# CERTIFICATION CURRICULUM MANUAL

## CHAPTER SIX

## HAZARDOUS MATERIALS

### NFPA 472, 2013 Edition

### Effective June 1, 2015

**Texas Commission on Fire Protection**
**P.O. Box 2286 Austin, Texas 78768-2286 (512) 936-3838**

# HAZARDOUS MATERIALS AWARENESS

# REFERENCE LIST FOR THE HAZARDOUS MATERIALS AWARENESS CURRICULUM

This Reference List is provided as a general guide for both instructors and students to locate information pertaining to the specific objectives in the TCFP Curriculum. This list is **not** all-inclusive and does not in any way limit TCFP development and use of questions to test the objectives of the curriculum:

## Required References

Texts

*Certification Curriculum Manual.* Texas Commission on Fire Protection. (Most current edition). Austin, TX: Texas Commission on Fire Protection.

*Code of Federal Regulations, Title 29 Part 1910.120, Appendix A*. United States. U.S. Department of Labor, Occupational Safety & Health Administration.

*Emergency Response Guidebook.* United States. (Most current edition). Washington, DC: U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration.

*Essentials of Fire Fighting and Fire Department Operations,* 6th *edition*. International Fire Service Training Association. (2013). Stillwater, OK: Fire Protection Publications, Oklahoma State University.

*Fundamentals of Fire Fighter Skills,* 3rd edition. International Association of Fire Chiefs, & National Fire Protection Association. (2014). Sudbury, MA: Jones and Bartlett.

*Hazardous Materials Awareness and Operations, 2nd edition*. Schnepp, R. (2010). Sudbury, MA: Jones & Bartlett.

*Hazardous Materials for First Responders,* 4th edition. International Fire Service Training Association. (2010). Stillwater, OK: Fire Protection Publications, Oklahoma State University.

*Hazardous Materials/Weapons of Mass Destruction Response Handbook*, 6th/2013 edition. McGowan, T. (2012). Quincy, MA: National Fire Protection Association.

*NFPA 472: Standard for Professional Competence of Responders to Hazardous Materials Incidents. (*2013 ed.). Quincy, MA: NFPA Publications. National Fire Protection Association

*Standards Manual for Fire Protection Personnel*. Texas Commission on Fire Protection. (Current edition). Austin, TX: Texas Commission on Fire Protection.

## Recommended References

The most current edition of the following publications and media are recommended (not required) supplemental material for program use.

Media

*DOT Chart 15: Hazardous Materials Marking, Labeling and Placarding Guide*. (or current edition) United States**.** Washington, DC: U.S. Dept. of Transportation, Pipeline and Hazardous Materials Safety Administration.

*Emergency Response Guidebook 2012.* [DVD]. United States. (2012). Washington, DC: U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration.

*Hazmat Awareness*. Action Training Systems, Inc. (2008). [2 Disc DVD Set - Recognition & Identification]. Poulsbo, WA: Action Training Systems.

*Hazardous Materials Awareness and Operations* [DVD]. International Association of Fire Chiefs, & National Fire Protection Association. (2006). Sudbury, MA: Jones and Bartlett.

# CHAPTER 6
# SECTION 601
# HAZARDOUS MATERIALS AWARENESS
# CURRICULUM OUTLINE

| SECTION | SUBJECT | RECOMMENDED HOURS |
|---|---|---|
| 601-4.1 | General - Introduction - Laws, Regulations, and National Consensus Standards | 1 |
| 601-4.2 | Analyzing the Incident | 5 |
| 601-4.3 | Planning the Response - Reserved - None Required at this Level | |
| 601-4.4 | Implementing the Planned Response | 2 |
| 601-4.5 | Evaluating Progress - Reserved - None Required at this Level | |
| 601-4.6 | Terminating the Incident - Reserved - None Required at this Level | |
| | **TOTAL RECOMMENDED HOURS** | **8** |

The recommended hours include time for skills evaluation and are based on 12 students. Hours needed depend on the actual number of students.

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

# *SECTION 601*

# *HAZARDOUS MATERIALS AWARENESS*

Awareness Level Personnel are those who, in the course of their normal duties, may encounter an emergency incident involving hazardous materials/weapons of mass destruction (WMD) and who are expected to:

- Recognize the presence of the hazardous materials/weapons of mass destruction (WMD),
- Protect themselves,
- Call for trained personnel, and
- Secure the scene

Response options for awareness level personnel are generally limited to nonintervention actions only.

## ***601-4.1 General***

### ***601-4.1.1 Introduction***

**601-4.1.1.1** Awareness level personnel shall be 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.

**601-4.1.1.2** Awareness level personnel shall be trained to meet all competencies of this chapter.

**601-4.1.1.3** Awareness level personnel shall receive additional training to meet applicable governmental occupational health and safety regulations.

1. Occupational training requirements
    a. Firefighter
    b. Peace officer
    c. Emergency medical services
    d. Other

2. Safety regulations
    a. OSHA

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

b. EPA
c. DOT
d. Other

### ***601-4.1.2 Goal***

**601-4.1.2.1** The goal of the competencies at the awareness level shall be to provide personnel already on the scene of a hazardous materials/WMD incident with the knowledge and skills to perform the tasks in 4.1.2.2 safely and effectively.

**601-4.1.2.2** When already on the scene of a hazardous materials/WMD incident, the awareness level personnel shall be able to perform the following tasks:

1. Analyze the incident to determine both the hazardous material/WMD present and the basic hazard and response information for each hazardous material/WMD agent by completing the following tasks:
    a. Detect the presence of hazardous materials/WMD.
    b. Survey a hazardous materials/WMD incident from a safe location to identify the name, UN/NA identification number, type of placard, or other distinctive marking applied for the hazardous materials/WMD involved.
    c. Collect hazard information from the current edition of the DOT *Emergency Response Guidebook.*

2. Implement actions consistent with the authority having jurisdiction (AHJ), and the current edition of the DOT *Emergency Response Guidebook* by completing the following tasks:
    a. Initiate protective actions.
    b. Initiate the notification process.

## ***601-4.2 Competencies — Analyzing the Incident***

### ***601-4.2.1 Detecting the Presence of Hazardous Materials/WMD***

Given examples of various situations, awareness level personnel shall identify those situations where hazardous materials/WMD are present and shall meet the following requirements:

1. Identify the definitions of both *hazardous material* (or *dangerous goods*, in Canada) and *WMD*.
    a. Hazardous materials (or dangerous goods in Canada) – a substance (solid, liquid, gas or energy) that when released is capable of creating harm to people, the environment, and

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

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

b. Weapons 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 four ounces, missile having an explosive or incendiary charge of more than one quarter ounce (7 grams), mine, or device similar to the above; (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.

2. Identify the UN/DOT hazard classes and divisions of hazardous materials/WMD and identify common examples of materials in each hazard class or division.
   a. Class 1 – Explosives
      i. Division 1.1 Explosives with a mass explosion hazard. Examples of Division 1.1 explosives include black powder trinitrotoluene, dynamite, and trinitrotoluene (TNT).
      ii. Division 1.2 Explosives with a projection hazard. Examples of Division 1.2 explosives include aerial flares, detonating cord, and power device cartridges.
      iii. Division 1.3 Explosives with predominantly a fire hazard. Examples of Division 1.3 explosives include liquid-fueled rocket motors and propellant explosives.
      iv. Division 1.4 Explosives with no significant blast hazard. Examples of Division 1.4 explosives include line-throwing rockets, practice ammunition, and signal cartridges.
      v. Division 1.5 Very insensitive explosives with a mass explosion hazard. Examples of Division 1.5 explosives include pilled ammonium nitrate fertilizer–fuel oil mixtures (blasting agents).
      vi. Division 1.6 Extremely insensitive articles. An example of Division 1.6 includes wetted cellulose nitrate.
   b. Class 2 - Gases
      i. Division 2.1 Flammable gases. Examples of Division 2.1 gases include inhibited butadienes, methyl chloride, and propane.
      ii. Division 2.2 Non-flammable, non-toxic gases. Examples of Division 2.2 gases include anhydrous ammonia,

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

cryogenic argon, carbon dioxide, and compressed nitrogen.

iii. Division 2.3 Toxic gases. Examples of Division 2.3 gases include anhydrous hydrogen fluoride, arsine, chlorine, and methyl bromide.

c. Class 3 - Flammable liquids (and Combustible liquids [U.S.]) Examples of Class 3 liquids include acetone, amyl acetate, gasoline, methyl alcohol, and toluene.

d. Class 4 - Flammable solids; Spontaneously combustible materials; and Dangerous when wet materials/Water-reactive substances

i. Division 4.1 Flammable solids. Examples of Division 4.1 materials include magnesium (pellets, turnings, or ribbons) and nitrocellulose.

ii. Division 4.2 Spontaneously combustible materials. Examples of Division 4.2 materials include aluminum alkyls, charcoal briquettes, magnesium alkyls, and phosphorus.

iii. Division 4.3 Water-reactive substances/Dangerous when wet materials. Examples of Division 4.3 materials include calcium carbide, magnesium powder, potassium metal alloys, and sodium hydride.

e. Class 5 - Oxidizing substances and Organic peroxides

i. Division 5.1 Oxidizing substances. Examples of Division 5.1 materials include ammonium nitrate, bromine trifluoride, and calcium hypochlorite.

ii. Division 5.2 Organic peroxides. Examples of Division 5.2 materials include dibenzoyl peroxide, methyl ethyl ketone peroxide, and peroxyacetic acid.

f. Class 6 - Toxic substances and Infectious substances

i. Division 6.1 Toxic substances. Examples of Division 6.1 materials include aniline, arsenic compounds, carbon tetrachloride, hydrocyanic acid, and tear gas.

ii. Division 6.2 Infectious substances. Examples of Division 6.2 materials include anthrax, botulism, rabies, and tetanus.

g. Class 7 - Radioactive materials. Examples of Class 7 materials include cobalt, uranium hexafluoride, and “yellow cake.”

h. Class 8 - Corrosive substances. Examples of Class 8 materials include nitric acid, phosphorus trichloride, sodium hydroxide, and sulfuric acid.

i. Class 9 - Miscellaneous hazardous materials/Products, Substances or Organisms. Examples of Class 9 materials

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

include adipic acid, hazardous substances (e.g., PCBs), and molten sulfur.

