selected, inspected, donned, worked in, decontaminated, and doffed; safety procedures are followed; hazards are avoided or minimized; equipment is maintained and stored properly; and the use of PPE is reported and documented.

(A)* Requisite Knowledge. Types of PPE and the hazards for which they are used; capabilities, advantages, limitations, selection, and use of PPE; components of an IAP; safety procedures for personnel working in PPE; additional safety concerns of working in the hot zone; procedures for decontamination, maintenance, inspection, and storage of PPE; procedures for being decontaminated while wearing PPE; procedures for maintenance, testing, inspection, and storage of PPE according to manufacturers' specifications and recommendations; importance of personnel exposure records, steps in keeping an activity log and exposure records, requirements for reporting and documenting the use of PPE, and requirements for filing documents and maintaining records.

(B) Requisite Skills. Inspecting, donning, working in, going through technical decontamination while wearing PPE; and completing required reports and supporting documents for the use of PPE.

7.4.3 Performing Control Functions.

7.4.3.1* Product Control. Perform product control techniques at a hazardous materials/WMD incident, given a hazardous materials/WMD incident with release of product, an assignment in an IAP, results of the incident analysis, policies and procedures for product control, response objectives and options for the incident, and approved tools, equipment, control agents, and PPE, so that an approved product control technique is selected and implemented; the product is controlled; approved PPE is selected and used; exposures and personnel are protected; safety procedures are followed; hazards are avoided or minimized; personnel, victims, tools, and equipment used are decontaminated; tools and equipment are inspected and maintained; and product control operations are reported and documented.

(A)* Requisite Knowledge. Types of PPE and the hazards for which they are used; policies and procedures for product control; product control techniques (absorption, adsorption, blanketing, damming, diking, dilution, dispersion, diversion, neutralization, overpacking, patching, plugging, pressure isolation and reduction, retention, remote valve shutoff, vapor dispersion, and vapor suppression); purpose of, procedures for, required tools and equipment for, and safety precautions for hazardous materials/WMD control techniques; location and operation of remote emergency shutoff devices; characteristics, applicability, and use of approved product control agents; use of approved tools and equipment; and procedures for inspection and maintenance of tools and equipment.

(B)* Requisite Skills. Selecting and using PPE, selecting and using approved control agents and equipment on a release involving hazardous materials/WMD, using container control valves and remote emergency shutoff devices, performing product control techniques, inspecting and maintaining tools and equipment; and completing required and supporting documentation for product control operations.

7.4.3.2* Controlling Container Leaks. Control leaks from containers and their closures at a hazardous materials/WMD incident, given three scenarios, including (1) a leak from a bulk or nonbulk pressure container or its closures, (2) a leak from a nonbulk liquid container or its closures, and (3) a leak from a bulk liquid container or its closures; an assignment in an IAP; results of the incident analysis; policies and procedures for controlling leaks from containers and/or their closures; and approved tools, equipment, and PPE, so that an approved product control technique is selected and used; approved PPE is selected and used; exposures and personnel are protected; safety procedures are followed; hazards are avoided or minimized; hazard monitoring is completed; leaks are controlled (confined or contained); emergency responders, tools, and equipment used are decontaminated; tools and equipment are inspected and maintained; and product control operations are reported and documented.

(A)* Requisite Knowledge. Types of PPE and the hazards for which they are used, policies and procedures for product control; types of containers and their closures; ways in which containers and their closures develop leaks, hazards of and safety precautions for controlling; container/closure leaks; methods for controlling container or closure leaks on nonbulk, intermediate bulk, radioactive, facility containers, and pipe and pipelines; location and operation of remote emergency shutoff devices on cargo tanks and at facilities; characteristics, applicability, and use of approved product control agents; approved tools and equipment used to control container/closure leaks; and procedures for inspection and maintenance of tools and equipment.

(B)* Requisite Skills. Selecting and using PPE, selecting and using approved control agents and equipment; controlling leaks on containers and their closures (patching, plugging, sealing closures, remote valve shutoff, closing valves, repositioning container; replacing missing plugs, and tightening loose

fittings); decontaminating tools and equipment; inspecting and maintaining tools and equipment; and requirements for reporting and documenting product control operations.

7.4.3.3* Overpacking Nonbulk and Radioactive Materials Containers. Overpack damaged or leaking nonbulk and radioactive materials containers at a hazardous materials/WMD incident, given a hazardous materials/WMD incident; an assignment in an IAP; results of the incident analysis; a loaded damaged or leaking container; a suitable overpack container; policies and procedures; and approved tools, equipment, and PPE, so that an approved overpack technique is selected; the damaged or leaking container is placed into a suitable overpack and the overpack is closed, marked, and labeled; approved PPE is selected and used; exposures and personnel are protected; safety procedures are followed; hazards are avoided or minimized; emergency responders, tools, and equipment are decontaminated; tools and equipment are inspected and maintained; and product control operations are reported and documented.

(A) Requisite Knowledge. Types of PPE and the hazards for which they are used; policies and procedures for overpacking damaged or leaking nonbulk and radioactive materials containers; ways in which nonbulk and radioactive materials containers are damaged; hazards associated with overpacking damaged or leaking nonbulk and radioactive materials containers; methods to overpack damaged or leaking nonbulk and radioactive materials containers; marking and labeling overpack containers; the tools and equipment used to overpack damaged or leaking nonbulk and radioactive materials containers; and equipment and maintenance procedures.

(B) Requisite Skills. Selecting and using PPE; placing a damaged or leaking nonbulk materials container into the overpack container;placing a damaged or leaking radioactive materials container into an overpack container; following safety procedures and minimizing and avoiding hazards; decontaminating tools and equipment; inspecting and maintaining tools and equipment; and completing requirements for reporting and documenting product control operations.

7.4.3.4 Liquid Product Transfer. Transfer liquids from leaking nonpressure containers at a hazardous materials/WMD incident, given a hazardous materials/WMD incident; an assignment in an IAP; results of the incident analysis; a leaking nonpressure container and a recovery container; policies and procedures for transferring liquids from leaking nonpressure containers; and approved tools, equipment, and PPE, so that an approved product transfer method is selected and used; approved PPE is selected and used; exposures and personnel are protected; safety procedures are followed; hazards are avoided or minimized; hazard monitoring is completed; the containers are bonded and grounded; product is transferred to the recovery container; emergency responders, tools, and equipment used are decontaminated; tools and equipment are inspected and maintained; and product control operations are reported and documented.

(A) Requisite Knowledge. Types of PPE and the hazards for which they are used; policies and procedures for liquid product transfer; identifying a compatible recovery container; requirements for hazard monitoring; methods for transferring liquid product; grounding and bonding methods; methods for vapor suppression; use of approved tools and equipment; procedures for inspection and maintenance of tools and equipment; and requirements for reporting and documenting product control operations.

(B) Requisite Skills. Selecting and using PPE; identifying a compatible recovery container and transfer equipment; monitoring for hazards; grounding and bonding containers; transferring liquid product from a leaking container to a recovery container; suppressing vapors; decontaminating tools and equipment; inspecting and maintaining tools and equipment; and completing reports and supporting documentation for product control operations.

7.4.4 Decontamination.

7.4.4.1 Mass Decontamination. Perform mass decontamination for ambulatory and nonambulatory victims at a hazardous materials/WMD incident, given a hazardous materials/WMD incident requiring mass decontamination; an assignment in an IAP; results of the incident analysis; policies and procedures; and approved PPE, tools, and equipment, so that PPE is selected and used; a mass decontamination procedure is selected, set up, implemented, evaluated, and terminated; victims are decontaminated; exposures and personnel are protected; safety procedures are followed; hazards are avoided or minimized; personnel, tools, and equipment are decontaminated; and mass decontamination operations are reported and documented.

(A)* Requisite Knowledge. Types of PPE and the hazards for which they are used; advantages and limitations of operations and methods of mass decontamination; policies and procedures; approved tools, equipment, and PPE; procedures for performing mass decontamination; safety precautions; crowd management techniques; AHJ mass decontamination unit duties within the command structure; and required reports and supporting documentation for mass decontamination operations.

(B)* Requisite Skills. Selecting and using suitable PPE, selecting a mass decontamination procedure to minimize the hazard, setting up and implementing mass decontamination operations for ambulatory and nonambulatory victims, evaluating the effectiveness of the mass decontamination process, and completing reporting and documentation requirements.

7.4.4.2 Technical Decontamination. Establish and implement technical decontamination in support of entry operations and for ambulatory and nonambulatory victims at a hazardous materials/WMD incident, given a hazardous materials/WMD incident requiring technical decontamination; an assignment in an IAP; results of the incident analysis; policies and procedures; and approved PPE, tools, and equipment, so that approved PPE is selected and used; a technical decontamination procedure is selected, set up, implemented, evaluated, and terminated; victims are decontaminated; safety procedures are followed; hazards are avoided or minimized; if contaminated, personnel, tools, and equipment are decontaminated; and all reports and documentation of technical decontamination operations are completed.

(A)* Requisite Knowledge. Types of PPE and the hazards for which they are used; advantages and limitations of operations and methods of technical decontamination; policies and procedures; approved tools, equipment, and PPE; procedures for performing technical decontamination; safety precautions; crowd management techniques; technical decontamination

unit duties within the command structure; and approved forms for reporting and documenting technical decontamination.

(B)* Requisite Skills. Selecting and using PPE, selecting a technical decontamination procedure to minimize the hazard, setting up and implementing technical decontamination operations, evaluating the effectiveness of the technical decontamination procedure, and completing required reports and supporting documentation for technical decontamination operations.

7.5 Evaluating and Reporting Progress.

7.5.1 Evaluate and report the progress of assigned tasks at a hazardous materials/WMD incident, given a hazardous materials/WMD incident, an assignment in an IAP, current incident conditions, response options and actions taken, and approved communication equipment, so that the actual behavior of material and container is compared to that predicted, the effectiveness of response options and actions in accomplishing response objectives is determined, modifications to the response options and actions are made, and the results are communicated.

(A) Requisite Knowledge. Procedures for evaluating whether the response options and actions are effective in accomplishing the response objectives; resources for identifying improving, static, or deteriorating conditions; approved communication procedures and communication equipment; and the process for modifying response options and action.

(B) Requisite Skills. Comparing predicted behavior of the material and its container to the actual behavior, determining effectiveness of response options and actions, communicating the status of response options and actions, and modifying the response options and actions based on the incident status review.

7.6* Terminating the Incident.

7.6.1 Terminate a hazardous materials/WMD incident, given a hazardous materials/WMD incident, an assignment in an IAP, policies and procedures, operational observations of response operations (incident information), and approved forms for documentation and reporting, so that assistance in scheduled incident debriefings and critiques is provided, and incident operations are reported and documented.

(A) Requisite Knowledge. Purpose, regulatory issues, elements, and procedures for conducting debriefings and critiques; documentation and reporting requirements; approved forms and procedures for completing required reports, records, and supporting documentation; and importance of and requirements for reporting and documenting incident operations, including filing and maintenance requirements.

(B) Requisite Skills. Communicating operational observations (incident information) at debriefings and critiques; and completing, forwarding, and filing required reports, records, and supporting documentation.

Chapter 8 Incident Commander

8.1 General.

8.1.1 The incident commander (IC) is that person, designated by the AHJ, responsible for all incident activities/operations, including the development of strategies and tactics and the ordering and release of resources.

8.1.2 An IC shall meet the job performance requirements defined in Sections 4.2 through 4.4.

8.1.3 An IC shall meet the job performance requirements defined in Sections 5.2 through 5.6.

8.1.4 An IC shall meet the job performance requirements defined in Sections 8.2 through 8.6.

8.1.5 General Knowledge Requirements. Knowledge of incident management system/incident command system (IMS/ICS) and importance of command presence.

8.1.6 General Skills Requirements. (Reserved)

8.2 Analyze the Incident.

8.2.1 Analyze a hazardous materials/weapons of mass destruction (WMD) incident, given a hazardous material/WMD incident; incident information; policies and procedures; available resources; approved references; and access to a hazardous materials technician, an allied professional, an emergency plan, or standard operating procedures, so that the hazards are assessed and risks are evaluated.

(A) Requisite Knowledge. Advantages and limitations of hazardous materials databases, detection and monitoring equipment, reference manuals, technical information centers, and technical information specialists; methods available to obtain local weather conditions and predictions; resources to predict behavior and estimate outcomes.

(B) Requisite Skills. Assessing hazards and evaluating risks; written and verbal communication.

8.3 Plan the Response.

8.3.1 Plan the response to a hazardous materials/WMD incident, given an hazardous materials/WMD incident, the results of the incident analysis, and available resources, so that the response objectives are identified, potential response options are identified, level of personal protective equipment (PPE) is approved, decontamination process is approved, response options are selected based on available resources, and an IAP is developed.

(A)* Requisite Knowledge. Response objectives, purpose of hazardous materials control techniques, approving the level of PPE, steps for developing an IAP, factors to be evaluated in public protective actions, making tactical assignments, and safe operating practices and procedures.

(B) Requisite Skills. Approving the personal protective equipment for response options, developing a plan of action, and ability to use verbal and written communication.

8.4 Implement the Incident Action Plan (IAP).

8.4.1 Implement the planned response in a hazardous materials/WMD incident, given a hazardous materials/WMD incident and resources and equipment available, so that IMS/ICS is implemented, resources are directed, a focal point for information transfer is established, and actions are taken to meet the response objectives of the IAP.

(A)* Requisite Knowledge. Role of the command element, concept of unified command and its application and use, duties and responsibilities of hazardous materials branch/

group functions, transfer of command, implementing IMS/ICS, directing resources, and establishing a focal point for information transfer.

(B) Requisite Skills. Implementing IMS/ICS including unified command as necessary, assigning and directing resources, and establishing information transfer focal point.

8.5* Evaluate Progress and Adjust IAP.

8.5.1 Evaluate the progress and adjust the IAP as needed at a hazardous materials/WMD incident, given a hazardous materials/WMD incident, actions taken, and changing incident conditions, so that actual behavior of material and container is compared to that predicted, effectiveness of action options and actions is determined, and modifications to the IAP are made as needed until the scene is determined to be stabilized and hazards are controlled.

(A) Requisite Knowledge. Determination of safe versus unsafe, procedures for evaluating whether the action options are effective in accomplishing the objectives, steps for comparing actual behavior of the material and the container to that predicted, and procedures for making modifications to the IAP.

(B) Requisite Skills. Comparing predicted behavior of the material and its container to the actual behavior, determining effectiveness of action options and actions, and modifying the IAP when needed.