3. Identify the primary hazards associated with each UN/DOT hazard class and division.
   a. Class 1 — Explosives
      An explosive is any substance or article, including a device, that is designed to function by explosion (i.e., an extremely rapid release of gas and heat) or that, by chemical reaction within itself, is able to function in a similar manner even if not designed to function by explosion. Explosives in Class 1 are divided into six divisions. Each division has a letter designation.
      i. Division 1.1 consists of explosives that have a mass explosion hazard. A mass explosion is one that affects almost the entire load instantaneously.
      ii. Division 1.2 consists of explosives that have a projection hazard but not a mass explosion hazard.
      iii. Division 1.3 consists of explosives that have a fire hazard and a minor blast hazard, a minor projection hazard, or both, but not a mass explosion hazard.
      iv. Division 1.4 consists of explosive devices that present a minor explosion hazard. No device in the division can contain more than 0.9 oz (25 g) of a detonating material. The explosive effects are largely confined to the package, and no projection of fragments of appreciable size or range are expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package.
      v. Division 1.5 consists of very insensitive explosives. This division comprises substances that have a mass explosion hazard but are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions of transport.
      vi. Division 1.6 consists of extremely insensitive articles that do not have a mass explosive hazard. This division comprises articles that contain only extremely insensitive detonating substances and that demonstrate a negligible probability of accidental initiation or propagation.
   b. Class 2 — Gases
      i. Division 2.1 (flammable gas) consists of materials that are a gas at 68°F (20°C) or less and 14.7 psi (101.3 kPa) of pressure, have a boiling point of 68°F (20°C) or less at 14.7 psi (101.3 kPa), and have the following properties:

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

a) Are ignitable at 14.7 psi (101.3 kPa) when in a mixture of 13 percent or less by volume with air
b) Have a flammable range at 14.7 psi (101.3 kPa) with air of at least 12 percent regardless of the lower limit

ii. Division 2.2 (nonflammable, nonpoisonous compressed gas, including compressed gas, liquefied gas, pressurized cryogenic gas, and compressed gas in solution, asphyxiant gas, and oxidizing gas) consists of materials (or mixtures) that exert in the packaging an absolute pressure of 41 psi (280 kPa) at 68°F (20°C). A cryogenic liquid is a refrigerated liquefied gas having a boiling point colder than –130°F (–90°C) at 14.7 psi (101.3 kPa).

iii. Division 2.3 (gas poisonous by inhalation) consists of materials that are a gas at 68°F (20°C) or less and a pressure of 14.7 psi, or 1 atm (101.3 kPa), have a boiling point of 68°F (20°C) or less at 14.7 psi (101.3 kPa), and have the following properties:

a) Are known to be so toxic to humans as to pose a hazard to health during transportation
b) In the absence of adequate data on human toxicity, are presumed to be toxic to humans because, when tested on laboratory animals, they have an $LC_{50}$ value of not more than 5000 ppm.

c. Class 3 — Flammable and Combustible Liquids

i. Flammable liquids are liquids having a flash point of not more than 140°F (60°C) or materials in a liquid phase with a flash point at or above 100°F (37.8°C) that are intentionally heated and offered for transportation or transported at or above their flash point in a bulk packaging. Examples of flammable liquids include acetone, amyl acetate, gasoline, methyl alcohol, and toluene.

ii. Combustible liquids are liquids that do not meet the definition of any other hazard class and that have a flash point above 140°F (60°C) and below 200°F (93°C). Flammable liquids with a flash point above 100°F (38°C) can be reclassified as combustible liquids. Examples of combustible liquids include mineral oil, peanut oil, and No. 6 fuel oil.

d. Class 4 — Flammable Solids

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

i. Division 4.1 (flammable solids) comprised of the following three types of materials:
   a) Desensitized explosives — explosives wetted with sufficient water, alcohol, or plasticizers to suppress explosive properties
   b) Self-reactive materials — materials that are thermally unstable and that can undergo a strongly exothermic decomposition even with participation of oxygen (air)
   c) Readily combustible solids — solids that can cause a fire through friction and any metal powders that can be ignited.

ii. Division 4.2 (spontaneously combustible material) comprises the following materials:
   a) Pyrophoric materials — liquids or solids that, even in small quantities and without an external ignition source, can ignite within 5 minutes after coming in contact with air
   b) Self-heating materials — materials that, when in contact with air and without an energy supply, are liable to self-heat

iii. Division 4.3 (dangerous-when-wet materials) is comprised of materials that, by contact with water, are liable to become spontaneously flammable or to give off flammable or toxic gas at a rate greater than 1 L/kg of the material per hour.

e. Class 5 — Oxidizers and Organic Peroxides
   i. Division 5.1 (oxidizers) is comprised of materials that can, generally by yielding oxygen, cause or enhance the combustion of other materials.
   ii. Division 5.2 (organic peroxides) is comprised of organic compounds that contain oxygen (O) in the bivalent -O-O- structure that can be considered a derivative of hydrogen peroxide, where one or more of the hydrogen atoms have been replaced by organic radicals.

f. Class 6 — Poisonous Materials
   i. Division 6.1 (poisonous materials) comprises materials other than gases that either are known to be so toxic to humans as to afford a hazard to health during transportation or in the absence of adequate data on human toxicity are presumed to be toxic to humans, including materials that cause irritation.

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

ii. Division 6.2 (infectious substances) comprises materials known to contain or suspected of containing a pathogen. A pathogen is a micro-organism (including viruses, plasmids, and other genetic elements) or a proteinaceous infectious particle (prion) that has the potential to cause disease in humans or animals. The terms *infectious substance* and *etiologic agent* are synonymous.

g. Class 7 — Radioactive Materials
Radioactive material is any material containing radionuclides where both the activity concentration and the total activity in the consignment exceed specified values.

h. Class 8 — Corrosive Materials
Corrosive materials are liquids or solids that cause full-thickness destruction of skin at the site of contact within a specified period of time. A liquid that has a severe corrosion rate on steel or aluminum is also a corrosive material.

i. Class 9 — Miscellaneous Hazardous Materials
Miscellaneous hazardous materials are materials that present a hazard during transport but that do not meet the definition of any other hazard class. Miscellaneous hazardous materials include the following:

i. Any material that has an anesthetic, noxious, or other similar property that could cause extreme annoyance or discomfort to a flight crew member so as to prevent the correct performance of assigned duties

ii. Any material that is not included in any other hazard class but that is subject to DOT requirements (e.g. elevated-temperature material, hazardous substance, hazardous waste, marine pollutant).

4. Identify the difference between hazardous materials/WMD incidents and other emergencies.
   a. Size
   b. Complexity
   c. Intent
   d. Crime scene management
   e. Secondary devices/attacks and armed

5. Identify typical occupancies and locations in the community where hazardous materials/WMD are manufactured, transported, stored, used, or disposed of.

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

6. Identify typical container shapes that can indicate the presence of hazardous materials/WMD.
    a. Non-bulk containers
    b. Bulk containers
    c. Fixed facility storage systems
    d. Pipelines
    e. Ships & marine vessels

7. Identify facility and transportation markings and colors that indicate hazardous materials/WMD, including the following:
    a. Transportation markings, including UN/NA identification number marks, marine pollutant mark, elevated temperature (HOT) mark, commodity marking, and inhalation hazard mark
    b. NFPA 704, *Standard System for the Identification of the Hazards of Materials for Emergency Response*, markings
    c. Military hazardous materials/WMD markings
    d. Special hazard communication markings for each hazard class (i.e., Hazardous Material Identification System – HMIS)
    e. Pipeline markings
    f. Container markings

8. Given an NFPA 704 marking, describe the significance of the colors, numbers, and special symbols.
    a. Categories of hazards
        a. Health – blue color
        b. Flammability – red color
        c. Reactivity – yellow color
        d. Special hazards (white color with symbol)
    b. Five degrees of hazards (0 – 4)

9. Identify U.S. and Canadian placards and labels that indicate hazardous materials/WMD. (see ERG or DOT Chart)

10. Identify the following basic information on material safety data sheets (MSDS) or safety data sheets (SDS) and shipping papers for hazardous materials:
    a. Identify where to find MSDS/SDS.
    b. Identify major sections of an MSDS/SDS.
        a. Basic information that indicates hazardous materials
        b. Entries that indicate the presence of hazardous materials containers by their shape
    c. Identify the entries on shipping papers that indicate the presence of hazardous materials.

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

d. Match the name of the shipping papers found in transportation (air, highway, rail, and water) with the mode of transportation.
    a. Air – air bill
    b. Highway – Bill of Lading or freight bill
    c. Water – dangerous cargo manifest
    d. Rail – waybill and/or consist
e. Identify the person responsible for having the shipping papers in each mode of transportation.
f. Identify where the shipping papers are found in each mode of transportation.
g. Identify where the papers can be found in an emergency in each mode of transportation.

11. Identify examples of clues (other than occupancy/ location, container shape, markings/color, placards/ labels, MSDS, and shipping papers) to include sight, sound, and odor of which indicate hazardous materials/WMD.
    a. Odors
    b. Gas leak
    c. Fire
    d. Vapor cloud
    e. Corrosive actions
    f. Visible chemical reactions
    g. Pooled liquids
    h. Sound of a pressure release
    i. Condensation line on pressure tank
    j. Injured persons or casualties

12. Describe the limitations of using the senses in determining the presence or absence of hazardous materials/WMD.
    a. Exposes responder to possible ill health effects; or
    b. Death

13. Identify at least four types of locations that could be targets for criminal or terrorist activity using hazardous materials/WMD.
    a. Public assembly areas
    b. Public buildings
    c. Mass transit systems
    d. Places with high economic impact
    e. Telecommunications facilities
    f. Places with historical or symbolic significance
    g. Military installations
    h. Airports

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

i. Industrial facilities

14. Describe the difference between a chemical and a biological incident.
    a. Chemical – characterized by rapid onset of symptoms
    b. Biological – symptoms requires days or weeks to manifest

15. Identify at least four indicators of possible criminal or terrorist activity involving chemical agents.
    a. The presence of hazardous materials/WMD or laboratory equipment that is not relevant to the occupancy
    b. Intentional release of hazardous materials/WMD
    c. Unexplained patterns of sudden onset of similar, nontraumatic illnesses or deaths (patterns that might be geographic, by employer, or associated with agent dissemination methods)
    d. Unexplained odors or tastes that are out of character with the surroundings
    e. Multiple individuals exhibiting unexplained signs of skin, eye, or airway irritation
    f. Unexplained bomb- or munitions-like material, especially if it contains a liquid
    g. Unexplained vapor clouds, mists, and plumes
    h. Multiple individuals exhibiting unexplained health problems such as nausea, vomiting, twitching, tightness in chest, sweating, pinpoint pupils (miosis), runny nose (rhinorrhea), disorientation, difficulty breathing, convulsions, or death
    i. Trees, shrubs, bushes, food crops, and/or lawns that are dead, discolored, abnormal in appearance, or withered (not due to a current drought and not just a patch of dead weeds)
    j. Surfaces exhibiting oily droplets/films and unexplained oily film on water surfaces
    k. An abnormal number of sick or dead birds, animals, or fish
    l. Unusual security, locks, bars on windows, covered windows, or barbed wire

16. Identify at least four indicators of possible criminal or terrorist activity involving biological agents.
    a. Unusual number of sick or dying people or animals (any number of symptoms; time before symptoms are observed dependent on the agent used but usually days to weeks)
    b. Healthcare facilities reporting multiple casualties with similar signs or symptoms
    c. Unscheduled or unusual spray being disseminated, especially if outdoors during period of darkness

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

d. Abandoned spray devices (devices with no distinct odors)

17. Identify at least four indicators of possible criminal or terrorist activity involving radiological agents.
    a. Radiation Symbols
    b. Unusual metal debris
    c. Heat-emitting material
    d. Glowing material
    e. Sick people/animals

18. Identify at least four indicators of possible criminal or terrorist activity involving illicit laboratories (e.g., clandestine laboratories, weapons lab, ricin lab).
    a. Structures with unusual or multiple vents
    b. Buildings with heavy security
    c. Obscured windows
    d. Odd or unusual odors
    e. May include mobile facilities, i.e. mobile meth labs

19. Identify at least four indicators of possible criminal or terrorist activity involving explosives
    a. Prior warning or threat of attack
    b. Unknown explosions
    c. Multiple fires or explosions
    d. Unattended packages, backpacks and other objects left in high traffic public areas
    e. Fragmentation damage or injuries
    f. Craters
    g. Small metal objects, i.e. nuts, bolts, nails used as shrapnel

20. Identify at least four indicators of secondary devices
    a. Containers with unknown liquids or materials
    b. Unusual devices or containers with electronic components such as wires, circuit boards, cellular phones, antennas and other items attached or exposed
    c. Devices containing quantities of fuses, fireworks, match heads, black powder, incendiary materials or other unusual materials
    d. Materials attached to or surrounding an item such as nails, bolts, drill bits that could be used for shrapnel
    e. Ordnance such as blasting caps, detcord, explosives, grenades, etc.

## ***601-4.2.2 Surveying Hazardous Materials/WMD Incidents***

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

Given examples of hazardous materials/WMD incidents, awareness level personnel shall, from a safe location, identify the hazardous material(s)/WMD involved in each situation by name, UN/NA identification number, or type placard applied by completing the following requirements:

1. Identify difficulties encountered in determining the specific names of hazardous materials/WMD at facilities and in transportation.

2. Identify sources for obtaining the names of, UN/NA identification numbers for, or types of placard associated with hazardous materials/WMD in transportation.
    a. Shipping documents
    b. Labels
    c. Placards
    d. DOT *Emergency Response Guidebook* (ERG)

3. Identify sources for obtaining the names of hazardous materials/WMD at a facility.
    a. Shipping documents
    b. Labels
    c. Placards
    d. ERG
    e. Safety Data Sheets (SDS)/Material Safety Data Sheets (MSDS)
    f. Facility documents
    g. Facility pre-plans

***601-4.2.3*** ***Collecting Hazard Information***

Given the identity of various hazardous materials/WMD (name, UN/NA identification number, or type placard), awareness level personnel shall identify the fire, explosion, and health hazard information for each material by using the current edition of the DOT *Emergency Response Guidebook* by completing the following requirements:

1. Identify the three methods for determining the guidebook page for a hazardous material/WMD.
    a. Locate UN number in the yellow-bordered pages
    b. Locate name of material in the alphabetic listing in the blue-bordered pages
    c. Locate a matching placard or container shape and consult the appropriate guide number

2. Identify the two general types of hazards found on each guidebook page.

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

a. Fire/explosive
b. Health

## ***601-4.3 Competencies — Planning the Response. (Reserved)***

## ***601-4.4 Competencies — Implementing the Planned Response***

### ***601-4.4.1 Initiating Protective Actions***

Given examples of hazardous materials/WMD incidents, the emergency response plan, the standard operating procedures, and the current edition of the DOT *Emergency Response Guidebook,* awareness level personnel shall be able to identify the actions to be taken to protect themselves and others and to control access to the scene and shall meet the following requirements:

1. Identify the location of both the emergency response plan and/or standard operating procedures (SOP).

2. Identify the role of the awareness level personnel during hazardous materials/WMD incidents.
   a. Recognize the presence of hazardous materials/WMD.
   b. Protect themselves
   c. Call for trained personnel
   d. Secure the area

3. Identify the following basic precautions to be taken to protect themselves and others in hazardous materials/WMD incidents:
   a. Identify the precautions necessary when providing emergency medical care to victims of hazardous materials/WMD incidents.
      i. Responder safety/appropriate PPE
      ii. Isolate the victim
      iii. Identify the product (by appropriately trained personnel)
      iv. Decontaminate the patient (by appropriately trained personnel)
   b. Identify typical ignition sources found at the scene of hazardous materials/WMD incidents.
   c. Identify the ways hazardous materials/WMD are harmful to people, the environment, and property.
      i. **T**hermal
      ii. **R**adiation
      iii. **A**sphyxiation
      iv. **C**hemical (i.e., poisons, corrosives)
      v. **E**tiologic

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

vi. **M**echanical
vii. **P**sychological/psychogenic

d. Identify the general routes of entry for human exposure to hazardous materials/WMD.
   i. Contact
   ii. Absorption
   iii. Inhalation
   iv. Ingestion

4. Given examples of hazardous materials/WMD and the identity of each hazardous material/WMD (name, UN/NA identification number, or type placard), identify the following response information:
   a. Emergency action (fire, spill, or leak and first aid)
   b. Personal protective equipment necessary
   c. Initial isolation and protective action distances

5. Given the name of a hazardous material, identify the recommended personal protective equipment from the following list:
   a. Street clothing and work uniforms
   b. Structural fire-fighting protective clothing
   c. Positive pressure self-contained breathing apparatus
   d. Chemical-protective clothing and equipment

6. Identify the definitions for each of the following protective actions:
   a. Isolation of the hazard area and denial of entry
   b. Evacuation
   c. Shelter-in-place

7. Identify the size and shape of recommended initial isolation and protective action zones.
   a. initial isolation zones
   b. protective action zones

8. Describe the difference between small and large spills as found in the Table of Initial Isolation and Protective Action Distances in the DOT *Emergency Response Guidebook*.
   a. large spill/release
   b. small spill/release

9. Identify the circumstances under which the following distances are used at a hazardous materials /WMD incidents:
   a. Table of Initial Isolation and Protective Action Distances (green-bordered pages)

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

b. Isolation distances in the numbered guides (orange-bordered pages)

10. Describe the difference between the isolation distances on the orange-bordered guidebook pages and the protective action distances on the green-bordered ERG *(Emergency Response Guidebook)* pages.

11. Identify the techniques used to isolate the hazard area and deny entry to unauthorized persons at hazardous materials/WMD incidents.

12. Identify at least four specific actions necessary when an incident is suspected to involve criminal or terrorist activity.
    a. Take the appropriate actions to protect yourself and other personnel
    b. Communicate the suspicion during the notification process
    c. Isolate potentially exposed people or animals
    d. Document the initial observation
    e. Be alert for booby traps and explosive devices

***601-4.4.2*** ***Initiating the Notification Process***

Given scenarios involving hazardous materials/WMD incidents, awareness level personnel shall identify the initial notifications to be made and how to make them, consistent with the AHJ.

***601-4.5*** ***Competencies — Evaluating Progress***

**No competencies required at this level.**

***601-4.6*** ***Competencies — Terminating the Incident***

**No competencies required at this level.**

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

# HAZARDOUS MATERIALS OPERATIONS

# REFERENCE LIST FOR THE HAZARDOUS MATERIALS OPERATIONS CURRICULUM

This Reference List is provided as a general guide for both instructors and students to locate information pertaining to the specific objectives in the TCFP Curriculum. This list is **not** all-inclusive and does not in any way limit TCFP development and use of questions to test the objectives of the curriculum:

## Required References

Texts

*Certification Curriculum Manual.* Texas Commission on Fire Protection. (Most current edition). Austin, TX: Texas Commission on Fire Protection.

*Code of Federal Regulations, Title 29 Part 1910.120, Appendix A*. United States. U.S. Department of Labor, Occupational Safety & Health Administration.

*Emergency Response Guidebook.* United States. (Most current edition). Washington, DC: U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration.

*Essentials of Fire Fighting and Fire Department Operations,* 6th *edition*. International Fire Service Training Association. (2013). Stillwater, OK: Fire Protection Publications, Oklahoma State University.

*Fundamentals of Fire Fighter Skills,* 3rd edition. International Association of Fire Chiefs, & National Fire Protection Association. (2014). Sudbury, MA: Jones and Bartlett.

*Hazardous Materials Awareness and Operations, 2nd Edition*. Schnepp (2014). Sudbury, MA: Jones & Bartlett.

*Hazardous Materials for First Responders,* 4th edition. International Fire Service Training Association. (2010). Stillwater, OK: Fire Protection Publications, Oklahoma State University.

*Hazardous Materials/Weapons of Mass Destruction Response Handbook*, 6th/2013 edition. McGowan, T. (2012). Quincy, MA: National Fire Protection Association.

*NFPA 472: Standard for Professional Competence of Responders to Hazardous Materials Incidents. (*2013 ed.). Quincy, MA: NFPA Publications. National Fire Protection Association

*NIOSH Pocket Guide to Chemical Hazards.* Cincinnati National Institute for Occupational Safety and Health. (most current edition). OH: US Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health. http://www.cdc.gov/niosh/npg/

*Standards Manual for Fire Protection Personnel.* Texas Commission on Fire Protection. (Most current edition). Austin, TX: Texas Commission on Fire Protection.

## Recommended References

The most current edition of the following publications and media are recommended (not required) supplemental material for program use.

Media

*DOT Chart 15: Hazardous Materials Marking, Labeling and Placarding Guide*. United States. (2007). Washington, DC: U.S. Dept. of Transportation, Pipeline and Hazardous Materials Safety Administration.

*Emergency Response Guidebook 2012.* United States. (2012). [DVD]. Washington, DC: U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration.

*Hazardous Materials Awareness and Operations.* International Association of Fire Chiefs, & National Fire Protection Association. (2006). [DVD Set]. Sudbury, MA: Jones and Bartlett.

*Hazmat Decontamination.* Action Training Systems, Inc. (2008). [4 Disc DVD Set]. Poulsbo, WA: Action Training Systems.

*Hazmat Operations.* Detrick Lawrence Corporation, Pye, S., & Lamont, J. B. (2006). [8 Disk DVD Set]. Edgartown, MA: Emergency Film Group.

# CHAPTER 6
# SECTION 602
# HAZARDOUS MATERIALS OPERATIONS
# CURRICULUM OUTLINE

| SECTION | SUBJECT | RECOMMENDED HOURS |
|---|---|---|
| 602-5.1 | General - Introduction - Laws, Regulations, and National Consensus Standards | 1 |
| 602-5.2 | Analyzing the Incident | 14 |
| 602-5.3 | Planning the Response | 9 |
| 602-5.4 | Implementing the Planned Response | 6 |
| 602-5.5 | Evaluating Progress | 2 |
| 602-5.6 | Terminating the Incident - Reserved - None required at this level | |
| | **TOTAL RECOMMENDED HOURS** | **32** |

The recommended hours include time for skills evaluation and are based on 12 students. Hours needed depend on the actual number of students.

Note: In order to successfully complete the Texas Commission on Fire Protection's Basic Structure Firefighter curriculum, all the job performance requirements and knowledge skills and abilities must be mastered pertaining to:

- Awareness Level Personnel (Section 601),
- Operations Level Responder (Section 602),
- Operations Level Responder: Mission Specific Competencies of:
    - Using Personal Protective Equipment (Section 603-6.2),
    - Performing Product Control (Section 603-6.6)

This is in accordance with the competency requirements of *NFPA 1001: Standard for Fire Fighter Professional Qualifications* 2013 ed., the *TCFP Standards Manual*, and the *TCFP Certification Curriculum Manual.*

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

# *SECTION 602*

# *HAZARDOUS MATERIALS OPERATIONS*

Hazardous Materials Operations Level Personnel are those 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.

Response options for operations level responders are generally limited to nonintervention or defensive actions.

The Hazardous Materials Operations Level Responder must first master all the job performance requirements and knowledge, skills and abilities pertaining to:

- Awareness Level Personnel, and
- The competencies of this chapter

**Note: In order to successfully complete the Texas Commission on Fire Protection's Basic Structure Firefighter curriculum, all the job performance requirements and knowledge, skills and abilities must be mastered pertaining to:**

- **Awareness Level Personnel,**
- **Operations Level Responders, and**
- **Hazardous Materials Operations Level – Mission Specific Competencies of:**
  - **Using Personal Protective Equipment, and**
  - **Performing Product Control.**

**This is in accordance with the competency requirements of *NFPA 1001: Standard for Fire Fighter Professional Qualifications* ~~2008~~ 2013 Ed., the *TCFP Standards Manual* and the *TCFP Curriculum Manual*.**

## *602-5.1* *General*

### *602-5.1.1* *Introduction*

**602-5.1.1.1** The operations level responder shall be that person who responds to hazardous materials/weapons of mass destruction (WMD) incidents for the purpose of protecting nearby persons, the environment, or property from the effects of the release.

**602-5.1.1.2** The operations level responder shall be trained to meet all competencies at the awareness level (Chapter 6, Section 601) and the competencies of this chapter.

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

**602-5.1.1.3** The operations level responder shall receive additional training to meet applicable governmental occupational health and safety regulations.

***602-5.1.2*** ***Goal***

**602-5.1.2.1** The goal of the competencies at this level shall be to provide operations level responders with the knowledge and skills to perform the core competencies in 5.1.2.2 safely.