8.6* Termination.

8.6.1 Terminate response operations at a hazardous materials/WMD incident, given a hazardous materials/WMD incident that has been determined to be stabilized with hazards controlled, operational observations, and approved forms for documentation and reporting, so that command is transferred, debriefings are held, post-incident analysis is completed, a critique is conducted, and overall incident response operations are reported and documented.

(A)* Requisite Knowledge. Transition from safe and nonsafe; regulatory issues; elements and procedures for conducting a debriefing, a post-incident analysis, and a critique; and requirements for reporting and documenting overall incident response operations.

(B) Requisite Skills. Transferring command; participating in a debriefing, post-incident analysis, and critiques; and completing required reports and supporting documentation for overall incident response operations.

Annex A Explanatory Material

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

A.1.1 The committee recognizes that emergency services organizations might have to invest considerable resources to provide the equipment and training needed to respond to incidents involving hazardous materials or weapons of mass destruction (WMD) in a safe and efficient manner. The committee does not mean to imply that organizations with limited resources cannot provide response services, only that the individuals charged with responsibilities are qualified to specific levels according to this standard.

A.1.2.3 Organization and management responsibilities should be addressed by the agency that personnel represent. The authority having jurisdiction should define the agency requirements for progression to positions of management responsibility.

A.1.2.6 The committee recognizes the importance of formal and continuing education and training programs to ensure that personnel at the various response levels — awareness, operations, operations mission-specific, hazardous materials technician, and incident commander — have maintained and updated the necessary skills and knowledge for the level of qualification. Continuing education and training programs can be developed or administered by local, state, provincial, or federal agencies as well as by professional associations and accredited institutions of higher education. The methods of learning would include areas of technology, refresher training, skills practices, and knowledge application to standards. The subject matter should directly relate to the requirements of this standard.

A.1.3.3 It is recommended, where practical, that evaluators be individuals who were not directly involved as instructors for the requirement being evaluated.

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

A.3.3.1 Allied Professional. Examples include certified safety professional (CSP), certified health physicist (CHP), certified industrial hygienist (CIH), radiation safety officer (RSO), or similar credentialed or competent individuals as determined by

the authority having jurisdiction (AHJ). Can also be referred to as a technical specialist or subject matter expert (SME).

A.3.3.8 Confined Space. Additionally, a confined space is further defined as having one or more of the following characteristics:

(1) The area contains or has the potential to contain a hazardous atmosphere, including an oxygen-deficient atmosphere.
(2) The area contains a material with the potential to engulf a member.
(3) The area has an internal configuration such that a member could be trapped by inwardly converging walls or a floor that slopes downward and tapers to a small cross section.
(4) The area contains any other recognized serious hazard.

A.3.3.9.7 Radioactive Materials Containers. *Excepted packaging* is used to transport materials with extremely low levels of radioactivity that meet only general design requirements for any hazardous material. Excepted packaging ranges from a product's fiberboard box to a sturdy wooden or steel crate, and typical shipments include limited quantities of materials, instruments, and articles such as smoke detectors. Excepted packaging will contain non-life-endangering amounts of radioactive material.

Industrial packaging is used to transport materials that present limited hazard to the public and the environment. Examples of these materials are contaminated equipment and radioactive waste solidified in materials such as concrete. This packaging is grouped into three categories based on the strength of packaging: IP-1, IP-2, and IP-3. Industrial packaging will contain non-life-endangering amounts of radioactive material.

Type A packaging is used to transport radioactive materials with concentrations of radioactivity not exceeding the limits established in 49 CFR 173.431. Typically, Type A packaging has an inner containment vessel made of glass, plastic, or metal and packing material made of polyethylene, rubber, or vermiculite. Examples of materials shipped in Type A packaging include radiopharmaceuticals and low-level radioactive wastes. Type A packaging will contain non-life-endangering amounts of radioactive material.

Type B packaging is used to transport radioactive materials with radioactivity levels higher than those allowed in Type A packaging, such as spent fuel and high-level radioactive waste. Limits on activity contained in Type B packaging are provided in 49 CFR 173.431. Type B packaging ranges from small drums [55 gal (208 L)] to heavily shielded steel casks that sometimes weigh more than 100 tons (90.7 metric tonnes). Type B packaging can contain potentially life-endangering amounts of radioactive material.

Type C packaging is used for consignments transported by aircraft of high-activity radioactive materials that have not been certified as "low dispersible radioactive material" (including plutonium). They are designed to withstand severe accident conditions associated with air transport without loss of containment or significant increase in external radiation levels. The Type C packaging performance requirements are significantly more stringent than those for Type B packaging. Type C packaging is not authorized for domestic use but can be authorized for international shipments of high-activity radioactive material consignments. Regulations require that both Type B and Type C packaging be marked with a trefoil symbol to ensure that the package can be positively identified as carrying radioactive material. The trefoil symbol must be resistant to the effects of both fire and water so that it is likely to survive a severe accident and serve as a warning to emergency responders.

The performance requirements for Type C packaging include those applicable to Type B packaging with enhancements on some tests that are significantly more stringent than those for Type B packaging. For example, a 200 mph (321.8 km/hr) impact onto an unyielding target is required instead of the 30 ft (9.1 m) drop test required for Type B packaging; a 60-minute fire test is required instead of the 30-minute test for Type B packaging; and a puncture/tearing test is required. These stringent tests are expected to result in packaging designs that will survive more severe aircraft accidents than Type B packaging designs.

A.3.3.13 Control Zones. Law enforcement agencies might utilize different terminology for site control, for example, *inner* and *outer* perimeters as opposed to *hot* and *cold* zones. The operations level responder should be familiar with the terminology and procedures used by the authority having jurisdiction (AHJ) and coordinate on-scene site control operations with law enforcement. Many terms are used to describe these control zones; however, for the purposes of this standard, zones are defined as hot, warm, and cold zones.

A.3.3.13.4 Warm Zone. The warm zone includes control points for the decontamination corridor, thus helping to reduce the spread of contamination. This support can include staging of backup personnel and equipment, staging of evidence, and personnel and equipment decontamination. Additionally, portions of this area can be used as a safe refuge for initial patient evacuation and triage.

A.3.3.15 Decontamination. There are three types of decontamination (also known as "decon") performed by emergency responders: emergency, mass, and technical.

Gross decontamination is performed on the following:

(1) Team members before their technical decontamination
(2) Emergency responders before leaving the incident scene
(3) Victims during emergency decontamination
(4) Persons requiring mass decontamination
(5) Personal protective equipment used by emergency responders before leaving the scene

A.3.3.15.1 Emergency Decontamination. This process can be as simple as removal of outer or all garments from the individual to washing down with water from a fire hose or emergency safety shower. The sole purpose is to quickly separate as much of the contaminant as possible from the individual to minimize exposure and injury.

A.3.3.15.2 Gross Decontamination. Victims of a hazardous material release that is potentially life threatening due to continued exposure from contamination are initially put through a gross decontamination, which will significantly reduce the amount of additional exposure. This is usually accomplished by mechanical removal of the contaminant or initial rinsing from handheld hose lines, emergency showers, or other nearby sources of water. Responders operating in a contaminated zone in personal protective equipment (PPE) are put through gross decontamination, which will make it safer for them to remove the PPE without exposure and for members assisting them.

A.3.3.15.3 Mass Decontamination. Mass decontamination is initiated where the number of victims and time constraints do not allow the establishment of an in-depth decontamination process.

Mass decontamination should be established at once to reduce the harm being done to the victims by the contaminants. Initial operations are most often performed with handheld hose lines or master streams supplied from fire apparatus while a more formal process is being set up. A formal technical decontamination might be necessary if it is determined through detection, observation, or concern that the initial emergency decontamination was not effective. For example, this could be the case for victims exposed to a radiological dispersal device (RDD) or an aerosolized biological agent.

A.3.3.15.4 Technical Decontamination. Technical decontamination is the process subsequent to gross decontamination designed to remove contaminants from responders, their equipment, and victims. It is intended to minimize the spread of contamination and ensure responder safety. Technical decontamination is normally established in support of emergency responder entry operations at a hazardous materials incident, with the scope and level of technical decontamination based on the type and properties of the contaminants involved. In non-life-threatening contamination incidents, technical decontamination can also be used on victims of the initial release. Examples of technical decontamination methods are the following:

(1) Absorption
(2) Adsorption
(3) Chemical degradation
(4) Dilution
(5) Disinfecting
(6) Evaporation
(7) Isolation and disposal
(8) Neutralization
(9) Solidification
(10) Sterilization
(11) Vacuuming
(12) Washing

The specific decontamination procedure to be used at an incident is typically selected by a hazardous materials technician *(see 7.3.3)* and is subject to the approval of the incident commander.

A.3.3.17 Demonstrate. This performance can be supplemented by simulation, explanation, illustration, or a combination of these.

A.3.3.26 Exposure. The magnitude of exposure is dependent primarily on the duration of exposure and the concentration of the hazardous material. This term is also used to describe a person, an animal, the environment, or a piece of equipment. The exposure can be external, internal, or both.

A.3.3.29 Fissile Material. Department of Transportation (DOT) regulations define fissile material as plutonium-239, plutonium-242, uranium-233, uranium-235, or any combination of these radionuclides. This material is usually transported with additional shipping controls that limit the quantity of material in any one shipment. Containers used for fissile material are designed and tested to prevent a fission reaction from occurring during normal transport conditions as well as hypothetical accident conditions.

A.3.3.32 Hazardous Material. In United Nations model codes and regulations, hazardous materials are called *dangerous goods*. See also 3.3.68 and A.3.3.68, Weapons of Mass Destruction (WMD).

A.3.3.33 Hazardous Materials Branch/Group. This function is directed by a hazardous materials officer and deals principally with the technical aspects of the incident.

A.3.3.34 Hazardous Materials Officer. This individual might also serve as a technical specialist for incidents that involve hazardous materials/WMD. The National Incident Management System (NIMS) identifies this person as the Hazardous Materials Branch Director/Supervisor.

A.3.3.35 Hazardous Materials Response Team (HMRT). The team members respond to releases or potential releases of hazardous materials/WMD for the purpose of control or stabilization of the incident.

A.3.3.36 Hazardous Materials Safety Officer. The hazardous materials safety officer will be called on to provide technical advice or assistance regarding safety issues to the hazardous materials officer and incident safety officer at a hazardous materials/WMD incident. The National Incident Management System (NIMS) identifies this person as the Assistant Safety Officer — Hazardous Materials.

A.3.3.37 Hazardous Materials Technician. This person might have additional competencies that are specific to their response mission, expected tasks, and equipment and training as determined by the authority having jurisdiction (AHJ).

A.3.3.41 Incident Commander (IC). This position is equivalent to the on-scene incident commander as defined in OSHA 1910.120(8), "Hazardous Waste Operations and Emergency Response." The incident commander (IC) has overall authority and responsibility for conducting incident operations and is responsible for the management of all incident operations at the incident site.

A.3.3.43 Incident Management System (IMS). The IMS provides a consistent approach for all levels of government, private sector, and volunteer organizations to work effectively and efficiently together to prepare for, respond to, and recover from domestic incidents, regardless of cause, size, or complexity. An IMS provides for interoperability and compatibility among all capability levels of government, the private sector, and volunteer organizations. The IMS includes a core set of concepts, principles, terminology, and technologies covering the incident command system, multiagency coordination systems, training, and identification and management of resources.

A.3.3.44 Job Performance Requirements (JPR). See Annex B for further information.

A.3.3.49 Personal Protective Equipment (PPE). Personal protective equipment includes both personal protective clothing and respiratory protection. Adequate personal protective equipment should protect the respiratory system, skin, eyes, face, hands, feet, head, body, and hearing..

A.3.3.50.1 Emergency Response Plan (ERP). Emergency response plans can be developed at organizational and governmental levels (agency, local, state, regional, provincial, territorial, tribal, and federal).

A.3.3.50.2 Incident Action Plan (IAP). It can include the identification of operational resources and assignments. It can also include attachments that provide direction and important information for management of the incident during one or more operational periods.

A.3.3.50.3 Site Safety and Control Plan. Reflective of the objectives identified in the IAP, the site safety and control plan is used to communicate incident conditions, incident hazards, and branch operations to the hazardous materials team during the safety briefing. Components of a typical site safety and control plan include an overview of the hazardous materials branch organization; personnel assignments; summary of incident hazards, both physical and chemical; branch tactical objectives; site control practices; identification of personal protective equipment or ensembles; hazardous materials branch communications; identification of decontamination practices and medical care; and monitoring of the identified hazards.

A.3.3.51 Planned Response. The following site safety plan considerations are from the EPA's *Standard Operating Safety Guides*:

(1) Site description
(2) Entry objectives
(3) On-site organization
(4) On-site control
(5) Hazard evaluations
(6) Personal protective equipment
(7) On-site work plans
(8) Communication procedures
(9) Decontamination procedures
(10) Site safety and health plan

A.3.3.53 Protective Clothing. Protective clothing is divided into three types:

(1) Structural fire-fighting protective clothing
(2) High temperature–protective clothing
(3) Chemical-protective clothing
    (a) Liquid splash–protective clothing
    (b) Vapor-protective clothing

A.3.3.53.2 Chemical-Protective Clothing (CPC). Chemical-protective clothing (garments) can be constructed as a single- or multipiece garment. The garment can completely enclose the wearer either by itself or in combination with the wearer's respiratory protection, attached or detachable hood, gloves, and boots.

A.3.3.53.2.1 Liquid Splash–Protective Ensemble. This type of protective clothing is a component of EPA Level B chemical protection. Liquid splash–protective ensembles should meet the requirements of NFPA 1992.

A.3.3.53.2.2 Vapor-Protective Ensemble. This type of protective clothing is a component of EPA Level A chemical protection. Vapor-protective clothing should meet the requirements of NFPA 1991 or NFPA 1994.

A.3.3.53.3 High Temperature–Protective Clothing. This type of clothing is usually of limited use in dealing with chemical commodities.

A.3.3.53.4 Structural Fire-Fighting Protective Clothing. Structural fire-fighting protective clothing provides limited protection from heat but might not provide adequate protection from the harmful gases, vapors, liquids, or dusts that are encountered during hazardous materials/WMD incidents. The NFPA 1971 CBRN option is intended to add chemical protection to structural fire-fighting protective clothing.