**602-5.1.2.2** When responding to hazardous materials/WMD incidents, operations level responders shall be able to perform the following tasks:

1. Analyze a hazardous materials/WMD incident to determine the scope of the problem and potential outcomes by completing the following tasks:
    a. Survey a hazardous materials/WMD incident to identify the containers and materials involved, determine whether hazardous materials/WMD have been released, and evaluate the surrounding conditions.
    b. Collect hazard and response information from MSDS; CHEMTREC/CANUTEC/SETIQ; local, state, and federal authorities; and shipper/manufacturer contacts.
    c. Predict the likely behavior of a hazardous material/WMD and its container.
    d. Estimate the potential harm at a hazardous materials/WMD incident.
        i. Thermal
        ii. Radiation
        iii. Asphyxiant
        iv. Chemical
        v. Etiologic
        vi. Mechanical
        vii. Psychological/psychogenic

2. Plan an initial response to a hazardous materials/WMD incident within the capabilities and competencies of available personnel and personal protective equipment by completing the following tasks:
    a. Describe the response objectives for the hazardous materials/WMD incident.
        i. Evacuation
        ii. Search and Rescue
        iii. Exposure Protection/Isolate the Area
        iv. Defensive Control Techniques
        v. Crime scene management and evidence preservation
        vi. Recovery and termination
    b. Describe the response options available for each objective.
        i. Evacuation

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

a) Public protection actions
    1) Full scale evacuation
    2) Shelter-in-place
    3) Combination

ii. Search and Rescue
    a) Based on training and equipment
    b) Risk-benefit analysis (i.e., risk a lot/save a lot, risk a little/save a little)

iii. Exposure Protection/Isolate the Area
    a) Establish initial isolation distance
    b) Establish protective action distance
    c) Establish control zones

iv. Defensive Control Techniques
    a) Damming
        1) Overflow
        2) Underflow
    b) Diking
    c) Retention
    d) Dispersion
    e) Absorption
    f) Adsorption
    g) Dilution
    h) Dissolution
    i) Diversion
    j) Vapor dispersion
    k) Vapor suppression
    l) Ventilation
    m) Remote valve shutoff

v. Crime scene management and evidence preservation
    a) Maintain scene control
    b) Limit access
    c) Maintain chain of custody
    d) Coordinate with AHJ

vi. Recovery and termination
    a) Short-term recovery
    b) Long-term recovery
    c) Termination activities
        1) Debriefing
        2) Critique
        3) Post-incident Analysis
    d) Demobilization

c. Determine whether the personal protective equipment provided is appropriate for implementing each option.
d. Describe emergency decontamination procedures.
e. Develop a plan of action, including safety considerations.

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

3. Implement the planned response for a hazardous materials/WMD incident to favorably change the outcomes consistent with the emergency response plan and/or standard operating procedures by completing the following tasks:

    a. Establish and enforce scene control procedures, including control zones, emergency decontamination, and communications.
    b. Where criminal or terrorist acts are suspected, establish means of evidence preservation.
    c. Initiate an incident command system (ICS) for hazardous materials/WMD incidents.
    d. Perform tasks assigned as identified in the incident action plan.
    e. Demonstrate emergency decontamination.

4. Evaluate the progress of the actions taken at a hazardous materials/WMD incident to ensure that the response objectives are being met safely, effectively, and efficiently by completing the following tasks:
    a. Evaluate the status of the actions taken in accomplishing the response objectives.
    b. Communicate the status of the planned response.

***602-5.2*** ***Core Competencies — Analyzing the Incident***

***602-5.2.1*** ***Surveying Hazardous Materials/WMD Incidents***

Given scenarios involving hazardous materials/WMD incidents, the operations level responder shall collect information about the incident to identify the containers, the materials involved, the surrounding conditions, and whether hazardous materials/WMD have been released, by completing the requirements of 5.2.1.1 through 5.2.1.6.

**602-5.2.1.1** Given three examples each of liquid, gas, and solid hazardous material or WMD, including various hazard classes, operations level personnel shall identify the general shapes of containers in which the hazardous materials/WMD are typically found.

**602-5.2.1.1.1** Given examples of the following tank cars, the operations level responder shall identify each tank car by type, as follows:

1. Cryogenic liquid tank cars

2. Nonpressure tank cars (general service or low pressure cars)

3. Pressure tank cars

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

**602-5.2.1.1.2** Given examples of the following intermodal tanks, the operations level responder shall identify each intermodal tank by type, as follows:

1. Nonpressure intermodal tanks
    a. IM-101 (IMO Type 1)
    b. IM-102 (IMO Type 2)

2. Pressure intermodal tanks (Spec 51/IMO Type 5)

3. Specialized intermodal tanks, including the following:
    a. Cryogenic intermodal tanks (IMO Type 7)
    b. Tube modules

**602-5.2.1.1.3** Given examples of the following cargo tanks, the operations level responder shall identify each cargo tank by type, as follows: (NOTE: CGA=Compressed Gas Association, MC= Motor Carrier, TC=Transport Canada, DOT=Dept. of Transportation, SCT=Secretariat of Communications and Transportation [Mexico])

1. Compressed gas tube trailers

2. Corrosive liquid tanks
    - DOT 412, TC 412, SCT 312, MC 312, TC 312

3. Cryogenic liquid tanks
    - MC 338, TC 338, SCT 338, TC 341, CGA 341

4. Dry bulk cargo tanks

5. High pressure tanks
    - MC 331, TC 331, SCT 331

6. Low pressure chemical tanks
    - DOT 407, TC 407, SCT 307, MC 307, TC 307

7. Non-pressure liquid tanks
    - DOT 406, TC 406, SCT 306, MC 306, TC 306

**602-5.2.1.1.4** Given examples of the following storage tanks, the operations level responder shall identify each tank by type, as follows:

1. Cryogenic liquid tank
    a. Refrigerated storage tanks=less than 15 psi
    b. High pressure cryogenic tanks=greater than 15psi

2. Non-pressure tank (Atmospheric pressure=0-0.5 psi)
    a. Horizontal tank

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

b. Cone roof tank
c. Floating roof tank
d. Covered floating roof tank
e. Floating roof with geodesic dome
f. Lifter roof tank
g. Vapor dome roof tank
h. Underground storage tanks

3. Pressure tank
   a. Low Pressure (0.5-15 psi)
      i. Vertical dome roof tanks
   b. High pressure (greater than 15 psi)
      i. Horizontal pressure vessel
      ii. Spherical pressure vessel
      iii. Noded spheroid
      iv. Underground high pressure

**602-5.2.1.1.5** Given examples of the following non-bulk packaging, the operations level responder shall identify each package by type, as follows:

1. Bags

2. Carboys and Jerricans

3. Cylinders

4. Drums
   a. Types
      i. Open head
      ii. Closed head
   b. Construction Materials
      i. Metal
      ii. Plastic
      iii. Fiberboard
      iv. Other suitable materials
   c. Fittings
      i. Bungs
      ii. Chime ring

5. Dewar flask (cryogenic liquids)

**602-5.2.1.1.6** Given examples of the following packaging, the operations level responder shall identify the characteristics of each container or package by type as follows:

1. Intermediate bulk container (IBC)
   a. Rigid intermediate bulk containers (RIBCs)

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

b. Flexible intermediate bulk containers (FIBCs)

2. Ton container
   a. Convex
   b. Concave

**602-5.2.1.1.7** Given examples of the following radioactive material packages, the operations level responder shall identify the characteristics of each container or package by type, as follows:

1. Excepted
2. Industrial
3. Type A
4. Type B
5. Type C

**602-5.2.1.2** Given examples of containers, the operations level responder shall identify the markings that differentiate one container from another.

1. DOT Placarding and Labeling System
2. UN Numbers
3. NFPA 704 Marking System
4. Hazardous Materials Identification System (HMIS)
5. Hazard Identification Codes (Intermodal Containers)
   a. Also known as “hazard identification numbers,” or;
   b. Kemler code

**602-5.2.1.2.1** Given examples of the following marked transport vehicles and their corresponding shipping papers, the operations level responder shall identify the following vehicle or tank identification marking:

1. Highway transport vehicles, including cargo tanks
   a. Company names and logos
   b. Vehicle identification numbers
   c. Manufacturer’s specification plate
2. Intermodal equipment, including tank containers
   a. Reporting marks

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

b. Tank number
c. Specification markings

3. Rail transport vehicles, including tank cars
   a. Standard transportation commodity code (STCC)
   b. Commodity stencil
   c. Reporting marks
   d. Capacity stencil
   e. Specification markings

**602-5.2.1.2.2** Given examples of facility containers, the operations level responder shall identify the markings indicating container size, product contained, and/or site identification numbers.

1. NFPA 704 Marking System
2. Hazardous Materials Identification System (HMIS)
3. Facility specification markings
4. Manufacturer's specification plate

**602-5.2.1.3** Given examples of hazardous materials incidents, the operations level responder shall identify the name(s) of the hazardous material(s) in 5.2.1.3.1 through 5.2.1.3.3.

**602-5.2.1.3.1** The operations level responder shall identify the following information on a pipeline marker:

1. Emergency telephone number
2. Owner
3. Product

**602-5.2.1.3.~~1~~2** Given a pesticide label, the operations level responder shall identify each of the following pieces of information, then match the piece of information to its significance in surveying hazardous materials incidents:

1. Active ingredient
2. Hazard statement
3. Name of pesticide
4. EPA Registration Number (Pest Control Product (PCP) number in Canada)

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

5. Precautionary statement

6. Signal word
    a. Poison/Danger
    b. Warning
    c. Caution

**602-5.2.1.3.3** Given a label for a radioactive material, the operations level responder shall identify the type or category of label, contents, activity, transport index, and criticality safety index as applicable.

1. Radioactive White-I Label

2. Radioactive Yellow-II Label

3. Radioactive Yellow-III Label

**602-5.2.1.4** The operations level responder shall identify and list the surrounding conditions that should be noted when a hazardous materials/WMD incident is surveyed.

1. Topography

2. Land use

3. Accessibility

4. Weather conditions

5. Bodies of water

6. Public exposure potential

7. Overhead and underground wires and pipelines

8. Storms and sewer drains

9. Possible ignition sources

10. Adjacent land use

11. Nature and extent of injuries

12. Building information

13. Ventilation ducts

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

14. Air returns

**602-5.2.1.5** The operations level responder shall describe ways to verify information obtained from the survey of a hazardous materials/WMD incident.

1. CHEMTREC
2. SDS/MSDS
3. Emergency Response Guides
4. Shipping Papers
5. Online, computer, and/or mobile-based applications (e.g., WISER)

**602-5.2.1.6** The operations level responder shall identify at least three additional hazards that could be associated with an incident involving terrorist or criminal activities.

1. Secondary events/devices intended to incapacitate or delay emergency responders
2. Armed resistance
3. Use of weapons
4. Booby traps
5. Secondary contamination from handling patients

***602-5.2.2*** ***Collecting Hazard and Response Information***

Given scenarios involving known hazardous materials/WMD, the operations level responder shall collect hazard and response information using MSDS, CHEMTREC/CANUTEC/SETIQ, governmental authorities, and shippers and manufacturers by completing the following requirements:

1. Match the definitions associated with the UN/DOT hazard classes and divisions of hazardous materials/WMD, including refrigerated liquefied gases and cryogenic liquids, with the class or division.
2. Identify two ways to obtain an MSDS in an emergency.
    a. Shipper
    b. Manufacturer
    c. CHEMTREC
    d. Websites

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

3. Using an MSDS for a specified material, identify the following hazard and response information:
    a. Physical and chemical characteristics
    b. Physical hazards of the material
    c. Health hazards of the material
    d. Signs and symptoms of exposure
    e. Routes of entry
    f. Permissible exposure limits
    g. Responsible party contact
    h. Precautions for safe handling (including hygiene practices, protective measures, and procedures for cleanup of spills and leaks)
    i. Applicable control measures, including personal protective equipment
    j. Emergency and first-aid procedures

4. Identify the following:
    a. Type of assistance provided by CHEMTREC/CANUTEC/SETIQ and governmental authorities
        i. Immediate advice and shipper contact information
        ii. Hazard information warnings and guidance
    b. Procedure for contacting CHEMTREC/CANUTEC/SETIQ and governmental authorities
    c. Information to be furnished to CHEMTREC/CANUTEC/SETIQ and governmental authorities
        i. Responder organization name
        ii. Location and nature of problem (spill, fire, etc.)
        iii. Name and identification number of materials(s) involved
        iv. Shipper/consignee/point of origin
        v. Carrier name, rail car or truck number
        vi. Container type and size
        vii. Quantity of materials transported/released
        viii. Local conditions (weather, terrain, proximity to schools, hospitals, waterways, etc.)
        ix. Injuries and exposures
        x. Local emergency service that have been notified

5. Identify two methods of contacting the manufacturer or shipper to obtain hazard and response information.
    a. Shipping paper contact information
    b. MSDS/SDS contact information
    c. CHEMTREC

6. Identify the type of assistance provided by governmental authorities with respect to criminal or terrorist activities involving the release or potential release of hazardous materials/WMD.
    a. Federal

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

i. DHS - Homeland Security Issues
ii. FBI - Crisis Management
iii. FEMA - Consequence Management
iv. EPA - Environmental Management
v. US Coast Guard - Navigable Waterway Management & Port Security
vi. DOD - Explosives, Munitions, Military Shipments Technical Assistance/Response
vii. ATF - Explosives Technical Assistance

b. State
   i. DPS - District Disaster Chair (DDC)
   ii. TDEM - Emergency Management
   iii. TCEQ - Environmental Management
   iv. TGLO - Water Quality
   v. TRRC - Pipelines and Propane Storage

c. Local
   i. Local emergency management
   ii. Local fire department
   iii. Local police department
   iv. EMS providers

7. Identify the procedure for contacting local, state, and federal authorities as specified in the emergency response plan and/or standard operating procedures.