A.3.3.56 Respiratory Protection. Respiratory protection is divided into four types:

(1) Self-contained breathing apparatus (SCBA) that meet the requirements of NFPA 1981, which also incorporates the Statement of Standard for NIOSH CBRN SCBA Testing
(2) Supplied air respirators
(3) Powered air-purifying respirators that meet the Statement of Standard for NIOSH CBRN PAPR Testing
(4) Air-purifying respirators that meet the Statement of Standard for NIOSH CBRN APR Testing

A.3.3.57 Response. The activities in the response portion of a hazardous materials/WMD incident include analyzing the incident, planning the response, implementing the planned response, evaluating progress, and terminating the emergency phase of the incident.

A.3.3.60 Safety Data Sheet (SDS). SDS is a component of the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) and replaces the term *material safety data sheet* (MSDS). GHS is an internationally agreed-upon system, created by the United Nations in 1992. It replaces the various classification and labeling standards used in different countries by using consistent criteria on a global level. It supersedes the relevant European Union (EU) system, which implemented the GHS into EU law as the Classification, Labelling and Packaging (CLP) Regulation and United States Occupational Safety and Health Administration (OSHA) standards. The SDS requires more information than MSDS regulations and provides a standardized structure for presenting the required information.

A.3.3.61 Sampling. During a hazardous materials incident, sampling can be used to determine requirements for public protective actions, decontamination, medical treatments, mitigation, or other related functions.

The collection of evidence for the purposes of investigation is a form of sampling that has extensive enhanced requirements determined by the law enforcement authority having jurisdiction (AHJ).

A.3.3.67 UN/NA Identification Number. United Nations (UN) numbers are four-digit numbers used in international commerce and transportation to identify hazardous chemicals or classes of hazardous materials. These numbers generally range between 0000 and 3500 and usually are preceded by the letters "UN" (e.g., "UN1005") to avoid confusion with number codes.

North American (NA) numbers are identical to UN numbers. If a material does not have a UN number, it may be assigned an NA number. These usually are preceded by "NA" followed by a four-digit number starting with 8 or 9.

A.3.3.68 Weapon of Mass Destruction (WMD). The source of this definition is 18 USC 2332a.

Weapons of mass destruction (WMD) are known by many different abbreviations and acronyms, the most common of which is CBRN, which is the acronym for chemical, biological, and radiological/nuclear, and explosives particulate agents that could be released as the result of a terrorist attack. CBRN agents are further categorized as follows:

(1) *Chemical terrorism agents* are materials used to inflict lethal or incapacitating casualties, generally on a civilian population, and include chemical warfare agents and toxic industrial chemicals:

(a) *Chemical warfare agents* are solid, liquid, gaseous, and vapor agents, including, but not limited to, GB (Sarin), GD (Soman), HD (sulfur mustard), and VX.

(b) *Toxic industrial chemicals* include chlorine and ammonia, which have been identified as mass casualty threats.

(2) *Biological terrorism agents* are liquid or particulate agents that can consist of a biologically derived toxin or pathogen to inflict lethal or incapacitating casualties, such as bacteria, viruses, or the toxins derived from biological material.

(3) *Radiological particulate terrorism agents* are particles that emit ionizing radiation in excess of normal background levels used to inflict lethal or incapacitating casualties, generally on a civilian population, as the result of a terrorist attack.

A.3.3.68.1 Radiological Weapons of Mass Destruction. The intent of this annex material is to provide information on the different types of radiological/nuclear devices that can be used as a weapon by those with malicious intent.

A.3.3.68.1.1 Improvised Nuclear Device (IND). The nuclear explosion from an IND produces extreme heat, powerful shockwaves, and prompt radiation that would be acutely lethal for a significant distance. It also produces potentially lethal radioactive fallout, which could spread and deposit over very large areas. It also produces potentially lethal radioactive fallout, which may spread and deposit over very large areas. A nuclear detonation in an urban area could result in over 100,000 fatalities (and many more injured), massive infrastructure damage, and thousands of square kilometers of contaminated land. If the IND fails to work correctly and does not create a nuclear explosion, then the detonation of the conventional explosives would likely disperse radioactive material like an explosive radiological dispersal device (RDD).

A.3.3.68.1.2 Radiation Exposure Device (RED). An RED (used interchangeably with the terms *radiological exposure device* or *radiation emitting device*) is a device consisting of radioactive material, either as a sealed source or as material within some type of container or radiation-generating device, that causes harm by exposure to ionizing radiation.

A.3.3.68.1.3 Radiological Dispersal Device (RDD). An RDD is any device that intentionally spreads radioactive material across an area with the intent to cause harm, without a nuclear explosion occurring. An RDD that uses explosives for spreading or dispersing radioactive material is commonly referred to as a "dirty bomb" or "explosive RDD." Nonexplosive RDDs could spread radioactive material using common items such as pressurized containers, fans, building air-handling systems, sprayers, crop dusters, or even by hand.

A.3.4.2 Operations Level Responders. The source of this definition is OSHA 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response." These responders can have additional competencies that are specific to their response mission, expected tasks, and equipment and training as determined by the authority having jurisdiction (AHJ).

A.4.1.2 Awareness personnel include public works employees, maintenance workers, and others who might see or encounter an incident involving hazardous materials/WMD occur while performing their regular assignment.

A.4.2 While the purpose of the JPR is to require the *Emergency Response Guidebook* (ERG) as the minimum reference at the awareness level, other reference sources can be provided as necessary, including an equivalent guide to the ERG; safety data sheets (SDS); manufacturer, shipper, and carrier (highway, rail, water, air, and pipeline) documents (shipping papers) and contacts; and the U.S. DOT *Hazardous Materials Marking, Labeling and Placarding Guide*. If provided, responders should be able to use these sources to accomplish the goals of the JPR.

In transportation, the name, placard applied, or identification number of the material provides access to information in the ERG or an equivalent document.

A.4.2.1(A) Instructors should include indicators of terrorist attacks and other potentials, emphasizing that "if you can smell it, taste it, or feel it, you are now (or might be) part of the problem."

While this is a minimum requirement, the AHJ has the option to select additional information from the operations chapter (Chapter 5) regarding container and hazard information as necessary, based on local conditions and circumstances.

Awareness level personnel should be able to match the hazard classes and divisions with the primary hazards and examples.

Indicators of the presence of hazardous materials include occupancy and locations, including facilities and transportation; container shape (general shape of the container); container owner/operator signage; placards and labels; markings, including NFPA 704 markings, military markings, transportation markings such as identification number marks, marine pollutant marks, elevated temperature marks, commodity markings, inhalation hazard marks, and pipe and pipeline markings and colors; GHS markings; shipping papers and emergency response information and SDS; and sensory clues (dead birds or fish, color of vapors, unusual odors, sheen, hissing noise, dead vegetation, etc.). Other items, such as fume hood exhaust stacks and vents on the exterior of a building, could indicate hazardous materials and can be identified in advance through pre-incident survey activities.

SDS is a component of the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) and replaces the term *material safety data sheet* (MSDS). GHS is an internationally agreed-upon system, created by the United Nations in 1992. It replaces the various classification and labeling standards used in different countries by using consistent criteria on a global level. It supersedes the relevant European Union (EU) system, which has implemented the GHS into EU law as the Classification, Labelling and Packaging (CLP) Regulation and United States Occupational Safety and Health Administration (OSHA) standards. The SDS requires more information than MSDS regulations and provides a standardized structure for presenting the required information.

A.4.2.1(B) These requisite skills can be assessed through cognitive testing.

A.4.3 People not directly involved in emergency response operations should be kept away from the hazard area, and

control should be established over the area of operations. Unprotected emergency responders should not be allowed to enter the isolation zone.

At the awareness level, approved reference sources include the current edition of the *Emergency Response Guidebook* (ERG), safety data sheets (SDS), shipping papers with emergency response information, and other approved reference sources.

A.4.3.1(A) Recommended precautions found on numbered guides in the ERG include public safety issues; recommended protective clothing; evacuation; emergency response to fire, spill, and leak; and first aid sections.

Examples of required knowledge include (1) precautions for providing emergency medical care to victims; typical ignition sources; ways hazardous materials/WMD are harmful to people, the environment, and property; general routes of entry for human exposure; emergency action (fire, spill, or leak; first aid); actions recommended not to be performed (e.g., closing of pipeline valves); protective actions (isolation of area and denial of entry, evacuation, shelter-in-place); size and shape of recommended initial isolation and protective action distances; difference between small and large spills; conditions that require the use of the ERG Table of Initial Isolation and Protective Action Distances and the isolation distances in the ERG numbered guide; techniques for isolating the hazard area and denying entry to unauthorized persons; how to recognize and protect evidence; and use of approved tools and equipment; (2) basic personal protective actions: staying clear of vapors, fumes, smoke, and spills; keeping vehicle at a safe distance from the scene; approaching from upwind, uphill, and upstream; and (3) types of protective actions and their purpose (e.g., isolate hazard area and deny entry, evacuation, and shelter-in-place); basic factors involved in the choice of protective actions (e.g., hazardous materials/WMD involved, population threatened, and weather conditions).

A.4.3.1(B) The requisite skills can be assessed through cognitive testing.

A.5.2 At the operations level, approved reference sources should include as a minimum of the *Emergency Response Guidebook* (ERG), safety data sheets (SDS), shipping papers, including emergency response information, and other approved reference sources such as CHEMTREC, CANUTEC, and SETIQ; governmental authorities; and manufacturers, shippers, carriers (highway, rail, water, air, and pipeline), and contacts.

A.5.2.1(A) At the operations level, responders should be able to recognize the following containers and identify them by name: rail tank cars (pressure, nonpressure, and cryogenic tank cars); highway cargo tanks (compressed gas tube trailers, corrosive liquid tanks, cryogenic tanks, dry bulk cargo tanks, high-pressure tanks, low-pressure chemical tanks, and nonpressure liquid tanks); UN portable tanks/intermodal tanks (nonpressure, pressure, cryogenic, and tube modules); storage tanks (nonpressure, pressure, and cryogenic storage tanks); piping and pipelines; intermediate bulk containers (IBC) and ton containers; radioactive materials packages (excepted, industrial, Type A, and Type B packages); and nonbulk containers (bags, carboys, cylinders, drums, and Dewar flasks for cryogenic liquids).

To ensure that operations level personnel also understand how to obtain information pertaining to a pipeline-involved incident, line markers or pipeline markers are added to supplement the list of information sources. In a pipeline incident, the pipeline markers would be the source of information used since no shipping papers, placards, UN numbers, or other information would be available.

Hazardous materials incident survey information. This includes location, weather conditions, topography, populated buildings, bodies of water, other buildings, remedial actions taken, container/package, contents, release, container damage, time of day, and other factors that help determine the scope of the problem.

Physical and chemical properties. Predicting the behavior of hazardous materials/WMD relies on understanding certain characteristics of the material. Information identifying the following characteristics should be collected and interpreted: boiling point, chemical reactivity, corrosivity (pH), flammable (explosive) range [LFL (LEL) and UFL(UEL)], flash point, ignition (autoignition) temperature, particle size, persistence, physical state (solid, liquid, gas), radiation (ionizing and nonionizing), specific gravity, toxic products of combustion, vapor density, vapor pressure, and water solubility.

Identifying hazards. The process for predicting/identifying the behavior of a hazardous material/WMD and its container under emergency conditions is based on the simple concepts that containers of hazardous materials/WMD under stress can open up and allow the contents to escape. The release of contents will vary in type and speed. A dispersion pattern will be formed by the escaping contents, potentially exposing people, the environment, or property to physical and/or health hazards.

This overall concept for identifying the likely behavior of a container and its contents under emergency conditions is often referred to as a general behavior model. The general behavior model considers the type of stress on the container involved and the potential type of breach, release, dispersion pattern, length of contact, and the health and physical hazards associated with the material and its container, as follows:

(1) *Stress.* The three types of stress that could cause a container to release its contents are thermal stress, mechanical stress, and chemical stress.
(2) *Breach.* The five ways in which containers can breach are disintegration, runaway cracking, closures opening up, punctures, and splits or tears.
(3) *Release.* The four ways in which containment systems can release their contents are detonation, violent rupture, rapid relief, and spill or leak.
(4) *Dispersion.* Seven dispersion patterns can be created upon release of agents: hemisphere, cloud, plume, cone, stream, pool, and irregular.
(5) *Contact.* The three general time frames for predicting the length of time that an exposure can be in contact with hazardous materials/WMD in an endangered area are short term (minutes and hours), medium term (days, weeks, and months), and long term (years and generations).
(6) *Hazards.* The seven health and physical hazards that could cause harm in a hazardous materials/WMD incident are thermal, mechanical, poisonous, corrosive, asphyxiating, radiological, and etiologic.

Identifying outcomes. The process for identifying the potential harm and associated outcomes within an endangered area at a

hazardous materials/WMD incident includes identifying the size and shape of the endangered area, the number of exposures (people, property, environment, and major systems) within the endangered area, and the physical, health, and safety hazards within the endangered area as determined from approved resources.

Resources for determining the size of an endangered area of a hazardous materials/WMD incident are the current edition of the ERG and plume dispersion modeling results from facility pre-incident plans.

The factors for determining the extent of physical, health, and safety hazards within an endangered area at a hazardous materials/WMD incident are victim presentation (including nonclinical indicators or clues of a material's presence), surrounding conditions, indication of the behavior of the hazardous material and its container, and the degree of hazard.

A.5.2.1(B) The requisite skills can be assessed through cognitive testing.

A.5.3 At the operations level, approved information sources should include a minimum of ERG; SDS; CHEMTREC, CANUTEC, or SETIQ; local, state, and governmental authorities; and manufacturers', shippers', and carriers' documents (shipping papers) and contacts.

A.5.3.1(A) Modes of operation are offensive, defensive, and nonintervention and include the following:

(1) Common response objectives, for example, product control; fire control; protection of people, the environment, and property; identification and isolation; evidence protection; rescue; recovery; and termination
(2) Common response options, for example, spill control, leak control, foam, control exposures, evacuation, isolation, shelter-in-place, and establishment of product control zones
(3) Contamination types: primary, secondary, and tertiary

A.5.3.1(B) The requisite skills can be assessed through cognitive testing.

A.5.4 Operations level responders should be able to identify their role during hazardous materials/WMD incidents as specified in the emergency response plan and/or standard operating procedures; the levels of hazardous materials/WMD incidents as defined in the emergency response plan; the purpose, need, benefits, and elements of the incident command system for hazardous materials/WMD incidents; the duties and responsibilities of the incident safety officer and hazardous materials branch or group; considerations for determining the location of the incident command post; procedures for requesting additional resources; and the role and response objectives of other responding agencies.