8. Describe the properties and characteristics of the following:
   a. Alpha radiation
   b. Beta radiation
   c. Gamma radiation
   d. Neutron radiation

***602-5.2.3*** ***Predicting the Likely Behavior of a Material and Its Container***

Given scenarios involving hazardous materials/WMD incidents, each with a single hazardous material/WMD, the operations level responder shall describe the likely behavior of the material or agent and its container by completing the following requirements:

1. Use the hazard and response information obtained from the current edition of the DOT *Emergency Response Guidebook,* MSDS, CHEMTREC/CANUTEC/SETIQ, governmental authorities, and shipper and manufacturer contacts, as follows:
   a. Match the following chemical and physical properties with their significance and impact on the behavior of the container and its contents:
      i. Boiling point
      ii. Chemical reactivity
      iii. Corrosivity (pH)

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

iv. Flammable (explosive) range
    a) Lower Explosive Limit (LEL)
    b) Upper Explosive Limit (UEL)
v. Flash point
vi. Ignition (autoignition) temperature
vii. Particle size
viii. Persistence
ix. Physical state (solid, liquid, gas)
x. Radiation (ionizing and non-ionizing)
xi. Specific gravity
xii. Toxic products of combustion
xiii. Vapor density
xiv. Vapor pressure
xv. Water solubility

b. Identify the differences between the following terms:
    i. Contamination and secondary contamination
    ii. Exposure and contamination
    iii. Exposure and hazard
    iv. Infectious and contagious
    v. Acute effects and chronic effects
    vi. Acute exposures and chronic exposures

2. Identify three types of stress that can cause a container system to release its contents.
    a. Thermal
    b. Mechanical
    c. Chemical

3. Identify five ways in which containers can breach.
    a. Disintegration
    b. Runaway cracking
    c. Closures opening up
    d. Punctures
    e. Tears or spills

4. Identify four ways in which containers can release their contents.
    a. Detonation
    b. Violent rupture
    c. Rapid relief
    d. Spill or leak

5. Identify at least four dispersion patterns that can be created upon release of a hazardous material.
    a. Hemisphere
    b. Cloud
    c. Plume
    d. Cone

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

e. Stream
f. Pool
g. Irregular

6. Identify the time frames for estimating the duration that hazardous materials/WMD will present an exposure risk.
   a. Short term – minutes and hours
   b. Medium term – days, weeks, months
   c. Long term – years and generations

7. Identify the health and physical hazards that could cause harm.
   a. **T**hermal
   b. **R**adiation
   c. **A**sphyxiation
   d. **C**hemical (i.e., poisons, corrosives)
   e. **E**tiologic
   f. **M**echanical
   g. **P**sychological/psychogenic

8. Identify the health hazards associated with the following terms:
   a. Alpha, beta, gamma, and neutron radiation
   b. Asphyxiant
      i. Simple
      ii. Chemical
   c. Carcinogen
   d. Convulsant
   e. Corrosive
   f. Highly toxic
   g. Irritant
   h. Sensitizer, allergen
   i. Target organ effects
      i. Hepatotoxins
      ii. Nephrotoxins
      iii. Neurotoxins
      iv. Mutagens
      v. Teratogens
      vi. Hematoxins
      vii. Pneumotoxins
      viii. Cutaneous hazards
      ix. Eye hazards
   j. Toxic

9. Given the following, identify the corresponding UN/DOT hazard class and division:
   a. Blood agents
   b. Biological agents and biological toxins
   c. Choking agents

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

d. Irritants (riot control agents)
e. Nerve agents
f. Radiological materials
g. Vesicants (blister agents)

***602-5.2.4*** ***Estimating Potential Harm***

Given scenarios involving hazardous materials/WMD incidents, the operations level responder shall describe the potential harm within the endangered area at each incident by completing the following requirements:

1. Identify a resource for determining the size of an endangered area of a hazardous materials/WMD incident.

2. Given the dimensions of the endangered area and the surrounding conditions at a hazardous materials/WMD incident, describe the number and type of exposures within that endangered area.

3. Identify resources available for determining the concentrations of a released hazardous material/WMD within an endangered area.

4. Given the concentrations of the released material, describe the factors for determining the extent of physical, health, and safety hazards within the endangered area of a hazardous materials/WMD incident.

5. Describe the impact that time, distance, and shielding have on exposure to radioactive materials specific to the expected dose rate.

***602-5.3*** ***Core Competencies — Planning the Response***

***602-5.3.1*** ***Describing Response Objectives***

Given at least two scenarios involving hazardous materials/WMD incidents, the operations level responder shall describe the response objectives for each example by completing the following requirements:

1. Given an analysis of a hazardous materials/WMD incident and the exposures, describe the number of exposures that could be saved with the resources provided by the AHJ.

2. Given an analysis of a hazardous materials/WMD incident, describe the steps for determining response objectives.
   a. Analyze the incident
   b. Hazard analysis and risk assessment
   c. Identify incident priorities
      i. Life safety
      ii. Incident stabilization
      iii. Property preservation/environmental conservation
   d. Develop Incident Objectives (SMART)

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

i. **S**pecific
ii. **M**easureable
iii. **A**ttainable
iv. **R**ealistic
v. **T**imely

e. Periodically reassess

3. Describe how to assess the risk to a responder for each hazard class in rescuing injured persons at a hazardous materials/WMD incident. NOTE: the following classes are assessed using the TRACEM-P acronym
   a. Class 1-thermal, radiological, asphyxiation, chemical, etiological, mechanical
   b. Class 2-thermal, asphyxiation, chemical, etiological, mechanical
   c. Class 3-thermal, chemical, mechanical
   d. Class 4-thermal, chemical, mechanical
   e. Class 5-thermal, chemical, mechanical
   f. Class 6-thermal, asphyxiation, chemical, etiological
   g. Class 7-thermal, radiological, chemical
   h. Class 8-thermal, chemical, mechanical
   i. Class 9-thermal, radiological, asphyxiation, chemical, etiological, mechanical

4. Describe the potential for secondary attacks and devices at criminal or terrorist events.
   a. Human threats
   b. Secondary devices
   c. Multiple agency response
      i. Fire
      ii. Hazardous materials
      iii. EMS
      iv. Law Enforcement

***602-5.3.2*** ***Identifying Action Options***

Given examples of hazardous materials/WMD incidents (facility and transportation), the operations level responder shall identify the options for each response objective and shall meet the following requirements:

1. Identify the options to accomplish a given response objective.
   a. Evacuation
   b. Recognition, identification, notification, isolation

2. Describe the prioritization of emergency medical care and removal of victims from the hazard area relative to exposure and contamination concerns.
   a. Per AHJ

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

b. Per Medical Protocol

***602-5.3.3*** ***Determining Suitability of Personal Protective Equipment***

Given examples of hazardous materials/WMD incidents, including the names of the hazardous materials/WMD involved and the anticipated type of exposure, the operations level responder shall determine whether available personal protective equipment is applicable to performing assigned tasks by completing the following requirements:

1. Identify the respiratory protection required for a given response option and the following:
    a. Describe the advantages, limitations, uses, and operational components of the following types of respiratory protection at hazardous materials/WMD incidents:
        i. Positive pressure self-contained breathing apparatus (SCBA)
        ii. Positive pressure air-line respirator with required escape unit
        iii. Closed-circuit SCBA
        iv. Powered air-purifying respirator (PAPR)
        v. Air-purifying respirator (APR)
        vi. Particulate respirator
    b. Identify the required physical capabilities and limitations of personnel working in respiratory protection.

2. Identify the personal protective clothing required for a given option and the following:
    a. Identify skin contact hazards encountered at hazardous materials/WMD incidents.
        i. Burns
        ii. Rash
        iii. Absorption
    b. Identify the purpose, advantages, and limitations of the following types of protective clothing at hazardous materials/WMD incidents:
        i. Chemical-protective clothing: liquid splash–protective clothing and vapor-protective clothing
        ii. High temperature–protective clothing: proximity suit and entry suits
        iii. Structural fire-fighting protective clothing

***602-5.3.4*** ***Identifying Decontamination Issues***

Given scenarios involving hazardous materials/WMD incidents, the operations level responder shall identify when emergency decontamination is needed by completing the following requirements:

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

1. Identify ways that people, personal protective equipment, apparatus, tools, and equipment become contaminated.

2. Describe how the potential for secondary contamination determines the need for decontamination.

3. Explain the importance and limitations of decontamination procedures at hazardous materials incidents.

4. Identify the purpose of emergency decontamination procedures at hazardous materials incidents.

5. Identify the methods, advantages, and limitations of emergency decontamination procedures.

## ***602-5.4*** ***Core Competencies — Implementing the Planned Response***

### ***602-5.4.1*** ***Establishing and Enforcing Scene Control Procedures***

Given two scenarios involving hazardous materials/WMD incidents, the operations level responder shall explain how to establish and maintain scene control, including control zones and emergency decontamination, and communications between responders and to the public by completing the following requirements:

1. Identify the procedures for establishing scene control through control zones.

2. Identify the criteria for determining the locations of the control zones at hazardous materials/WMD incidents.

3. Identify the basic techniques for the following protective actions at hazardous materials/WMD incidents:
    a. Evacuation
    b. Shelter-in-place

4. Demonstrate the ability to perform emergency decontamination

5. Identify the items to be considered in a safety briefing prior to allowing personnel to work at the following:
    a. Hazardous material incidents
        i. Preliminary evaluation
        ii. Hazard identification
        iii. Description of site
        iv. Task(s) to be performed
        v. Length of time for task(s)
        vi. Required personnel protective clothing

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

vii. Monitoring requirements
viii. Notification of identified risks
b. Hazardous materials/WMD incidents involving criminal activities

6. Identify the procedures for ensuring coordinated communication between responders and to the public.

***602-5.4.2*** ***Preserving Evidence***

Given two scenarios involving hazardous materials/WMD incidents, the operations level responder shall describe the process to preserve evidence as listed in the emergency response plan and/or standard operating procedures.

***602-5.4.3*** ***Initiating the Incident Command System***

Given scenarios involving hazardous materials/WMD incidents, the operations level responder shall 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
      i. Obtains briefing from:
         a) Incident Commander; or
         b) Incident Safety Officer; and
         c) Hazard Branch Director or Hazard Division/Group Supervisor
      ii. Participates in:
         a) Preparation of incident safety plan
         b) Implementation of the incident safety plan; and
         c) Medical monitoring of entry team personnel before and after entry
      iii. Advises Incident Commander or Hazard Branch Director or Hazard Division/Group Supervisor of:
         a) Deviations from the incident safety plan
         b) Dangerous or unsafe activities

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

iv. Alters, suspends, or terminates any operation that is considered unsafe

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.