Executive Summary – Field Decon

Over the past decade, research has been published linking higher rates of cancer in fire service personnel to repeated, chronic exposure to the by-products of smoke and particulates from structure fires. Various studies have proven that fire fighters are experiencing higher rates of certain types of cancers and that they are more likely to have rare forms of cancers than the general population. See NIOSH Study of Cancer among U.S. Fire Fighters at www.cdc.gov/niosh/firefighters/ffcancerstudy.html.

The fire service has begun to adapt to these findings by changing organizational practices in order to minimize exposures to known and suspected carcinogenic by-products in structure fires. Evolving adaptations include decontamination processes relating to fireground activities. Changes include, but are not limited to, forced air and water decontamination of structural fire-fighting personal protective equipment (PPE), modifying station practices, such as mandating that structural PPE be laundered after exposure to fire contaminants, and personal hygiene changes, such as mandating personnel to shower as soon as possible after interior fire-fighting activities at structure fires. In some instances, fire departments are assigning hazardous materials response assets to structure fire incidents to assist with scene (field) decontamination tasks.

During the recent meeting of the National Fire Protection Association (NFPA) Technical Committee (TC) – Hazardous Materials Response Personnel (HCZ-AAA), lengthy discussions regarding the role of emergency responders during field decontamination practices took place. These discussions led the Technical Committee to a decision that expanded technical language was needed in relation to job performance requirements (JPRs). Secondly, the TC decided that decontamination management does fit within one or more of the technical documents under the purview of the Committee. Of specific focus was NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications*. A small task group was formed to further research this subject and develop suggested language for possible inclusion into the upcoming version of NFPA 1072, which is currently in the second draft phase.

On January 19, 2016, the task group met via teleconference and determined that information about the previously referenced decontamination practices does indeed fall within the scope of the JPRs that have been developed as part of NFPA 1072. The task group reached a consensus that additional language should be crafted and inserted into the working copy of the second draft in support of the fire service's efforts to reduce or prevent cancer among fire fighters. The task group believes that the expanded information should be added to the existing language that deals with the use of PPE. The three specific areas include gross decontamination, action plan implementation, and decontamination.

As more information becomes available and this movement gains momentum and as best practices are developed, it is projected that field decontamination of personnel will remain a high priority and the means for minimizing fire fighter exposures to carcinogens. As such, it is incumbent upon the fire service that such practices become standardized and documented to ensure that the goals of supporting fire fighter health and safety are met by the broadest base of fire service organizations. If the referenced recommendations are accepted by the TC, it will place the NFPA in a position to play an integral role in addressing fire fighter decontamination and cancer concerns.

A.5.4.1(A) *Evidence preservation.* Preservation of evidence is essential to the integrity and credibility of an incident investigation. Preservation techniques must be acceptable to the law enforcement agency having jurisdiction; therefore, it is important to get that agency's input ahead of time on the techniques specified in the AHJ emergency response plan or the organization's standard operating procedures.

General procedures for preserving evidence include the following:

(1) Secure and isolate any incident area where evidence is located. This can include discarded personal protection equipment, specialized packaging (shipping or workplace labels and placards), biohazard containers, glass or metal fragments, containers (e.g., plastic, pipes, cylinders, bottles, fuel containers), and other materials that appear relevant to the occurrence, such as roadway flares, electrical components, fluids, and chemicals.
(2) Leave fatalities and body parts in place and secure the area in which they are located.
(3) Isolate any apparent source location of the event (e.g., blast area, spill release point).
(4) Leave in place any explosive components or housing materials.
(5) Place light-colored tarpaulins on the ground of access and exit corridors, decontamination zones, treatment areas, and rehabilitation sectors to allow possible evidence that might drop during decontamination and doffing of clothes to be spotted and collected.
(6) Secure and isolate all food vending locations in the immediate area. Contaminated food products will qualify as primary or secondary evidence in the event of a chemical or biological incident.

The collection (as opposed to preservation) of evidence is usually conducted by law enforcement personnel, unless other protocols are in place. If law enforcement personnel are not equipped or trained to enter the hot zone, hazardous materials technicians should be trained to collect samples in such a manner as to maintain the integrity of the samples for evidentiary purposes and to document the chain of evidence.

Safety precautions. Safety precautions should include buddy systems, backup systems, accountability systems, safety briefing, and evacuation/escape procedures. The following items should be considered in a safety briefing prior to allowing personnel to work at hazardous materials/WMD incidents:

(1) Preliminary evaluation
(2) Hazard identification
(3) Description of the site
(4) Task(s) to be performed
(5) Length of time for task(s)
(6) Required PPE
(7) Monitoring requirements
(8) Notification of identified risk

A.5.4.1(B) The operations level responder should implement the incident command system as required by the AHJ by completing the following requirements:

(1) Identify the role of the operations level responder during hazardous materials/WMD incidents as specified in the emergency response plan and/or standard operating procedures
(2) Identify the levels of hazardous materials/WMD incidents as defined in the emergency response plan
(3) Identify the purpose, need, benefits, and elements of the incident command system for hazardous materials/WMD incidents
(4) Identify the duties and responsibilities of the following functions within the incident management system:
    (a) Incident safety officer
    (b) Hazardous materials branch or group
(5) Identify the considerations for determining the location of the incident command post for a hazardous materials/WMD incident
(6) Identify the procedures for requesting additional resources at a hazardous materials/WMD incident
(7) Describe the role and response objectives of other agencies that respond to hazardous materials/WMD incidents

A.5.6 All responders should understand why their efforts must be evaluated. If they are not making progress, the plan must be re-evaluated to determine why. The evaluation should include what changes have occurred with the circumstances of the incident (behavior of container or its contents).

To decide whether the actions being taken at an incident are effective and the objectives are being achieved, the responder must determine whether the incident is stabilizing or increasing in intensity. Factors to be considered include reduction of potential impact to persons or the environment and status of resources available to manage the incident. The evaluation should take place upon initiation of the IAP, and the IC/unified command and general staff should constantly monitor the status of the incident. The actions taken should be leading to a desirable outcome, with minimal loss of life and property. Changes in the status of the incident should influence the development of the IAP for the next operational period.

A.5.6.1(A) Remaining in the immediate vicinity of an incident when nothing can be done to mitigate it and the situation is about to deteriorate is pointless. If flames are impinging on an LP-Gas vessel, for example, and providing the necessary volume of water to cool it is impossible, it would be prudent to withdraw to a safe distance. ICs should always evaluate the benefit of operations against the risk. Refer to the ERG or other references to determine appropriate action to be taken under the circumstances.

A.5.6.1(B) The proper methods for communicating the status of the planned response lie within the guidelines of the ICS and are dictated by the incident-specific IAP. The ICS identifies two types of communication at an incident, formal and informal. Formal communication should be used for all policy-related communication, using the ICS principles of unity of command and chain of command, while maintaining span of control. Ideally, all critical information should be communicated face-to-face.

The format for communications within the ICS must be established by the IC/unified command with input from the general staff.

A procedure should be established to allow responders to notify the IC immediately when conditions become critical and personnel are threatened. For example, the notification could take the form of a pre-established emergency radio message or tone that signifies danger, or it might be repeated blasts on an air horn. The message should not be delayed while responders try to locate a specific person in the chain of command.

A.6.1.5 Operations level responders need only be trained to meet the competencies in Chapter 5. All the competencies listed in Chapter 6 (mission-specific competencies) are not required for qualification as operations level responders and should be viewed as optional at the discretion of the AHJ, based on an assessment of local risks. The purpose of Chapter 6 is to provide a more effective and efficient process so that

the AHJ can match the expected tasks and duties of its personnel with the required competencies to perform those tasks.

A.6.1.6 Although some of the mission-specific JPRs in this chapter are taken from Chapter 7 of NFPA 472, the technical committee wants to clearly state that operations mission-specific responders are not replacements for or qualified as hazardous materials technicians. Operations mission-specific responders can perform some technician skills, but they do not have the broader skills and competencies required of a hazardous materials technician, particularly regarding risk assessment and the selection of control options. The following two options are examples of how guidance can be provided to ensure that operations mission-specific responders do not go beyond their level of training and equipment:

Direct guidance. Operations mission-specific responders are working under the control of a hazardous materials technician or an allied professional who has the ability to (1) continuously assess and/or observe their actions and (2) provide immediate feedback. Guidance by a hazardous materials technician or an allied professional can be provided through direct visual observation or through assessment reports communicated by the operations mission-specific responders to them.

Written guidance. Written standard operating procedures or similar guidance should clearly state the rules of engagement for operations mission-specific responders' competency. Emphasis should be placed on the following:

(1) Tasks expected of operations level responders
(2) Tasks beyond the capability of operations level responders
(3) Required PPE and equipment to perform the expected tasks
(4) Procedures for ensuring coordination within the AHJ ICS

A.6.2 At this level, PPE refers to personal protective equipment that would be used in situations where contact with hazardous materials/WMD is possible or expected. Such equipment can include chemical-protective clothing, bomb suits, respirators, or other equipment that typically would not be worn by operations level responders. Specialized PPE also refers to operations level responders' PPE that requires changes to donning, doffing, and usage procedures — for example, taping gaps in fire-fighter protective clothing, doffing in a decontamination corridor, or working in the hot zone as a member of a buddy system. Personnel should be able to describe the types of PPE available and the options for thermal hazards, radiological hazards, asphyxiation hazards, chemical hazards, etiological/biological hazards, and mechanical hazards. *(See also A.6.1.6.)*

A.6.2.1(A) Limitations of PPE include permeation, penetration, and degradation of protective clothing and limitations of respiratory protective equipment, such as air-purifying respirators.

Requisite knowledge includes the ability to describe the types of PPE that are available for response based on NFPA standards and the PPE options for thermal hazards, radiological hazards, asphyxiating hazards, chemical hazards, etiological/biological hazards, and mechanical hazards.

A.6.3 See A.6.1.5.

A.6.3.1(A) Policies and procedures for performing mass decontamination include containment of runoff according to the following EPA guidance: "During a hazardous materials incident (including a chemical/biological agent terrorist event), first responders should undertake any necessary emergency actions to save lives and protect the public and themselves. Once any imminent threats to human health and life are addressed, first responders should immediately take all reasonable efforts to contain the contamination and avoid or mitigate environmental consequences. EPA will not pursue enforcement actions against state and local responders for the environmental consequences of necessary and appropriate emergency response actions. First responders would not be protected under CERCLA from intentional contamination such as washing hazardous materials down the storm-sewer during a response action as an alternative to costly and problematic disposal or in order to avoid extra effort."

A.6.3.1(B) Methods that can be useful in assessing the effectiveness of decontamination (determining if entry personnel, tools and equipment, and victims have been decontaminated) include the following:

(1) Visual observation (stains, discolorations, corrosive effects, etc.)
(2) Monitoring devices [such as photoionization detectors (PIDs), detector tubes, radiation monitors, and pH paper strips/meters] that show whether contamination levels are at least below the device's detection limit]
(3) Wipe sampling, which provides after-the-fact information on the effectiveness of decontamination (Once a wipe swab is taken, it is analyzed by chemical means, usually in a laboratory. Protective clothing, equipment, and skin can be tested using wipe samples.)

A.6.4 See A.6.1.6.

A.6.4.1(A) See A.6.3.1(A).

A.6.4.1(B) See A.6.3.1(B).

A.6.5 See A.6.1.6.

A.6.6 See A.6.1.6.

For the purposes of this section, the intent is to focus on confining or containing the release with limited risk of personal exposure. The applicable techniques include absorption, adsorption, damming, diking, dilution, diversion, remote valve shutoff, retention, vapor dispersion, and vapor suppression. Product control also includes techniques for controlling flammable liquid incidents and flammable gas incidents.

Tools and equipment include such items as Class B foam application equipment, diking equipment, damming equipment, approved absorbent materials and products, shovels and other hand tools, piping, heavy equipment (such as backhoes), floats, and spill booms.

Control agents can include Class B foam, dispersal agents, and so on.

A.6.6.1(A) Product control techniques that focus on confining/containing the release with limited risk of personal exposure include absorption, adsorption, damming, diking, dilution, diversion, remote valve shutoff, retention, vapor dispersion, and vapor suppression. Product control also includes techniques for controlling flammable liquid incidents and flammable gas incidents.

Remote/emergency shutoff devices include those for MC-306/DOT-406, MC-407/DOT-407, MC-331 cargo tanks, and intermodal tanks.

A.6.6.1(B) Product control techniques that focus on confining/containing the release with limited risk of personal exposure include absorption, adsorption, damming, diking, dilution, diversion, remote valve shutoff, retention, vapor dispersion, and vapor suppression. Techniques for controlling flammable liquid incidents and flammable gas incidents (e.g., hose handling, nozzle patterns, and attack operations) can be found in NFPA 1001.

A.6.7 See A.6.1.6.

A.6.7.1(A) Field tests include bump tests, calibration, and other tests performed at the incident scene to prepare the equipment for use.

A.6.8 See A.6.1.6.

A.6.8.1(A) Victim prioritization utilizes risk-based factors to establish an action plan for victim removal and eventual treatment. Patient triage is a clinical prioritization employed to maximize survival and to prioritize application of therapeutic modalities.

A.6.9 See A.6.1.6.

A.6.9.1(A) Types of illicit laboratories include chemical, biological, explosive, and drug manufacturing. Booby traps found at illicit laboratories include anti-personnel devices. Clearance of such devices is carried out by explosive ordnance disposal (EOD) personnel trained for these procedures.

Law enforcement agencies having investigative jurisdiction might differ based on whether the situation involves illicit drug manufacturing, illicit WMD manufacturing, or environmental crimes resulting from illicit laboratory operations. Agency jurisdiction, investigative guidelines, and investigative priorities are complex and dynamic. Specific jurisdictional situations should be identified with governmental investigative agencies.

Considerations for decontaminating and contaminate neutralization tactical law enforcement personnel include being aware of specialized equipment used by law enforcement, including weapons; ammunition; concussion devices; persons in custody; procedures for securing evidence, weapons, and ammunition; and coordination to ensure a safe operating zone.

A.7.2.1 The committee determined that the basic hazard categories [corrosivity, energy (explosivity, radioactivity, reactivity), flammability, oxygen concentration, thermal (heat and cold), and toxicity] are core components of a hazardous materials technician's requisite knowledge. The technical committee wanted to specify the hazard categories to eliminate any potential ambiguity.

When sampling, or using methods to identify materials, including those in containers, methods should be used to avoid cross-contaminating the material. These methods are critical when sampling materials, which could be evidentiary in nature.

A.7.2.1(A) The committee determined that the basic hazard categories [corrosivity, energy (explosivity, radioactivity, reactivity), flammability, oxygen concentration, thermal (heat and cold), and toxicity] are core components of a hazardous materials technician's requisite knowledge. The technical committee wanted to specify the hazard categories to eliminate any potential ambiguity.

A.7.2.1(B) All hazardous materials technicians must be able to protect themselves and the public from basic everyday response hazards. Therefore, the committee determined that all hazardous materials technicians must have the knowledge and skills necessary to operate each of the following pieces of detection and monitoring equipment: colorimetrics (e.g., tubes, chips, papers, strips, reagents); electrochemical cells (e.g., toxic gas sensors), flammable gas/LEL noncontact thermal detection, oxygen concentration, and photoionization detector (PID) devices; and radiation detection and monitoring devices.

A.7.2.2 Approved reference sources beyond the ERG and SDS should include hazardous materials computer databases; information obtained from detection, monitoring, and sampling; reference manuals; technical information centers, including CHEMTREC, CANUTEC, or SETIQ; governmental authorities; and technical information specialists.

Equipment includes monitoring and detection equipment, computers, printers, communication equipment, and so forth.

A.7.2.2(B) The requisite skills can be assessed through cognitive testing.

A.7.2.3 The condition of a container can be damaged with no product release, undamaged with no product release, damaged with product release, and undamaged with product release.

Containers include bulk, nonbulk, bulk facility containers, radioactive materials containers, and pipelines and piping, as well as their closures.

Required markings include specification markings for bulk transportation containers, including tank cars (cryogenic liquid, nonpressure, pneumatically unloaded covered hopper cars, and pressure), intermodal tanks/UN portable tanks (nonpressure, pressure, cryogenic liquid, and tube modules), and cargo tanks (compressed gas tube trailers, corrosive liquid, cryogenic liquid, dry bulk, high-pressure, low-pressure chemical, and nonpressure liquid).

Approved resources include printed and technical resources, computer databases, and specialists in the field.

Types of damage to containers include cracks, scores, gouges, dents, closures problems (closures not secure, worn, damaged, or missing), and structural damage to container.

Types of stress on containers include thermal, mechanical, and chemical.

A.7.2.3(A) Types of containers are as follows:

(1) Bulk containers
   (a) Cargo tanks, including compressed gas tube trailers, corrosive liquid tanks, cryogenic liquid tanks, dry bulk cargo tanks, high-pressure tanks, low-pressure liquid tanks, and nonpressure liquid tanks
   (b) Facility tanks, including nonpressure tanks, pressure tanks, and cryogenic liquid tanks
   (c) Intermediate bulk containers (IBCs), including the following:
      i. Tote tanks
      ii. Ton containers
      iii. Portable tanks, including HM portable tanks [nonpressure (T11-T22, IM-101, IM-102, IMO Type 1, IMO Type 2), pressure (T50, Specification 51, IMO Type 5), cryogenic (T75, IMO Type 7), and tube modules]
   (d) Piping and pipelines
   (e) Railroad cars (nonpressure tank cars, pressure tank cars, cryogenic liquid tank cars, and pneumatically unloaded hopper cars)
   (f) Special containers found in the AHJ area
(2) Nonbulk containers, to include bags, carboys, drums, and cylinders
(3) Radioactive material packages to include excepted, industrial, Type A, and Type B
(4) Piping and pipelines
(5) Specifications for rail tank cars, highway cargo tanks, and intermodal tank containers (UN Portable Tanks)

The capacity of a container is determined using the markings on the container, the shipping papers accompanying the shipment in transportation, or the facility documentation or resources. If the container has more than one compartment, the pressure and the quantity remaining in all compartments should be determined.

A.7.2.4 Surrounding conditions include topography; land use, including utilities and fiber optic cables; accessibility; weather condition; bodies of water, including recharge ponds; public exposure potential; overhead and underground wires and pipelines; storm and sewer drains; possible ignition sources; adjacent land use such as rail lines, highways, and airports; and the nature and extent of injuries. Building information, such as floor drains, ventilation ducts, and air returns, also should be included where appropriate.

Approved reference sources include printed and technical resources, computer databases, specialists in the field, and approved resources available at the awareness, operations, and technician levels.

Behavior of the container includes the effects of damage and stress on the container and the expected breach type.

Behavior of the contents include the expected release type, dispersion pattern, length of contact, time with exposures, and potential hazards.

Also see A.5.2.1(A).

A.7.2.4(A) The process for predicting behavior should take into consideration the following factors: stress on the container in addition to damage on the container, breach of the container, release of contents, dispersion pattern of released matter or energy, contact time, hazards creating harm, and synergistic effects of mixing multiple materials. The following are the types of conditions to be aware of:

(1) Types of stresses (thermal, mechanical, chemical)
(2) Types of potential breaches (disintegration, runaway cracking, closures opening up, punctures, and splits or tears)
(3) Types of potential releases (detonation, violent rupture, rapid relief, and spill or leak)
(4) Types of potential dispersion patterns (hemisphere, cloud, plume, cone, stream, pool, and irregular)
(5) Length of potential contact time (short term, medium term, long term)
(6) Potential hazards that could cause harm (thermal, radiological, asphyxiation, chemical, etiological, and mechanical)

Fire and safety features to be considered for incidents at facilities include fire protection systems, monitoring and detection systems, pressure relief and vacuum relief protection, product spillage and control (impoundment and diking), tank spacing, and transfer operations. Should transportation containers be involved at facilities, fire and safety features should be considered where appropriate.

A.7.2.4(B) The process for predicting behavior should take into consideration the following factors: damage to the container, stress on the container in addition to the damage on the container, breach of the container, release of contents, dispersion pattern of released matter or energy, contact time, hazards creating harm, and synergistic effects of mixing multiple materials.

A.7.2.5 Results of the incident analysis include weather conditions (current and projected); terrain; time of day; buildings; people; bodies of water; hazard and response information collected; results of detection, monitoring, and sampling; condition of container; and predicted behavior of the container and its contents.

Approved resources include printed and technical resources, computer databases, and specialists in the field.

A.7.3.2 PPE includes both respiratory protection and liquid splash–protective ensembles, vapor-protective clothing, high temperature–protective ensembles, and structural fire-fighting protective ensembles.

A.7.3.2(A) Levels of protection specified by the OSHA/EPA are Level A, Level B, Level C, and Level D with explanations. Table A.7.3.2(A) cross-references the OSHA/EPA level with the NFPA PPE standards.

Hazards include thermal, radiological, asphyxiating, chemical, etiological, and mechanical.

A.7.3.2(B) PPE includes dermal and respiratory protection elements. If CPC is selected, determine the effectiveness of protective ensemble construction material using chemical compatibility charts.

A.7.3.3(A) Decontamination operations include emergency decontamination, gross decontamination, mass decontamination, and technical decontamination. Gross decontamination is the phase of the decontamination process during which the amount of surface contaminants is significantly reduced.

Decontamination methods include absorption, adsorption, chemical degradation, dilution, disinfecting, evaporation, isola-

Table A.7.3.2(A) Ensemble Description

Ensemble Description Using Performance-Based Standard(s)	OSHA/EPA Level
NFPA 1991 worn with NFPA 1981 SCBA	A
NFPA 1992 worn with NFPA 1981 SCBA	B
NFPA 1994 Class 2 worn with NFPA 1981 SCBA	B
NFPA 1994 Class 3 worn with NFPA 1981 SCBA	C
NFPA 1994 Class 3 worn with NIOSH CBRN PAPR	C
NFPA 1994 Class 3 worn with NIOSH CBRN APR	C

tion and disposal, neutralization, solidification, sterilization, vacuuming, and washing.

A.7.3.4 The hazardous materials technician's responsibility is to develop a plan of action for an assignment, including site safety and control, that is consistent with the emergency response plans and standard operating procedures and within the capability of available personnel, PPE, and control equipment.

A.7.3.4(A) Components of an IAP and subplans should include site safety and control tasks.

Techniques for hazardous materials/WMD (product) control include absorption; adsorption; blanketing; covering, damming, diking, dilution, dispersion, diversion; fire suppression; neutralization; overpacking, patching; plugging; sealing closures; pressure isolation and reduction (flaring, venting, vent and burn; isolation of valves, pumps, or energy sources); remote valve shut-off; retention; sealing closures [valves, pressure relief devices (pressure relief valves, rupture disks, fusible plugs)]; solidification; transfer; and vapor control (dispersion, suppression).

A.7.4.1(A) The functions of the hazardous materials branch or group include hazardous materials branch director/group supervisor, assistant safety officer—hazardous materials, site access control group supervisor, decontamination group supervisor, technical specialist—hazardous materials reference, entry team group supervisor, and safe refuge group supervisor.

A.7.4.2 PPE at this level includes chemical-protective clothing (liquid splash–protective and vapor-protective clothing) and respiratory protection as well as any other specialized protective clothing provided by the AHJ.

A.7.4.2(A) Safety procedures for personnel working in CPC should address: keeping the individual cool and protected from heat exposure, prevention of dehydration, medical monitoring, and stringent accounting of time spent on air and in the suit.

Safety concerns of working in the hot zone include visibility, mobility, and communications issues; emergency procedures for personnel working in chemical-protective clothing; loss of suit integrity; loss of verbal communications; the buddy system; and use of backup personnel wearing the same level of PPE.

A.7.4.3.1 Product control techniques include absorption, adsorption, blanketing, damming, diking, dilution, dispersion, diversion, neutralization, overpacking, patching, plugging, sealing closures, retention, remote valve shutoff, vapor dispersion, and vapor suppression. Note: It will be necessary for non–fire fighters to develop fire-fighting skills (hose handling, nozzle control, application techniques, etc.) before performing fire-fighting operations.

Tools and equipment include such items as Class B foam application equipment, diking equipment, damming equipment, approved absorbent materials and products, shovels and other hand tools, piping, dispersal agents, heavy equipment (such as backhoes), floats, and spill booms.

Product control agents can include Class B foam, dispersal agents, and so forth.

Safety procedures can include grounding, bonding, and monitoring as necessary.

A.7.4.3.1(A) See A.7.4.3.1.

Remote/emergency shutoff devices include emergency shutoff devices for MC-306/DOT-406, MC-307/DOT-407, and MC-331 cargo tanks as well as remote shutoff valves at fixed facilities.

A.7.4.3.1(B) See A.7.4.3.1.

A.7.4.3.2 Containers include nonbulk containers (bags, barrels, bottles, boxes, jerry cans, pails, drums, and cylinders, including UN pressure receptacles and "y" cylinders) radioactive materials containers (excepted; industrial, Type A, Type B).

Closures include valves, pressure relief devices (pressure relief valves, rupture discs, fusible plugs), manways, flanged fittings, screwed caps, plugs, packing glands, drum bungs, and drum lids.

Leaks include punctures (nail holes, fork truck punctures); rips, tears, splits, cracks, and ruptures; chime leaks; and leaking closures [screwed fitting leaks (bung leaks), open valves, missing plugs, packing gland leaks, flange leaks, gasket leaks, blown rupture discs].

A.7.4.3.2(A) See A.7.4.3.2.

A.7.4.3.2(B) See A.7.4.3.2.

A.7.4.3.3 For example, there are three overpack methods for a leaking 55 gal (208 L) drum: rolling slide-in, slip-over, or other approved method.

A.7.4.4.1(A) See A.6.3.1(A).

A.7.4.4.1(B) See A.6.3.1(B).

A.7.4.4.2(A) See A.6.3.1(A).

A.7.4.4.2(B) See A.6.3.1(B).

A.7.6 Documentation and reporting requirements include ensuring that required reports (e.g., incident reports and critique reports) and records (e.g., training records, exposure records, activity logs, hot zone entry and exit logs, and PPE logs) are completed and verified; supporting documentation is provided; reports, records, and supporting documentation are forwarded as required; reports, records, and supporting documentation are filed as required; and files are maintained as required.

A.8.3.1(A) Hazardous materials control techniques include absorption, adsorption, blanketing, covering, contamination isolation, damming, diking, dilution, dispersion, diversion, fire

suppression, neutralization, overpacking, patching, plugging, pressure isolation and reduction (flaring, venting, vent and burn, isolation of valves, pumps, or energy sources), retention, solidification, transfer, and vapor control (dispersion and suppression).

Approving the level of PPE requires knowledge of the four levels of chemical-protective clothing (CPC), the equipment required for each level, and conditions under which each level is used; impact and significance of degradation, penetration, and permeation on CPC; safety considerations for personnel working in vapor-protective, liquid splash–protective, and high temperature–protective clothing; and physiological and psychological stresses that can affect users of PPE.

Tactical assignments include the following:

(1) Receive the initial notification.
(2) Provide secondary notification and activation of response agencies.
(3) Make ongoing assessments of the situation.
(4) Command on-scene personnel (incident management system).
(5) Coordinate support and mutual aid.
(6) Provide law enforcement and on-scene security (crowd control).
(7) Provide traffic control and rerouting.
(8) Provide resources for public safety protective action (evacuation or shelter-in-place).
(9) Provide fire suppression services.
(10) Provide on-scene medical assistance (ambulance) and medical treatment (hospital).
(11) Provide public notification (warning).
(12) Provide public information (news media statements).
(13) Provide on-scene communications support.
(14) Provide emergency on-scene decontamination.
(15) Provide operations-level hazard control services.
(16) Provide technician-level hazard mitigation services.
(17) Provide environmental remedial action (cleanup) services.
(18) Provide environmental monitoring.
(19) Implement on-site accountability.
(20) Provide on-site responder identification.
(21) Provide incident command post security.
(22) Provide incident or crime scene investigation.
(23) Provide evidence collection and sampling.

Safe operating practices and procedures include pre-incident planning; safety briefings; buddy system; backup teams; safety precautions for search, rescue, and recovery missions; advantages and limitations of decontamination methods; and hazardous materials atmospheric and physical safety hazards in confined spaces.

Decontamination methods include the following:

(1) Absorption
(2) Adsorption
(3) Chemical degradation
(4) Dilution
(5) Disinfection
(6) Evaporation
(7) Isolation and disposal
(8) Neutralization
(9) Solidification
(10) Sterilization
(11) Vacuuming
(12) Washing

A.8.4.1(A) Functions include the following:

(1) Decontamination
(2) Entry (backup)
(3) Hazardous materials branch director or group supervisor
(4) Hazardous materials safety
(5) Information and research

A.8.5 Effectiveness of response options and actions include control, containment, confinement, and extinguishment operations; decontamination process; established control zones; personnel being used; and PPE.