***602-5.4.4*** ***Using Personal Protective Equipment***

Given the personal protective equipment provided by the AHJ, the operations level responder shall describe considerations for the use of personal protective equipment provided by the AHJ, and shall meet the following requirements:

1. Identify the importance of the buddy system.

2. Identify the importance of the backup personnel.

3. Identify the safety precautions to be observed when approaching and working at hazardous materials/WMD incidents.

4. Identify the signs and symptoms of heat and cold stress and procedures for their control.

5. Identify the capabilities and limitations of personnel working in the personal protective equipment provided by the AHJ.

6. Identify the procedures for cleaning, disinfecting, and inspecting personal protective equipment provided by the AHJ.

7. Describe the maintenance, testing, inspection, and storage procedures for personal protective equipment provided by the AHJ according to the manufacturer's specifications and recommendations.

***602-5.5*** ***Core Competencies — Evaluating Progress***

***602-5.5.1*** ***Evaluating the Status of Planned Response***

Given two scenarios involving hazardous materials/WMD incidents, including the incident action plan, the operations level responder shall determine the effectiveness of the actions taken in accomplishing the response objectives and shall meet the following requirements:

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

1. Identify the considerations for evaluating whether actions taken were effective in accomplishing the objectives.
    a. Incident stabilized
    b. Incident increasing in intensity

2. Describe the circumstances under which it would be prudent to withdraw from a hazardous materials/WMD incident.

***602-5.5.2*** ***Communicating the Status of the Planned Response***

Given two scenarios involving hazardous materials/WMD incidents, including the incident action plan, the operations level responder shall report the status of the planned response through the normal chain of command by completing the following requirements:

1. Identify the procedures for reporting the status of the planned response through the normal chain of command.

2. Identify the methods for immediate notification of the incident commander and other response personnel about critical emergency conditions at the incident.

***602-5.6*** ***Competencies — Terminating the Incident*** **(Reserved)**

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

# HAZARDOUS MATERIALS OPERATIONS

## (Mission Specific Competencies)

# REFERENCE LIST FOR THE HAZARDOUS MATERIALS OPERATIONS - MISSION SPECIFIC COMPETENCIES CURRICULUM

This Reference List is provided as a general guide for both instructors and students to locate information pertaining to the specific objectives in the TCFP Curriculum. This list is **not** all-inclusive and does not in any way limit TCFP development and use of questions to test the objectives of the curriculum:

## Required References

Texts

*Certification Curriculum Manual.* Texas Commission on Fire Protection. (Most current edition). Austin, TX: Texas Commission on Fire Protection.

*Code of Federal Regulations, Title 29 Part 1910.120, Appendix A*. United States. U.S. Department of Labor, Occupational Safety & Health Administration. http://edocket.access.gpo.gov/cfr_2007/julqtr/pdf/29cfr1910.120.pdf

*Emergency Response Guidebook.* United States. (Most current edition). Washington, DC: U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration.

*Essentials of Fire Fighting and Fire Department Operations,* 6th *edition*. International Fire Service Training Association. (2013). Stillwater, OK: Fire Protection Publications, Oklahoma State University.

*Fundamentals of Fire Fighter Skills,* 3rd edition. International Association of Fire Chiefs, & National Fire Protection Association. (2014). Sudbury, MA: Jones and Bartlett.

*Hazardous Materials Awareness and Operations, 2nd Edition*. Schnepp (2014). Sudbury, MA: Jones & Bartlett.

*Hazardous Materials for First Responders,* 4th edition. International Fire Service Training Association. (2010). Stillwater, OK: Fire Protection Publications, Oklahoma State University.

*Hazardous Materials: Managing the Incident*, 4th edition. Noll, G. G., Hildebrand, M. S., Schnepp, R. & Rudner, G.D. (2014). Burlington, MA: Jones and Bartlett.

*Hazardous Materials/Weapons of Mass Destruction Response Handbook*, 6th/2013 edition. McGowan, T. (2012). Quincy, MA: National Fire Protection Association.

*NFPA 472: Standard for Professional Competence of Responders to Hazardous Materials Incidents.* (2013 ed.). Quincy, MA: NFPA Publications. National Fire Protection Association

*NIOSH Pocket Guide to Chemical Hazards.* National Institute for Occupational Safety and Health. (Most current edition). Cincinnati, OH: US Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health. http://www.cdc.gov/niosh/npg/

*Standards Manual for Fire Protection Personnel.* Texas Commission on Fire Protection. (Most current edition). Austin, TX: Texas Commission on Fire Protection.

## Recommended References

The most current edition of the following publications and media are recommended (not required) supplemental material for program use.

Texts

*Bretherick's Handbook of Reactive Chemical Hazards*. Urben, P. G., Pitt, M. J., & Bretherick, L. (2007). Amsterdam: Elsevier.

*Emergency Care for Hazardous Materials Exposure*. Currance, P., Bronstein, A. C., & Clements, B. (2005). St. Louis, MO: Mosby.

*Field Guide to Tank Cars.* Bureau of Explosives. (2010). Pueblo, Colorado: Association of American Railroads.

*Fire Protection Guide to Hazardous Materials*. 2010 edition. National Fire Protection Association. Quincy, MA: National Fire Protection Association.

*Hawley's Condensed Chemical Dictionary*. 15th edition. Lewis, R. J. (2007). West Sussex: Wiley.

*Hazardous Materials: Managing the Incident Field Operations Guide*. 2nd edition. Bevelacqua, A. S., (2014). Jones and Bartlett.

Media

*Chlorine Emergencies: An Overview for First Responders*. Chlorine Institute. (2007). Arlington, VA: The Chlorine Institute.

*Hazardous Materials Containment Series*. Action Training Systems. [4 Disc DVD Set] Hazardous materials containment - series of 4 titles. Seattle, WA: Action Training Systems.

*Hazardous Materials: Managing the Incident DVD Series*. Massingham, G., Noll, G. G., Hildebrand, M. S., & Noll, G. G. (2005). [8 Disc DVD Set] Edgartown, MA: Emergency Film Group.

*How to Use the Chlorine Institute Emergency Kit "A" for 100 lb. and 150 lb. Chlorine Cylinders*. Chlorine Institute. (Sept. 2013). New York. NY: The Chlorine Institute. [DVD + pamphlet]

*How to Use the Chlorine Institute Emergency Kit “B” for Chlorine Ton Containers*. New Chlorine Institute. (Dec. 2013). York, NY: The Chlorine Institute. [DVD + pamphlet]

*How to Use the Chlorine Institute Emergency Kit "C" for Chlorine Tank Cars and Tank Trucks*. Chlorine Institute. (Feb. 2014). New York, NY: The Chlorine Institute. [DVD + pamphlet]

# CHAPTER 6

## SECTION 603
## HAZARDOUS MATERIALS OPERATIONS - MISSION SPECIFIC COMPETENCIES CURRICULUM OUTLINES

*Sections 603-6.2 Mission Specific Competencies: Personal Protective Equipment and 603-6.6 Mission Specific Competencies: Product Control are required for TCFP Basic Structure Fire Fighter curriculum training. All other Hazardous Materials Operations-Mission Specific Competencies are provided for optional training use by the AHJ.

| SECTION | SUBJECT | RECOMMENDED HOURS |
|---|---|---|
| 603-6.1 | General - Introduction - Laws, Regulations, and National Consensus Standards | 1 |
| 603-6.2 | Mission Specific Competencies: Personal Protective Equipment* | 8 |
| 603-6.3 | Mission Specific Competencies: Mass Decontamination | 8 |
| 603-6.4 | Mission Specific Competencies: Technical Decontamination | 8 |
| 603-6.5 | Mission Specific Competencies: Evidence Preservation and Sampling | 8 |
| 603-6.6 | Mission Specific Competencies: Product Control* | 8 |
| 603-6.7 | Mission Specific Competencies: Air Monitoring and Sampling | 8 |
| 603-6.8 | Mission Specific Competencies: Victim Rescue and Recovery | 8 |
| 603-6.9 | Mission Specific Competencies: Response to Illicit Laboratory Incidents | 16 |
| 603-6.10 | Mission Specific Competencies: Disablement/Disruption of Improvised Explosives Devices (IEDs), Improvised WMD Dispersal Devices, and Operations at Improvised Explosives Laboratories | 16 |

| Mission Specific - Personal Protective Equipment* | | |
|---|---|---|
| **SECTION** | **SUBJECT** | **RECOMMENDED HOURS** |
| 603-6.2 | Mission Specific Competencies: Personal Protective Equipment | |
| 603-6.2.1 | General - Introduction - Laws, Regulations, and National Consensus Standards | 1 |
| 603-6.2.2 | Analyzing the Incident - Reserved - None Required at this Level | |
| 603-6.2.3 | Planning the Response | 3 |
| 603-6.2.4 | Implementing the Planned Response | 3 |
| 603-6.2.5 | Terminating the Incident | 1 |
| | **TOTAL RECOMMENDED HOURS** | **8** |

| Mission Specific - Mass Decontamination | | |
|---|---|---|
| **SECTION** | **SUBJECT** | **RECOMMENDED HOURS** |
| 603-6.3 | Mission Specific Competencies: Mass Decontamination | |

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

| | | |
|---|---|---|
| 603-6.3.1 | General - Introduction - Laws, Regulations, and National Consensus Standards | 1 |
| 603-6.3.2 | Analyzing the Incident - Reserved - None Required at this Level | |
| 603-6.3.3 | Planning the Response | 2 |
| 603-6.3.4 | Implementing the Planned Response | 3 |
| 603-6.3.5 | Evaluating Progress | 1 |
| 603-6.3.6 | Terminating the Incident | 1 |
| | **TOTAL RECOMMENDED HOURS** | **8** |

| **Mission Specific - Technical Decontamination** | | |
|---|---|---|
| **SECTION** | **SUBJECT** | **RECOMMENDED HOURS** |
| 603-6.4 | Mission Specific Competencies: Technical Decontamination | |
| 603-6.4.1 | General - Introduction - Laws, Regulations, and National Consensus Standards | 1 |
| 603-6.4.2 | Analyzing the Incident - Reserved - None Required at this Level | |
| 603-6.4.3 | Planning the Response | 2 |
| 603-6.4.4 | Implementing the Planned Response | 3 |
| 603-6.4.5 | Evaluating Progress | 1 |
| 603-6.4.6 | Terminating the Incident | 1 |
| | **TOTAL RECOMMENDED HOURS** | **8** |

| **Mission Specific – Evidence Preservation and Sampling** | | |
|---|---|---|
| **SECTION** | **SUBJECT** | **RECOMMENDED HOURS** |
| 603-6.5 | Mission Specific Competencies: Evidence Preservation and Sampling | |
| 603-6.5.1 | General - Introduction - Laws, Regulations, and National Consensus Standards | 1 |
| 603-6.5.2 | Analyzing the Incident | 1 |
| 603-6.5.3 | Planning the Response | 2 |
| 603-6.5.4 | Implementing the Planned Response | 4 |
| 603-6.5.5 | Evaluating Progress - Reserved - None Required at this Level | |
| 603-6.5.6 | Terminating the Incident - Reserved - None Required at this Level | |
| | **TOTAL RECOMMENDED HOURS** | **8** |

| **Mission Specific – Product Control*** | | |
|---|---|---|
| **SECTION** | **SUBJECT** | **RECOMMENDED HOURS** |