A.8.6 Final documentation and reporting requirements include ensuring that required reports (e.g., incident reports and critique reports) and records (e.g., training records, exposure records, activity logs, hot zone entry and exit logs, and personal protective equipment logs) are completed and verified; supporting documentation is provided; reports, records, and supporting documentation are forwarded as required; reports, records, and supporting documentation are filed as required; and files are maintained as required.

A.8.6.1(A) Explanation of transition from safe to nonsafe or unsafe.

Annex B Explanation of the Professional Qualifications Standards and Concepts of JPRs

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

B.1 Explanation of the Professional Qualifications Standards and Concepts of Job Performance Requirements (JPRs). The primary benefit of establishing national professional qualifications standards is to provide both public and private sectors with a framework of the job requirements for emergency services personnel. Other benefits include enhancement of the profession, individual as well as organizational growth and development, and standardization of practices.

NFPA professional qualifications standards identify the minimum job performance requirements (JPRs) for specific emergency services levels and positions. The standards can be used for training design and evaluation; certification; measuring and critiquing on-the-job performance; defining hiring practices; job descriptions; and setting organizational policies, procedures, and goals.

Professional qualifications standards for specific jobs are organized by major areas of responsibility defined as “duties”. For example, the fire fighter's duties might include fire department communications, fireground operations, and preparedness and maintenance, whereas the fire and life safety educator's duties might include education and implementation, planning and development, and evaluation. Duties are major functional areas of responsibility within a specific job.

The professional qualifications standards are written as JPRs. JPRs describe the performance required for a specific job and are grouped according to the duties of the job. The complete list of JPRs for each duty defines what an individual must be able to do in order to perform and achieve that duty.

B.2 The Parts of a JPR.

B.2.1 Critical Components. The JPR comprises three critical components, which are as follows:

(1) Task to be performed, partial description using an action verb
(2) Tools, equipment, or materials that are to be provided to complete the task
(3) Evaluation parameters and performance outcomes

Table B.2.1 gives an example of the critical components of a JPR.

B.2.1.1 The Task to Be Performed. The first component is a concise statement of what the person is required to do. A significant aspect of that phrase is the use of an action verb, which sets the expectation for what is to be accomplished.

B.2.1.2 Tools, Equipment, or Materials That Must Be Provided for Successful Completion of the Task. This component ensures that all individuals completing the task are given the same tools, equipment, or materials when they are being evaluated. Both the individual and the evaluator will know what will be provided in order for the individual to complete the task.

B.2.1.3 Evaluation Parameters and Performance Outcomes. This component defines — for both the performer and the evaluator — how well the individual should perform each task. The JPR guides performance toward successful completion by identifying evaluation parameters and performance outcomes. This portion of the JPR promotes consistency in evaluation by reducing the variables used to gauge performance.

B.2.2 Requisite Knowledge and Skills. In addition to these three components, the JPR describes requisite knowledge and skills. As the term *requisite* suggests, these are the necessary knowledge and skills the individual should have prior to being able to perform the task. Requisite knowledge and skills are the foundation for task performance.

B.2.3 Examples. With the components and requisites combined, a JPR might read similar to the following two examples.

B.2.3.1 Example: Fire Fighter I. Perform overhaul at a fire scene, given approved PPE, attack line, hand tools, flashlight, and an assignment, so that structural integrity is not compromised, all hidden fires are discovered, fire cause evidence is preserved, and the fire is extinguished.

Table B.2.1 Example of a JPR

Component	Example
(1) Task to be performed	(1) Perform overhaul at a fire scene,
(2) Tools, equipment, or materials	(2) given approved PPE, attack line, hand tools, flashlight, and an assignment,
(3) Evaluation parameters and performance outcomes	(3) so that structural integrity is not compromised, all hidden fires are discovered, fire cause evidence is preserved, and the fire is extinguished.

(A) Requisite Knowledge. Knowledge of types of fire attack lines and water application devices for overhaul, water application methods for extinguishment that limit water damage, types of tools and methods used to expose hidden fire, dangers associated with overhaul, signs of area of origin or signs of arson, and reasons for protection of fire scene.

(B) Requisite Skills. The ability to deploy and operate an attack line; remove flooring, ceiling, and wall components to expose void spaces without compromising structural integrity; apply water for maximum effectiveness; expose and extinguish hidden fires in walls, ceilings, and subfloor spaces; recognize and preserve signs of area of origin and arson; and evaluate for complete extinguishment.

B.2.3.2 Example: Fire and Life Safety Educator II. Prepare a written budget proposal for a specific program or activity, given budgetary guidelines, program needs, and delivery expense projections, so that all guidelines are followed and the budget identifies all program needs.

(A) Requisite Knowledge. Knowledge of budgetary process; governmental accounting procedures; federal, tribal, state, and local laws; organizational bidding process; and organization purchase requests.

(B) Requisite Skills. The ability to estimate project costs; complete budget forms; requisition/purchase orders; collect, organize, and format budgetary information; complete program budget proposal; and complete purchase requests.

B.3 Potential Uses for JPRs.

B.3.1 Certification. JPRs can be used to establish the evaluation criteria for certification at a specific job level. When used for certification, evaluation should be based on the successful completion of the JPRs.

The evaluator would verify the attainment of requisite knowledge and skills prior to JPR evaluation. Verification could be through documentation review or testing.

The individual seeking certification would be evaluated on completion of the JPRs. The individual would perform the task and be evaluated based on the evaluation parameters and performance outcomes. This performance-based evaluation is based on practical exercises for psychomotor skills and written examinations for cognitive skills.

Psychomotor skills are those physical skills that can be demonstrated or observed. Cognitive skills cannot be observed but rather are evaluated on how an individual completes the task (process-oriented) or on the task outcome (product-oriented).

Performance evaluation requires that individuals be given the tools, equipment, or materials listed in the JPR in order to complete the task.

B.3.2 Curriculum Development and Training Design and Evaluation. The statements contained in this document that refer to job performance were designed and written as JPRs. Although a resemblance to instructional objectives might be present, these statements should not be used in a teaching situation until after they have been modified for instructional use.

JPRs state the behaviors required to perform specific skills on the job, as opposed to a learning situation. These statements should be converted into instructional objectives with behaviors, conditions, and degree to be measured within the educational environment.

While the differences between JPRs and instructional objectives are subtle in appearance, their purposes differ. JPRs state what is necessary to perform the job in practical and actual experience. Instructional objectives, on the other hand, are used to identify what students must do at the end of a training session and are stated in behavioral terms that are measurable in the training environment.

By converting JPRs into instructional objectives, instructors would be able to clarify performance expectations and avoid confusion caused by the use of statements designed for purposes other than teaching. Instructors would be able to add jurisdictional elements of performance into the learning objectives as intended by the developers.

Requisite skills and knowledge could be converted into enabling objectives, which would help to define the course content. The course content would include each item of the requisite knowledge and skills ensuring that the course content supports the terminal objective.

B.3.2.1 Example: Converting a Fire Fighter I JPR into an Instructional Objective. The instructional objectives are just two of several instructional objectives that would be written to support the terminal objective based on the JPR.

JPR: Perform overhaul at a fire scene, given approved PPE, attack line, hand tools, flashlight, and an assignment, so that structural integrity is not compromised, all hidden fires are discovered, fire cause evidence is preserved, and the fire is extinguished.

Instructional Objective (Cognitive): The Fire Fighter I will identify and describe five safety considerations associated with structural integrity compromise during overhaul as part of a written examination.

Instructional Objective (Psychomotor): The Fire Fighter I will demonstrate the designed use of tools and equipment during overhaul to locate and extinguish hidden fires without compromising structural integrity.

B.3.2.2 Example: Converting a Fire and Life Safety Educator II JPR into an Instructional Objective. The instructional objectives are just two of several instructional objectives that would be written to support the terminal objective based on the JPR.

JPR: Prepare a written budget proposal for a specific program or activity, given budgetary guidelines, program needs, and delivery expense projections, so that all guidelines are followed and the budget identifies all program needs.

Instructional Objective (Cognitive): The Fire and Life Safety Educator II will list and describe the bidding process for the purchase of a published program using budgetary guidelines, program needs, and the guidelines established by local organizational procedures as part of a written examination.

Instructional Objective (Psychomotor): The Fire and Life Safety Educator II will lead in the purchase of a specific fire and life safety educational program by following the bidding process to completion, using local organizational guidelines, including budgetary procedures, program needs, and delivery expense projections.

B.4 Other Uses for JPRs. While the professional qualifications standards are used to establish minimum JPRs for qualification, they have been recognized as guides for the development of training and certification programs, as well as a number of other potential uses.

These areas might include the following:

(1) *Employee Evaluation/Performance Critiquing.* The professional qualifications standards can be used as a guide by both the supervisor and the employee during an evaluation. The JPRs for a specific job define tasks that are essential to perform on the job, as well as the evaluation criteria to measure completion of the tasks.

(2) *Establishing Hiring Criteria.* The professional qualifications standards can be helpful in a number of ways to further the establishment of hiring criteria. The authority having jurisdiction (AHJ) could simply require certification at a specific job level, for example, Fire Fighter I. The JPRs could also be used as the basis for pre-employment screening to establish essential minimal tasks and the related evaluation criteria. An added benefit is that individuals interested in employment can work toward the minimal hiring criteria at local colleges.

(3) *Employee Development.* The professional qualifications standards can be practical for both the employee and the employer in developing a plan for the employee's growth within the organization. The JPRs and the associated requisite knowledge and skills can be used as a guide to determine additional training and education required for the employee to master the job or profession.

(4) *Succession Planning.* Succession planning addresses the efficient placement of individuals into jobs in response to current needs and anticipated future needs. A career development path can be established for targeted employees to prepare them for growth within the organization. The JPRs and requisite knowledge and skills could then be used to develop an educational path to aid in the employee's advancement within the organization or profession.

(5) *Establishing Organizational Policies, Procedures, and Goals.* The professional qualifications standards can be functional for incorporating policies, procedures, and goals into the organization or agency.

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Annex C An Overview of JPRs for Hazardous Materials/WMD Response Personnel

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

C.1 Hazardous Materials/WMD Response Personnel. The matrices shown in Table C.1 are included to provide the user of the standard with an overview of the JPRs and the progression of the various levels found in the document. They are intended to assist the user of the document with the implementation of the requirements and the development of training programs using the JPRs.

Annex D National Fallen Firefighters Foundation

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

D.1 16 Firefighter Life Safety Initiatives. In 2004, the NFFF held an unprecedented gathering of the fire service leadership when more than 200 individuals assembled in Tampa, Florida to focus on the troubling question of how to prevent line-of-duty deaths and injuries. Every year approximately 100 fire fighters lose their lives in the line of duty in the United States; about one every 80 hours. Every identifiable segment of the fire service was represented and participated in the Summit.

The first Firefighter Life Safety Summit marked a significant milestone, because it not only gathered all the segments of the fire service behind a common goal but it also developed the "16 Firefighter Life Safety Initiatives." The summit attendees agreed that the "16 Firefighter Life Safety Initiatives" serve as a blueprint to reduce line-of-duty deaths and injuries. In 2014, a second Life Safety Summit was held and more than 300 fire service leaders gathered. At the second Firefighter Life Safety Summit, the "16 Firefighter Life Safety Initiatives" were reaffirmed as being relevant to reduce line-of-duty deaths and injuries.

NFFF "16 Firefighter Life Safety Initiatives."

(1) Define and advocate the need for a cultural change within the fire service relating to safety; incorporating leadership, management, supervision, accountability and personal responsibility.
(2) Enhance the personal and organizational accountability for health and safety throughout the fire service.
(3) Focus greater attention on the integration of risk management with incident management at all levels, including strategic, tactical, and planning responsibilities.
(4) All fire fighters must be empowered to stop unsafe practices.
(5) Develop and implement national standards for training, qualifications, and certification (including regular recertification) that are equally applicable to all fire fighters based on the duties they are expected to perform.
(6) Develop and implement national medical and physical fitness standards that are equally applicable to all fire fighters, based on the duties they are expected to perform.
(7) Create a national research agenda and data collection system that relates to the initiatives.
(8) Utilize available technology wherever it can produce higher levels of health and safety.
(9) Thoroughly investigate all fire fighter fatalities, injuries, and near misses.
(10) Grant programs should support the implementation of safe practices and/or mandate safe practices as an eligibility requirement.
(11) National standards for emergency response policies and procedures should be developed and championed.
(12) National protocols for response to violent incidents should be developed and championed.
(13) Fire fighters and their families must have access to counseling and psychological support.
(14) Public education must receive more resources and be championed as a critical fire and life safety program.
(15) Advocacy must be strengthened for the enforcement of codes and the installation of home fire sprinklers.
(16) Safety must be a primary consideration in the design of apparatus and equipment.

Table C.1 Overview of JPRs for Hazardous Materials/WMD Response Personnel

Awareness	Operations	Technician
4.2 Recognize and identify the hazardous materials/WMD and hazards involved in a hazardous materials/WMD incident, given a hazardous materials/WMD incident and approved reference sources, so that the presence of hazardous materials/WMD is recognized and the materials and their hazards are identified.	5.2 Identify the scope of the problem at a hazardous materials/WMD incident, given a hazardous materials/WMD incident, an assignment, policies and procedures, and approved reference sources, so that container types, materials, location of any release, and surrounding conditions are identified, hazard information is collected, the potential behavior of a material and its container is identified, and the potential hazards, harm, and outcomes associated with that behavior are identified.	7.2.1 Classify hazardous materials/WMD and verify the presence and concentrations of hazardous materials through detection, monitoring, and sampling at a hazardous materials/WMD incident, given a hazardous materials/WMD incident with released identified and unidentified hazardous materials; an assignment in an incident action plan (IAP); policies and procedures; approved resources; detection and monitoring equipment, and personal protective equipment (PPE), so that PPE is selected and used; hazardous materials/WMD are classified by their basic hazard categories; the presence of hazardous materials is verified; the concentrations of hazardous materials in the atmosphere are determined; signs of exposure in victims and responders are recognized and identified; samples of solids, liquids, and gases are collected; results of detection and monitoring equipment are read, interpreted, recorded, and communicated; exposures and personnel are protected; safety procedures are followed; hazards are avoided or minimized; personnel using the detection, monitoring, and sampling equipment, as well as the equipment, are decontaminated; detection, monitoring, and sampling equipment is maintained according to manufacturers' recommendations; and detection, monitoring, and sampling operations are reported and documented.
4.3 Isolate the hazard area and deny entry at a hazardous materials/WMD incident, given a hazardous materials/WMD incident, policies and procedures, and approved reference sources, so that the hazard area is isolated and secured, personal safety procedures are followed, hazards are avoided or minimized, and additional people are not exposed to further harm.	5.3 Identify the action options for a hazardous materials/WMD incident, given a hazardous materials/WMD incident, an assignment, policies and procedures, approved reference sources, and the scope of the problem, so that response objectives, action options, safety precautions, suitability of approved personal protective equipment (PPE) available, and emergency decontamination needs are identified.	7.2.2 Collect and interpret hazard and response information at a hazardous materials/WMD incident, given a hazardous materials/WMD incident, an assignment in an IAP, policies and procedures, approved reference sources, and approved tools and equipment, so that hazard and response information is collected, interpreted, and communicated.
4.4 Initiate required notifications at a hazardous materials/WMD incident, given a hazardous materials/WMD incident, policies and procedures, and approved communications equipment, so that the notification process is initiated and the necessary information is communicated.	5.4 Perform assigned tasks at a hazardous materials/WMD incident, given a hazardous materials/WMD incident; an assignment with limited potential of contact with hazardous materials/WMD, policies and procedures, the scope of the problem,approved tools, equipment, and PPE, so that protective actions and scene control are established and maintained,on-scene incident command is described, evidence is preserved,approved PPE is selected and used in the proper manner; exposures and personnel are protected; safety procedures are followed; hazards are avoided or minimized; assignments are completed; and gross decontamination of personnel, tools, equipment, and PPE is conducted in the field.	7.2.3 Assess the condition of a container and its closures at a hazardous materials/WMD incident, given an incident involving hazardous materials/WMD; an assignment in an IAP; policies and procedures; the scope of the incident; identity of material(s) involved and their hazards, including results of detection, monitoring, and sampling; a container with required markings; and approved resources and PPE, so that PPE is selected and used; the container and its closures are inspected; the type of damage to the container and closures is identified; the type of stress on the container is identified; the level of risk associated with container and closure damage and stress is identified; safety procedures are followed; hazards are avoided or minimized; personnel, tools, and equipment are decontaminated; and a description of the condition of the container and its closures is communicated.

(continues)

Table C.1 *Continued*

Awareness	Operations	Technician
	5.5 Perform emergency decontamination at a hazardous materials/WMD incident, given a hazardous materials/WMD incident that requires emergency decontamination; an assignment; scope of the problem; policies and procedures; and approved tools, equipment, and PPE for emergency decontamination, so that emergency decontamination needs are identified, approved PPE is selected and used, exposures and personnel are protected, safety procedures are followed, hazards are avoided or minimized, emergency decontamination is set up and implemented, and victims and responders are decontaminated.	7.2.4 Predict the behavior of the hazardous materials/WMD involved in a hazardous materials/WMD incident, given an incident involving multiple hazardous materials/WMD; an assignment in an IAP; policies and procedures; physical and chemical properties of the materials involved; results of detection, monitoring, and sampling; condition of the container (damage and stress); surrounding conditions; and approved reference sources, so that the behavior of each hazardous materials/WMD container and its contents is identified, the reactivity issues and hazards of the combined materials are identified, and a description of the likely behavior of the hazards is communicated.
	5.6 Evaluate and report the progress of the assigned tasks for a hazardous materials/WMD incident, given a hazardous materials/WMD incident, an assignment, policies and procedures, status of assigned tasks, and approved communication tools and equipment, so that the effectiveness of the assigned tasks is evaluated and communicated to the supervisor, who can adjust the IAP as needed.	7.2.5 Estimate the potential outcomes at a hazardous materials/WMD incident, given a hazardous materials/WMD incident, an assignment in an IAP, policies and procedures, the likely behavior of the container and its contents, and approved resources and equipment, so that the concentrations of materials within the endangered area are measured or predicted; physical, health, and safety hazards within the endangered area are identified; areas of potential harm in the endangered area are identified; potential outcomes within the endangered area are identified; and potential outcomes are communicated.
		7.3.1 Develop and recommend to the incident commander or hazardous materials officer response objectives and action options at a hazardous materials/WMD incident, given a hazardous materials/WMD incident; an assignment in an IAP; results of the incident analysis, including incident-related information, life safety risks, environmental risks, and property risks; available resources; and policies and procedures, so that response objectives are identified for the incident and action options are identified for each response objective.
		7.3.2 Select the PPE ensemble required for a given response option at a hazardous materials/WMD incident, given a hazardous materials/WMD incident, results of the incident analysis, response objectives and options for the incident, approved references, and policies and procedures, so that required PPE is identified for each response option.
		7.3.3 Select the decontamination method for a given response option at a hazardous materials/WMD incident, given a hazardous materials/WMD incident, results of the incident analysis, response objectives and options for the incident, available resources, and policies and procedures, so that a decontamination method to minimize the hazards for each response option is identified and the equipment required to implement the decontamination procedure is identified.

(continues)

Table C.1 *Continued*

Awareness	Operations	Technician
		7.3.4 Develop a plan of action for a hazardous materials/WMD incident, given a hazardous materials/WMD incident, an assignment in an IAP, results of the incident analysis, response objectives and options for the given incident, available resources, and policies and procedures, so that the tasks and resources required to meet the response objectives are identified, specified response objectives and response options are addressed, plan is consistent with the emergency response plan and policies and procedures, and plan is within the capability of available personnel, PPE, and control equipment.
		7.4.1 Perform assigned hazardous materials branch or group functions within the incident command system (ICS) at a hazardous materials/WMD incident, given a hazardous materials/WMD incident; an assignment in an IAP; results of the incident analysis; policies and procedures, including an emergency response plan and standard operating procedures; the IAP; and approved resources, so that the assigned functions within the hazardous materials branch or group are completed.
		7.4.2 Don, work in, and doff PPE at a hazardous materials/WMD incident, given a hazardous materials/WMD incident, an assignment in an IAP, policies and procedures, results of the incident analysis, response objectives and options for the incident, and PPE ensembles as identified in the IAP, so that PPE is selected, inspected, donned, worked in, decontaminated, and doffed; safety procedures are followed; hazards are avoided or minimized; equipment is maintained and stored properly; and the use of PPE is reported and documented.
		7.4.3.1 Perform product control techniques at a hazardous materials/WMD incident, given a hazardous materials/WMD incident with release of product, an assignment in an IAP, results of the incident analysis, policies and procedures for product control, response objectives and options for the incident, and approved tools, equipment, control agents, and PPE, so that an approved product control technique is selected and implemented; the product is controlled; approved PPE is selected and used; exposures and personnel are protected; safety procedures are followed; hazards are avoided or minimized; personnel, victims, tools, and equipment used are decontaminated; tools and equipment are inspected and maintained; and product control operations are reported and documented.

(continues)

Table C.1 ***Continued***

Awareness	Operations	Technician
		7.4.3.2 Control leaks from containers and their closures at a hazardous materials/WMD incident, given three scenarios, including (1) a leak from a bulk or nonbulk pressure container or its closures, (2) a leak from a nonbulk liquid container or its closures, and (3) a leak from a bulk liquid container or its closures; an assignment in an IAP; results of the incident analysis; policies and procedures for controlling leaks from containers and/or their closures; and approved tools, equipment, and PPE, so that an approved product control technique is selected and used; approved PPE is selected and used; exposures and personnel are protected; safety procedures are followed; hazards are avoided or minimized; hazard monitoring is completed; leaks are controlled (confined or contained); emergency responders, tools, and equipment used are decontaminated; tools and equipment are inspected and maintained; and product control operations are reported and documented.
		7.4.3.3 Overpack damaged or leaking nonbulk and radioactive materials containers at a hazardous materials/WMD incident, given a hazardous materials/WMD incident; an assignment in an IAP; results of the incident analysis; a loaded damaged or leaking container; a suitable overpack container; policies and procedures; and approved tools, equipment, and PPE, so that an approved overpack technique is selected; the damaged or leaking container is placed into a suitable overpack and the overpack is closed, marked, and labeled; approved PPE is selected and used; exposures and personnel are protected; safety procedures are followed; hazards are avoided or minimized; emergency responders, tools, and equipment are decontaminated; tools and equipment are inspected and maintained; and product control operations are reported and documented.
		7.4.3.4 Transfer liquids from leaking nonpressure containers at a hazardous materials/WMD incident, given a hazardous materials/WMD incident; an assignment in an IAP; results of the incident analysis; a leaking nonpressure container and a recovery container; policies and procedures for transferring liquids from leaking nonpressure containers; and approved tools, equipment, and PPE, so that an approved product transfer method is selected and used; approved PPE is selected and used; exposures and personnel are protected; safety procedures are followed; hazards are avoided or minimized; hazard monitoring is completed; the containers are bonded and grounded; product is transferred to the recovery container; emergency responders, tools, and equipment used are decontaminated; tools and equipment are inspected and maintained; and product control operations are reported and documented.

(continues)

Table C.1 *Continued*

Awareness	Operations	Technician
		7.4.4.1 Perform mass decontamination for ambulatory and nonambulatory victims at a hazardous materials/WMD incident, given a hazardous materials/WMD incident requiring mass decontamination; an assignment in an IAP; results of the incident analysis; policies and procedures; and approved PPE, tools, and equipment, so that PPE is selected and used; a mass decontamination procedure is selected, set up, implemented, evaluated, and terminated; victims are decontaminated; exposures and personnel are protected; safety procedures are followed; hazards are avoided or minimized; personnel, tools, and equipment are decontaminated; and mass decontamination operations are reported and documented.
		7.4.4.2 Establish and implement technical decontamination in support of entry operations and for ambulatory and nonambulatory victims at a hazardous materials/WMD incident, given a hazardous materials/WMD incident requiring technical decontamination; an assignment in an IAP; results of the incident analysis; policies and procedures; and approved PPE, tools, and equipment, so that approved PPE is selected and used; a technical decontamination procedure is selected, set up, implemented, evaluated, and terminated; victims are decontaminated; safety procedures are followed; hazards are avoided or minimized;if contaminated, personnel, tools, and equipment are decontaminated; and all reports and documentation of technical decontamination operations are completed.
		7.5 Evaluate and report the progress of assigned tasks at a hazardous materials/WMD incident, given a hazardous materials/WMD incident, an assignment in an IAP, current incident conditions, response options and actions taken, and approved communication equipment, so that the actual behavior of material and container is compared to that predicted, the effectiveness of response options and actions in accomplishing response objectives is determined, modifications to the response options and actions are made, and the results are communicated.
		7.6 Terminate a hazardous materials/WMD incident, given a hazardous materials/WMD incident, an assignment in an IAP, policies and procedures, operational observations of response operations (incident information), and approved forms for documentation and reporting, so that assistance in scheduled incident debriefings and critiques is provided, and incident operations are reported and documented.

Annex E Informational References

E.1 Referenced Publications. The documents or portions thereof listed in this annex are referenced within the informational sections of this standard and are not part of the requirements of this document unless also listed in Chapter 2 for other reasons.

E.1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

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

NFPA 704, *Standard System for the Identification of the Hazards of Materials for Emergency Response*, 2017 edition.

NFPA 1001, *Standard for Fire Fighter Professional Qualifications*, 2013 edition.

NFPA 1971, *Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*, 2013 edition.

NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services*, 2013 edition.

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

NFPA 1992, *Standard on Liquid Splash–Protective Ensembles and Clothing for Hazardous Materials Emergencies*, 2017 edition.

NFPA 1994, *Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents*, 2017 edition.

E.1.2 Other Publications.

E.1.2.1 U.S. Government Publications. U.S. Government Publishing Office, 732 North Capitol Street, NW, Washington, DC 20401-0001.

Emergency Response Guidebook, Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation, 2016.

Hazardous Materials Marking, Labeling and Placarding Guide, Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation.

Standard Operating Safety Guides, Environmental Protection Agency, June 1992.

Title 18, U.S. Code, Section 2332a, "Use of Weapons of Mass Destruction."

Title 29, Code of Federal Regulations, Parts 1910.119–1910.120.

Title 49, Code of Federal Regulations, Part 173.431.

E.1.2.2 Other Publications. "16 Firefighter Life Safety Initiatives," National Fallen Firefighters Foundation, Emmitsburg, MD, 2004, reaffirmed 2014.

E.2 Informational References. The following documents or portions thereof are listed here as informational resources only. They are not a part of the requirements of this document.

E.2.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 11, *Standard for Low-, Medium-, and High-Expansion Foam*, 2016 edition.

NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*, 2017 edition.

NFPA 30, *Flammable and Combustible Liquids Code*, 2015 edition.

NFPA 58, *Liquefied Petroleum Gas Code*, 2017 edition.

NFPA 306, *Standard for the Control of Gas Hazards on Vessels*, 2014 edition.

NFPA 424, *Guide for Airport/Community Emergency Planning*, 2013 edition.

NFPA 473, *Standard for Competencies for EMS Personnel Responding to Hazardous Materials/Weapons of Mass Destruction Incidents*, 2013 edition.

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

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

NFPA 1404, *Standard for Fire Service Respiratory Protection Training*, 2013 edition.

NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, 2013 edition.

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

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

NFPA 1951, *Standard on Protective Ensembles for Technical Rescue Incidents*, 2013 edition.

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E.2.2 American Chemistry Council Publications. American Chemistry Council, 700 Second St., NE, Washington, DC 20002.

Recommended Terms for Personal Protective Equipment, 1985.

E.2.3 Annex B Bibliography. Annett, J., and N. E. Stanton, *Task Analysis*. London and New York: Taylor and Francis, 2000.

Brannick, M. T., and E. L. Levine, *Job Analysis: Methods, Research, and Applications for Human Resource Management in the New Millennium*. Thousand Oaks, CA: Sage Publications, 2002.

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NFPA 1001, *Standard for Fire Fighter Professional Qualifications*, 2013 edition.

NFPA 1035, *Standard for Fire and Life Safety Educator, Public Information Officer, Youth Firesetter Intervention Specialist, and Youth Firesetter Program Manager Professional Qualifications*, 2015 edition.

Phillips, J. J., *In Action: Performance Analysis and Consulting*. Alexandria, VA: American Society for Training & Development, 2000.

Phillips, J. J., and E. F. Holton III, *In Action: Conducting Needs Assessment*. Alexandria, VA: American Society for Training & Development, 1995.

Robinson, D. G., and J. C. Robinson (Eds.), *Moving from Training to Performance: A Practical Guidebook*. Alexandria, VA: American Society for Training & Development; San Francisco: Berett-Koehler, 1998.

Schippmann, J.S., *Strategic Job Modeling: Working at the Core of Integrated Human Resources*. Mahwah, NJ: Lawrence Erlbaum Associates, 1999.