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

| | | |
|---|---|---|
| 603-6.6 | Mission Specific Competencies: Product Control | |
| 603-6.6.1 | General - Introduction - Laws, Regulations, and National Consensus Standards | 1 |
| 603-6.6.2 | Analyzing the Incident - Reserved - None Required at this Level | |
| 603-6.6.3 | Planning the Response | 2 |
| 603-6.6.4 | Implementing the Planned Response | 5 |
| 603-6.6.5 | Evaluating Progress - Reserved - None Required at this Level | |
| 603-6.6.6 | Terminating the Incident - Reserved - None Required at this Level | |
| | **TOTAL RECOMMENDED HOURS** | **8** |

| **Mission Specific - Air Monitoring and Sampling** | | |
|---|---|---|
| **SECTION** | **SUBJECT** | **RECOMMENDED HOURS** |
| 603-6.7 | Mission Specific Competencies: Air Monitoring and Sampling | |
| 603-6.7.1 | General - Introduction - Laws, Regulations, and National Consensus Standards | 1 |
| 603-6.7.2 | Analyzing the Incident - Reserved - None Required at this Level | |
| 603-6.7.3 | Planning the Response | 4 |
| 603-6.7.4 | Implementing the Planned Response | 3 |
| 603-6.7.5 | Evaluating Progress - Reserved - None Required at this Level | |
| 603-6.7.6 | Terminating the Incident - Reserved - None Required at this Level | |
| | **TOTAL RECOMMENDED HOURS** | **8** |

| **Mission Specific – Victim Rescue and Recovery** | | |
|---|---|---|
| **SECTION** | **SUBJECT** | **RECOMMENDED HOURS** |
| 603-6.8 | Mission Specific Competencies: Victim Rescue and Recovery | |
| 603-6.8.1 | General - Introduction - Laws, Regulations, and National Consensus Standards | 1 |
| 603-6.8.2 | Analyzing the Incident - Reserved - None Required at this Level | |
| 603-6.8.3 | Planning the Response | 3 |
| 603-6.8.4 | Implementing the Planned Response | 4 |
| 603-6.8.5 | Evaluating Progress - Reserved - None Required at this Level | |
| 603-6.8.6 | Terminating the Incident - Reserved - None Required at this Level | |
| | **TOTAL RECOMMENDED HOURS** | **8** |

| **Mission Specific – Response to Illicit Laboratory Incidents** | | |
|---|---|---|
| **SECTION** | **SUBJECT** | **RECOMMENDED HOURS** |
| 603-6.9 | Mission Specific Competencies: Response to Illicit Laboratory Incidents | |
| 603-6.9.1 | General - Introduction - Laws, Regulations, and National | 1 |

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

| | | |
|---|---|---|
| | Consensus Standards | |
| 603-6.9.2 | Analyzing the Incident | 4 |
| 603-6.9.3 | Planning the Response | 6 |
| 603-6.9.4 | Implementing the Planned Response | 5 |
| 603-6.9.5 | Evaluating Progress - Reserved - None Required at this Level | |
| 603-6.9.6 | Terminating the Incident - Reserved - None Required at this Level | |
| | **TOTAL RECOMMENDED HOURS** | **16** |

| **Mission Specific – Disablement/Disruption of Improvised Explosives Devices (IEDs), Improvised WMD Dispersal Devices, and Operations at Improvised Explosives Laboratories** | | |
|---|---|---|
| **SECTION** | **SUBJECT** | **RECOMMENDED HOURS** |
| 603-6.10 | Mission Specific Competencies: Disablement/Disruption of Improvised Explosives Devices (IEDs), Improvised WMD Dispersal Devices, and Operations at Improvised Explosives Laboratories | |
| 603-6.10.1 | General - Introduction - Laws, Regulations, and National Consensus Standards | 1 |
| 603-6.10.2 | Analyzing the Incident | 4 |
| 603-6.10.3 | Planning the Response | 6 |
| 603-6.10.4 | Implementing the Planned Response | 5 |
| 603-6.10.5 | Evaluating Progress - Reserved - None Required at this Level | |
| 603-6.10.6 | Terminating the Incident - Reserved - None Required at this Level | |
| | **TOTAL RECOMMENDED HOURS** | **16** |

The recommended hours include time for skills evaluation and are based on 12 students. Hours needed depend on the actual number of students.

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

# *SECTION 603*

## *HAZARDOUS MATERIALS OPERATIONS*

## *MISSION SPECIFIC COMPETENCIES*

**Hazardous Materials Operations – Mission Specific Competencies are <u>optional</u> job performance requirements (JPRs) which <u>may</u> be adopted by the authority having jurisdiction (AHJ). These JPRs <u>may</u> be adopted in whole or in part for the Operations Level Responders to perform.**

Hazardous Materials Operations Level Responders trained to perform Mission Specific Competencies must first master all the job performance requirements and knowledge, skills and abilities pertaining to:

- Awareness Level Personnel, and
- Operations Level Responders.

The Operations Level Responder may be required to perform any combination of the following Operations level mission specific tasks by the authority having jurisdiction (AHJ):

- Use personal protective equipment, as provided by the AHJ
- Perform technical decontamination
- Perform mass decontamination
- Perform product control
- Perform air monitoring and sampling
- Perform victim rescue and recovery operations
- Evidence preservation and sampling
- Respond to illicit laboratory incidents

Operations level mission specific tasks must be performed under the supervision and guidance of a hazardous materials technician, allied professional or established standard operating procedure.

**In order to successfully complete the Texas Commission on Fire Protection's Basic Structure Firefighter curriculum, all the job performance requirements and knowledge, skills and abilities must be mastered pertaining to:**

- **Awareness Level Personnel**
- **Operations Level Responders, and**
- **Hazardous Materials Operations Level – Mission Specific Competencies of:**
  - **Personal Protective Equipment**
  - **Product Control**

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

**This is in accordance with the competency requirements of *NFPA 1001: Standard for Fire Fighter Professional Qualifications* 2013 Ed., the *TCFP Standards Manual* and the *TCFP Curriculum Manual*.**

## ***603-6.1*** ***General***

### ***603-6.1.1*** ***Introduction***

**603-6.1.1.1** This chapter shall address competencies for the following operations level responders assigned mission-specific responsibilities at hazardous materials/WMD incidents by the authority having jurisdiction beyond the core competencies at the operations level (Section 602):

1. Operations level responders assigned to use personal protective equipment
2. Operations level responders assigned to perform mass decontamination
3. Operations level responders assigned to perform technical decontamination
4. Operations level responders assigned to perform evidence preservation and sampling
5. Operations level responders assigned to perform product control
6. Operations level responders assigned to perform air monitoring and sampling
7. Operations level responders assigned to perform victim rescue/recovery
8. Operations level responders assigned to respond to illicit laboratory incidents
9. Operational level responders assigned to perform disablement/disruption of improvised explosives devices (IED), improvised WMD dispersal devices, and operations at improvised explosive laboratories.

**603-6.1.1.2** The operations level responder who is assigned mission-specific responsibilities at hazardous materials/WMD incidents shall be trained to meet all competencies at the awareness level (Section 601), all core competencies at the operations level (Section 602), and all competencies for the assigned responsibilities in the applicable section(s) in this chapter.

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

**603-6.1.1.3** The operations level responder who is assigned mission-specific responsibilities at hazardous materials/WMD incidents shall receive additional training to meet applicable governmental occupational health and safety regulations.

**603-6.1.1.4** The operations level responder who is 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.

**603-6.1.1.5** The development of assigned mission-specific knowledge and skills shall be based on the tools, equipment, and procedures provided by the AHJ for the mission-specific responsibilities assigned.

***603-6.1.2*** ***Goal***

The goal of the competencies in this chapter shall be to provide the operations level responder assigned mission-specific responsibilities at hazardous materials/WMD incidents by the AHJ with the knowledge and skills to perform the assigned mission-specific responsibilities safely and effectively.

***603-6.1.3*** ***Mandating of Competencies***

This standard shall not mandate that the response organizations perform mission-specific responsibilities.

**603-6.1.3.1** Operations level responders assigned mission-specific responsibilities at hazardous materials/WMD incidents, operating within the scope of their training in this chapter, shall be able to perform their assigned mission-specific responsibilities.

**603-6.1.3.2** If a response organization desires to train some or all of its operations level responders to perform mission-specific responsibilities at hazardous materials/WMD incidents, the minimum required competencies shall be as set out in this chapter.

***603-6.2*** ***Mission-Specific Competencies: Personal Protective Equipment***

***603-6.2.1*** ***General***

***603-6.2.1.1*** ***Introduction***

**603-6.2.1.1.1** The operations level responder assigned to use personal protective equipment shall be that person, competent at the operations level, who is assigned to use personal protective equipment at hazardous materials/WMD incidents.

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

**603-6.2.1.1.2** The operations level responder assigned to use personal protective equipment at hazardous materials/WMD incidents shall be trained to meet all competencies at the awareness level (Section 601), all core competencies at the operations level (Section 602), and all competencies in this section.

**603-6.2.1.1.3** The operations level responder assigned to use personal protective equipment at hazardous materials/WMD incidents shall operate under the guidance of a hazardous materials technician, an allied professional, or standard operating procedures.

**603-6.2.1.1.4** The operations level responder assigned to use personal protective equipment shall receive the additional training necessary to meet specific needs of the jurisdiction.

***603-6.2.1.2*** ***Goal***

The goal of the competencies in this section shall be to provide the operations level responder assigned to use personal protective equipment with the knowledge and skills to perform the following tasks safely and effectively:

1. Plan a response within the capabilities of personal protective equipment provided by the AHJ in order to perform mission specific tasks assigned.

2. Implement the planned response consistent with the standard operating procedures and site safety and control plan by donning, working in, and doffing personal protective equipment provided by the AHJ.

3. Terminate the incident by completing the reports and documentation pertaining to personal protective equipment.

***603-6.2.2*** ***Competencies — Analyzing the Incident (Reserved)***

***603-6.2.3*** ***Competencies — Planning the Response***

***603-6.2.3.1*** ***Selecting Personal Protective Equipment***

Given scenarios involving hazardous materials/WMD incidents with known and unknown hazardous materials/WMD, and the personal protective equipment provided by the AHJ, the operations level responder assigned to use personal protective equipment shall select the personal protective equipment required to support mission-specific tasks at hazardous materials/WMD incidents based on local procedures by completing the following requirements:

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

1. Describe the types of personal protective equipment that are available for response based on NFPA standards and how these items relate to EPA levels of protection.

2. Describe personal protective equipment options for the following hazards:
    a. Thermal
    b. Radiological
    c. Asphyxiating
    d. Chemical
    e. Etiological/biological
    f. Mechanical

3. Select personal protective equipment for mission-specific tasks at hazardous materials/WMD incidents based on local procedures.
    a. Describe the following terms and explain their impact and significance on the selection of chemical-protective clothing:
        i. Degradation
        ii. Penetration
        iii. Permeation
    b. Identify at least three indications of material degradation of chemical-protective clothing.
    c. Identify the different designs of vapor-protective and splash-protective clothing and describe the advantages and disadvantages of each type.
    d. Identify the relative advantages and disadvantages of the following heat exchange units used for the cooling of personnel operating in personal protective equipment:
        i. Air cooled
        ii. Ice cooled
        iii. Water cooled
        iv. Phase change cooling technology
    e. Identify the physiological and psychological stresses that can affect users of personal protective equipment.
    f. Describe local procedures for going through the technical decontamination process.

## ***603-6.2.4 Competencies — Implementing the Planned Response***

### ***603-6.2.4.1 Using Protective Clothing and Respiratory Protection***

Given the personal protective equipment provided by the AHJ, the operations level responder assigned to use personal protective equipment shall demonstrate the ability to don, work in, and doff the equipment provided to support mission-specific tasks by completing the following requirements:

1. Describe at least three safety procedures for personnel wearing protective clothing.

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

2. Describe at least three emergency procedures for personnel wearing protective clothing.

3. Demonstrate the ability to don, work in, and doff personal protective equipment provided by the AHJ.

4. Demonstrate local procedures for responders undergoing the technical decontamination process.

5. Describe the maintenance, testing, inspection, storage, and documentation procedures for personal protective equipment provided by the AHJ according to the manufacturer's specifications and recommendations.