Shepherd, A., *Hierarchical Task Analysis*. London and New York: Taylor and Francis, 2000.

Zemke, R., and T. Kramlinger, *Figuring Things Out: A Trainer's Guide to Needs and Task Analysis*. New York: Perseus Books, 1993.

E.2.4 API Publications. American Petroleum Institute, 1220 L Street, NW, Washington, DC 20005-4070.

API 2021, *Guide for Fighting Fires in and Around Flammable and Combustible Liquid Atmospheric Petroleum Storage Tanks*, 2001.

API 2510-A, *Fire Protection Considerations for the Design and Operation of Liquefied Petroleum Gas (LPG) Storage Facilities*, 1996.

E.2.5 ASTM Publication. ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA, 19428-2959.

ASTM E2458, *Standard Practices for Bulk Sample Collection and Swab Sample Collection of Visible Powders Suspected of Being Biothreat Agents from Nonporous Surfaces,* 2010.

ASTM E2601, *Standard Practice for Radiological Emergency Response*, 2008.

ASTM E2601, *Standard Practice for Radiological Emergency Response*, 2008.

ASTM E2770, *Standard Guide for Operational Guidelines for Initial Response to a Suspected Biothreat Agent*, 2010.

E.2.6 IMO Publications. International Maritime Organization, 4 Albert Embankment, London SEI 7SR, UK.

Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (BCH Code).

International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code)

International Code for the Construction and Equipment of Ships Carrying Dangerous Liquefied Gases in Bulk (IGC Code).

International Maritime Dangerous Goods Code (IMDG Code).

MARPOL 73/78.

Safety of Life at Sea (SOLAS).

E.2.7 NRT Publications. U.S. National Response Team, Washington, DC 20593, www.nrt.org.

NRT-1, *Hazardous Materials Emergency Planning Guide*, 2001.

E.2.8 U.S. Government Publications. U.S. Government Publishing Office, 732 North Capitol Street, NW, Washington, DC 20401-0001.

Department of Homeland Security (DHS), Responder Knowledge Base. http://www.rkb.mipt.org

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Universal Task List, May 2005, https://www.llis.dhs.gov.

E.2.9 Other Publications. Association of American Railroads, *Field Guide to Tank Cars*, Bureau of Explosions, Pueblo, CO 2010.

Grey, G. L., et al., *Hazardous Materials/Waste Handling for the Emergency Responder*, Fire Engineering Publications, New York, 1989.

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SIGTTO *Liquefied Gas Handling Principles on Ships and in Terminals*, 3rd edition, McGuire and White (Authors) London, 2000, Witherby Seamanship International.

U.S. Army Research, Development, and Engineering Command (RDECOM), Edgewood Chemical Biological Center, Emergency Response, Command, and Planning Guidelines (various documents) for terrorist incidents involving chemical and biological agents. http://www.ecbc.army.mil/hld.

E.3 References for Extracts in Informational Sections.

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

Index

Sequence of Events for the Standards Development Process

Once the current edition is published, a Standard is opened for Public Input.

Step 1 – Input Stage

- Input accepted from the public or other committees for consideration to develop the First Draft
- Technical Committee holds First Draft Meeting to revise Standard (23 weeks); Technical Committee(s) with Correlating Committee (10 weeks)
- Technical Committee ballots on First Draft (12 weeks); Technical Committee(s) with Correlating Committee (11 weeks)
- Correlating Committee First Draft Meeting (9 weeks)
- Correlating Committee ballots on First Draft (5 weeks)
- First Draft Report posted on the document information page

Step 2 – Comment Stage

- Public Comments accepted on First Draft (10 weeks) following posting of First Draft Report
- If Standard does not receive Public Comments and the Technical Committee chooses not to hold a Second Draft meeting, the Standard becomes a Consent Standard and is sent directly to the Standards Council for issuance (see Step 4) or
- Technical Committee holds Second Draft Meeting (21 weeks); Technical Committee(s) with Correlating Committee (7 weeks)
- Technical Committee ballots on Second Draft (11 weeks); Technical Committee(s) with Correlating Committee (10 weeks)
- Correlating Committee Second Draft Meeting (9 weeks)
- Correlating Committee ballots on Second Draft (8 weeks)
- Second Draft Report posted on the document information page

Step 3 – NFPA Technical Meeting

- Notice of Intent to Make a Motion (NITMAM) accepted (5 weeks) following the posting of Second Draft Report
- NITMAMs are reviewed and valid motions are certified by the Motions Committee for presentation at the NFPA Technical Meeting
- NFPA membership meets each June at the NFPA Technical Meeting to act on Standards with "Certified Amending Motions" (certified NITMAMs)
- Committee(s) vote on any successful amendments to the Technical Committee Reports made by the NFPA membership at the NFPA Technical Meeting

Step 4 – Council Appeals and Issuance of Standard

- Notification of intent to file an appeal to the Standards Council on Technical Meeting action must be filed within 20 days of the NFPA Technical Meeting
- Standards Council decides, based on all evidence, whether to issue the standard or to take other action

Notes:

1. Time periods are approximate; refer to published schedules for actual dates.
2. Annual revision cycle documents with certified amending motions take approximately 101 weeks to complete.
3. Fall revision cycle documents receiving certified amending motions take approximately 141 weeks to complete.

Committee Membership Classifications[1,2,3,4]

The following classifications apply to Committee members and represent their principal interest in the activity of the Committee.

1. M *Manufacturer:* A representative of a maker or marketer of a product, assembly, or system, or portion thereof, that is affected by the standard.
2. U *User:* A representative of an entity that is subject to the provisions of the standard or that voluntarily uses the standard.
3. IM *Installer/Maintainer:* A representative of an entity that is in the business of installing or maintaining a product, assembly, or system affected by the standard.
4. L *Labor:* A labor representative or employee concerned with safety in the workplace.
5. RT *Applied Research/Testing Laboratory:* A representative of an independent testing laboratory or independent applied research organization that promulgates and/or enforces standards.
6. E *Enforcing Authority:* A representative of an agency or an organization that promulgates and/or enforces standards.
7. I *Insurance:* A representative of an insurance company, broker, agent, bureau, or inspection agency.
8. C *Consumer:* A person who is or represents the ultimate purchaser of a product, system, or service affected by the standard, but who is not included in (2).
9. SE *Special Expert:* A person not representing (1) through (8) and who has special expertise in the scope of the standard or portion thereof.

NOTE 1: "Standard" connotes code, standard, recommended practice, or guide.

NOTE 2: A representative includes an employee.

NOTE 3: While these classifications will be used by the Standards Council to achieve a balance for Technical Committees, the Standards Council may determine that new classifications of member or unique interests need representation in order to foster the best possible Committee deliberations on any project. In this connection, the Standards Council may make such appointments as it deems appropriate in the public interest, such as the classification of "Utilities" in the National Electrical Code Committee.

NOTE 4: Representatives of subsidiaries of any group are generally considered to have the same classification as the parent organization.

Submitting Public Input / Public Comment Through the Online Submission System

Soon after the current edition is published, a Standard is open for Public Input.

Before accessing the Online Submission System, you must first sign in at www.nfpa.org. *Note: You will be asked to sign-in or create a free online account with NFPA before using this system:*

a. Click on Sign In at the upper right side of the page.
b. Under the Codes and Standards heading, click on the "List of NFPA Codes & Standards," and then select your document from the list or use one of the search features.

OR

a. Go directly to your specific document information page by typing the convenient shortcut link of www.nfpa.org/document# (Example: NFPA 921 would be www.nfpa.org/921). Sign in at the upper right side of the page.

To begin your Public Input, select the link "The next edition of this standard is now open for Public Input" located on the About tab, Current & Prior Editions tab, and the Next Edition tab. Alternatively, the Next Edition tab includes a link to Submit Public Input online.

At this point, the NFPA Standards Development Site will open showing details for the document you have selected. This "Document Home" page site includes an explanatory introduction, information on the current document phase and closing date, a left-hand navigation panel that includes useful links, a document Table of Contents, and icons at the top you can click for Help when using the site. The Help icons and navigation panel will be visible except when you are actually in the process of creating a Public Input.

Once the First Draft Report becomes available there is a Public Comment period during which anyone may submit a Public Comment on the First Draft. Any objections or further related changes to the content of the First Draft must be submitted at the Comment stage.

To submit a Public Comment you may access the online submission system utilizing the same steps as previously explained for the submission of Public Input.

For further information on submitting public input and public comments, go to: http://www.nfpa.org/publicinput.

Other Resources Available on the Document Information Pages

About tab: View general document and subject-related information.

Current & Prior Editions tab: Research current and previous edition information on a Standard.

Next Edition tab: Follow the committee's progress in the processing of a Standard in its next revision cycle.

Technical Committee tab: View current committee member rosters or apply to a committee.

Technical Questions tab: For members and Public Sector Officials/AHJs to submit questions about codes and standards to NFPA staff. Our Technical Questions Service provides a convenient way to receive timely and consistent technical assistance when you need to know more about NFPA codes and standards relevant to your work. Responses are provided by NFPA staff on an informal basis.

Products & Training tab: List of NFPA's publications and training available for purchase.

Information on the NFPA Standards Development Process

I. Applicable Regulations. The primary rules governing the processing of NFPA standards (codes, standards, recommended practices, and guides) are the NFPA *Regulations Governing the Development of NFPA Standards (Regs)*. Other applicable rules include NFPA *Bylaws*, NFPA *Technical Meeting Convention Rules*, NFPA *Guide for the Conduct of Participants in the NFPA Standards Development Process*, and the NFPA *Regulations Governing Petitions to the Board of Directors from Decisions of the Standards Council*. Most of these rules and regulations are contained in the *NFPA Standards Directory*. For copies of the *Directory*, contact Codes and Standards Administration at NFPA Headquarters; all these documents are also available on the NFPA website at "www.nfpa.org."

The following is general information on the NFPA process. All participants, however, should refer to the actual rules and regulations for a full understanding of this process and for the criteria that govern participation.

II. Technical Committee Report. The Technical Committee Report is defined as "the Report of the responsible Committee(s), in accordance with the Regulations, in preparation of a new or revised NFPA Standard." The Technical Committee Report is in two parts and consists of the First Draft Report and the Second Draft Report. (See *Regs* at Section 1.4.)

III. Step 1: First Draft Report. The First Draft Report is defined as "Part one of the Technical Committee Report, which documents the Input Stage." The First Draft Report consists of the First Draft, Public Input, Committee Input, Committee and Correlating Committee Statements, Correlating Notes, and Ballot Statements. (See *Regs* at 4.2.5.2 and Section 4.3.) Any objection to an action in the First Draft Report must be raised through the filing of an appropriate Comment for consideration in the Second Draft Report or the objection will be considered resolved. [See *Regs* at 4.3.1(b).]

IV. Step 2: Second Draft Report. The Second Draft Report is defined as "Part two of the Technical Committee Report, which documents the Comment Stage." The Second Draft Report consists of the Second Draft, Public Comments with corresponding Committee Actions and Committee Statements, Correlating Notes and their respective Committee Statements, Committee Comments, Correlating Revisions, and Ballot Statements. (See *Regs* at 4.2.5.2 and Section 4.4.) The First Draft Report and the Second Draft Report together constitute the Technical Committee Report. Any outstanding objection following the Second Draft Report must be raised through an appropriate Amending Motion at the NFPA Technical Meeting or the objection will be considered resolved. [See *Regs* at 4.4.1(b).]

V. Step 3a: Action at NFPA Technical Meeting. Following the publication of the Second Draft Report, there is a period during which those wishing to make proper Amending Motions on the Technical Committee Reports must signal their intention by submitting a Notice of Intent to Make a Motion (NITMAM). (See *Regs* at 4.5.2.) Standards that receive notice of proper Amending Motions (Certified Amending Motions) will be presented for action at the annual June NFPA Technical Meeting. At the meeting, the NFPA membership can consider and act on these Certified Amending Motions as well as Follow-up Amending Motions, that is, motions that become necessary as a result of a previous successful Amending Motion. (See 4.5.3.2 through 4.5.3.6 and Table 1, Columns 1-3 of *Regs* for a summary of the available Amending Motions and who may make them.) Any outstanding objection following action at an NFPA Technical Meeting (and any further Technical Committee consideration following successful Amending Motions, see *Regs* at 4.5.3.7 through 4.6.5.3) must be raised through an appeal to the Standards Council or it will be considered to be resolved.

VI. Step 3b: Documents Forwarded Directly to the Council. Where no NITMAM is received and certified in accordance with the Technical Meeting Convention Rules, the standard is forwarded directly to the Standards Council for action on issuance. Objections are deemed to be resolved for these documents. (See *Regs* at 4.5.2.5.)

VII. Step 4a: Council Appeals. Anyone can appeal to the Standards Council concerning procedural or substantive matters related to the development, content, or issuance of any document of the NFPA or on matters within the purview of the authority of the Council, as established by the Bylaws and as determined by the Board of Directors. Such appeals must be in written form and filed with the Secretary of the Standards Council (see *Regs* at Section 1.6). Time constraints for filing an appeal must be in accordance with 1.6.2 of the *Regs*. Objections are deemed to be resolved if not pursued at this level.

VIII. Step 4b: Document Issuance. The Standards Council is the issuer of all documents (see Article 8 of *Bylaws*). The Council acts on the issuance of a document presented for action at an NFPA Technical Meeting within 75 days from the date of the recommendation from the NFPA Technical Meeting, unless this period is extended by the Council (see *Regs* at 4.7.2). For documents forwarded directly to the Standards Council, the Council acts on the issuance of the document at its next scheduled meeting, or at such other meeting as the Council may determine (see *Regs* at 4.5.2.5 and 4.7.4).

IX. Petitions to the Board of Directors. The Standards Council has been delegated the responsibility for the administration of the codes and standards development process and the issuance of documents. However, where extraordinary circumstances requiring the intervention of the Board of Directors exist, the Board of Directors may take any action necessary to fulfill its obligations to preserve the integrity of the codes and standards development process and to protect the interests of the NFPA. The rules for petitioning the Board of Directors can be found in the *Regulations Governing Petitions to the Board of Directors from Decisions of the Standards Council* and in Section 1.7 of the *Regs*.

X. For More Information. The program for the NFPA Technical Meeting (as well as the NFPA website as information becomes available) should be consulted for the date on which each report scheduled for consideration at the meeting will be presented. To view the First Draft Report and Second Draft Report as well as information on NFPA rules and for up-to-date information on schedules and deadlines for processing NFPA documents, check the NFPA website (www.nfpa.org/docinfo) or contact NFPA Codes & Standards Administration at (617) 984-7246.

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