***603-6.2.5*** ***Competencies — Terminating the Incident***

***603-6.2.5.1*** ***Reporting and Documenting the Incident***

Given a scenario involving a hazardous materials/WMD incident, the operations level responder assigned to use personal protective equipment shall document use of the personal protective equipment by completing the documentation requirements of the emergency response plan or standard operating procedures regarding personal protective equipment.

***603-6.3*** ***Mission-Specific Competencies: Mass Decontamination***

***603-6.3.1*** ***General***

***603-6.3.1.1*** ***Introduction***

**603-6.3.1.1.1** The operations level responder assigned to perform mass decontamination at hazardous materials/WMD incidents shall be that person, competent at the operations level, who is assigned to implement mass decontamination operations at hazardous materials/WMD incidents.

**603-6.3.1.1.2** The operations level responder assigned to perform mass decontamination at hazardous materials/WMD incidents shall be trained to meet all competencies at the awareness level (Section 601), all core competencies at the operations level (Section 602), all mission-specific competencies for personal protective equipment (Section 603-6.2), and all competencies in this section.

**603-6.3.1.1.3** The operations level responder assigned to perform mass decontamination at hazardous materials/WMD incidents shall operate under the guidance of a hazardous materials technician, an allied professional, or standard operating procedures.

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

**603-6.3.1.1.4** The operations level responder assigned to perform mass decontamination at hazardous materials/WMD incidents shall receive the additional training necessary to meet specific needs of the jurisdiction.

***603-6.3.1.2*** ***Goal***

**603-6.3.1.2.1** The goal of the competencies in this section shall be to provide the operations level responder assigned to perform mass decontamination at hazardous materials/WMD incidents with the knowledge and skills to perform the tasks in 6.3.1.2.2 safely and effectively.

**603-6.3.1.2.2** When responding to hazardous materials/WMD incidents, the operations level responder assigned to perform mass decontamination shall be able to perform the following tasks:

1. Plan a response within the capabilities of available personnel, personal protective equipment, and control equipment by selecting a mass decontamination process to minimize the hazard.

2. Implement the planned response to favorably change the outcomes consistent with standard operating procedures and the site safety and control plan by completing the following tasks:
    a. Perform the decontamination duties as assigned.
    b. Perform the mass decontamination functions identified in the incident action plan.

3. Evaluate the progress of the planned response by evaluating the effectiveness of the mass decontamination process.

4. Terminate the incident by providing reports and documentation of decontamination operations.

***603-6.3.2*** ***Competencies — Analyzing the Incident (Reserved)***

***603-6.3.3*** ***Competencies — Planning the Response***

***603-6.3.3.1*** ***Selecting Personal Protective Equipment***
Given an emergency response plan or standard operating procedures and the personal protective equipment provided by the AHJ, the operations level responder assigned to mass decontamination shall select the personal protective equipment required to support mass decontamination at hazardous materials/WMD incidents based on local procedures *(see Section 603-6.2*).

***603-6.3.3.2*** ***Selecting Decontamination Procedures***
Given scenarios involving hazardous materials/WMD incidents, the operations level responder assigned to mass decontamination operations shall select a mass decontamination procedure that will minimize the hazard

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

and spread of contamination, determine the equipment required to implement that procedure, and meet the following requirements:

1. Identify the advantages and limitations of mass decontamination operations.

2. Describe the advantages and limitations of each of the following mass decontamination methods:
   a. Dilution
   b. Isolation
   c. Washing

3. Identify sources of information for determining the correct mass decontamination procedure and identify how to access those resources in a hazardous materials/WMD incident.

4. Given resources provided by the AHJ, identify the supplies and equipment required to set up and implement mass decontamination operations.

5. Identify procedures, equipment, and safety precautions for communicating with crowds and crowd management techniques that can be used at incidents where a large number of people might be contaminated.

**603-6.3.4** ***Competencies — Implementing the Planned Response***

**603-6.3.4.1** ***Performing Incident Management Duties***

Given a scenario involving a hazardous materials/WMD incident and the emergency response plan or standard operating procedures, the operations level responder assigned to mass decontamination operations shall demonstrate the mass decontamination duties assigned in the incident action plan by describing the local procedures for the implementation of the mass decontamination function within the incident command system.

**603-6.3.4.2** ***Performing Decontamination Operations Identified in Incident Action Plan***

The operations level responder assigned to mass decontamination operations shall demonstrate the ability to set up and implement mass decontamination operations for ambulatory and nonambulatory victims.

***603-6.3.5*** ***Competencies — Evaluating Progress***

***603-6.3.5.1*** ***Evaluating the Effectiveness of the Mass Decontamination Process***

Given examples of contaminated items that have undergone the required decontamination, the operations level responder assigned to mass decontamination operations shall identify procedures for determining whether

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

the items have been fully decontaminated according to the standard operating procedures of the AHJ or the incident action plan.

***603-6.3.6*** ***Competencies — Terminating the Incident***

***603-6.3.6.1*** ***Reporting and Documenting the Incident***

Given a scenario involving a hazardous materials/WMD incident, the operations level responder assigned to mass decontamination operations shall document the mass decontamination activities as required by the AHJ by completing the following:

1. Identify the reports and supporting documentation required by the emergency response plan or standard operating procedures.
2. Describe the importance of personnel exposure records.
3. Identify the steps in keeping an activity log and exposure records.
4. Identify the requirements for filing documents and maintaining records.

***603-6.4*** ***Mission-Specific Competencies: Technical Decontamination***

***603-6.4.1*** ***General***

***603-6.4.1.1*** ***Introduction***

**603-6.4.1.1.1** The operations level responder assigned to perform technical decontamination at hazardous materials/WMD incidents shall be that person, competent at the operations level, who is assigned to implement technical decontamination operations at hazardous materials/WMD incidents.

**603-6.4.1.1.2** The operations level responder assigned to perform technical decontamination at hazardous materials/WMD incidents shall be trained to meet all competencies at the awareness level (Section 601), all core competencies at the operations level (Section 602), all mission-specific competencies for personal protective equipment (Section 603-6.2), and all competencies in this section.

**603-6.4.1.1.3** The operations level responder assigned to perform technical decontamination at hazardous materials/WMD incidents shall operate under the guidance of a hazardous materials technician, an allied professional, or standard operating procedures.

**603-6.4.1.1.4** The operations level responder assigned to perform technical decontamination at hazardous materials/WMD incidents shall receive the additional training necessary to meet specific needs of the jurisdiction.

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

***603-6.4.1.2*** ***Goal***

**603-6.4.1.2.1** The goal of the competencies in this section shall be to provide the operations level responder assigned to perform technical decontamination at hazardous materials/WMD incidents with the knowledge and skills to perform the tasks in 6.4.1.2.2 safely and effectively.

**603-6.4.1.2.2** When responding to hazardous materials/WMD incidents, the operations level responder assigned to perform technical decontamination shall be able to perform the following tasks:

1. Plan a response within the capabilities of available personnel, personal protective equipment, and control equipment by selecting a technical decontamination process to minimize the hazard.

2. Implement the planned response to favorably change the outcomes consistent with standard operating procedures and the site safety and control plan by completing the following tasks:
    a. Perform the technical decontamination duties as assigned.
    b. Perform the technical decontamination functions identified in the incident action plan.

3. Evaluate the progress of the planned response by evaluating the effectiveness of the technical decontamination process.

4. Terminate the incident by completing the providing reports and documentation of decontamination operations.

***603-6.4.2*** ***Competencies — Analyzing the Incident (Reserved)***

***603-6.4.3*** ***Competencies — Planning the Response***

***603-6.4.3.1*** ***Selecting Personal Protective Equipment***
Given an emergency response plan or standard operating procedures and the personal protective equipment provided by the AHJ, the operations level responder assigned to technical decontamination operations shall select the personal protective equipment required to support technical decontamination at hazardous materials/WMD incidents based on local procedures *(see Section 603-6.2)*.

***603-6.4.3.2*** ***Selecting Decontamination Procedures***
Given scenarios involving hazardous materials/WMD incidents, the operations level responder assigned to technical decontamination operations shall select a technical decontamination procedure that will minimize the hazard and spread of contamination and determine the equipment required to implement that procedure by completing the following requirements:

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

1. Identify the advantages and limitations of technical decontamination operations.

2. Describe the advantages and limitations of each of the following technical decontamination methods:
   a. Absorption
   b. Adsorption
   c. Chemical degradation
   d. Dilution
   e. Disinfection
   f. Evaporation
   g. Isolation and disposal
   h. Neutralization
   i. Solidification
   j. Sterilization
   k. Vacuuming
   l. Washing

3. Identify sources of information for determining the correct technical decontamination procedure and identify how to access those resources in a hazardous materials/WMD incident.

4. Given resources provided by the AHJ, identify the supplies and equipment required to set up and implement technical decontamination operations.

5. Identify the procedures, equipment, and safety precautions for processing evidence during technical decontamination operations at hazardous materials/WMD incidents.

6. Identify procedures, equipment, and safety precautions for handling tools, equipment, weapons, criminal suspects, and law enforcement/search canines brought to the decontamination corridor at hazardous materials/WMD incidents.

### ***603-6.4.4 Competencies — Implementing the Planned Response***

#### ***603-6.4.4.1 Performing Incident Management Duties***

Given a scenario involving a hazardous materials/WMD incident and the emergency response plan or standard operating procedures, the operations level responder assigned to technical decontamination operations shall demonstrate the technical decontamination duties assigned in the incident action plan by completing the following requirements:

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

1. Identify the role of the operations level responder assigned to technical decontamination operations during hazardous materials/WMD incidents.

2. Describe the procedures for implementing technical decontamination operations within the incident command system.

***603-6.4.4.2*** ***Performing Decontamination Operations Identified in Incident Action Plan***

The responder assigned to technical decontamination operations shall demonstrate the ability to set up and implement the following types of decontamination operations:

1. Technical decontamination operations in support of entry operations

2. Technical decontamination operations for ambulatory and nonambulatory victims

***603-6.4.5*** ***Competencies — Evaluating Progress***

***603-6.4.5.1*** ***Evaluating the Effectiveness of the Technical Decontamination Process***

Given examples of contaminated items that have undergone the required decontamination, the operations level responder assigned to technical decontamination operations shall identify procedures for determining whether the items have been fully decontaminated according to the standard operating procedures of the AHJ or the incident action plan.

***603-6.4.6*** ***Competencies — Terminating the Incident***

***603-6.4.6.1*** ***Reporting and Documenting the Incident***

Given a scenario involving a hazardous materials/WMD incident, the operations level responder assigned to technical decontamination operations shall document the mass decontamination activities as required by the AHJ by completing the following:

1. Identify the reports and supporting technical documentation required by the emergency response plan or standard operating procedures.

2. Describe the importance of personnel exposure records.

3. Identify the steps in keeping an activity log and exposure records.

4. Identify the requirements for filing documents and maintaining records.

***603-6.5*** ***Mission-Specific Competencies: Evidence Preservation and Sampling***

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

***603-6.5.1*** ***General***

***603-6.5.1.1*** ***Introduction***

***603-6.5.1.1.1*** The operations level responder assigned to perform evidence preservation and sampling shall be that person, competent at the operations level, who is assigned to preserve forensic evidence, take samples, and/or seize evidence at hazardous materials/WMD incidents involving potential violations of criminal statutes or governmental regulations.

***603-6.5.1.1.2*** The operations level responder assigned to perform evidence preservation and sampling at hazardous materials/WMD incidents shall be trained to meet all competencies at the awareness level (Section 601), all core competencies at the operations level (Section 602), all mission-specific competencies for personal protective equipment (Section 603-6.2), and all competencies in this section.

***603-6.5.1.1.3*** The operations level responder assigned to perform evidence preservation and sampling at hazardous materials/WMD incidents shall operate under the guidance of a hazardous materials technician, an allied professional, or standard operating procedures.

***603-6.5.1.1.4*** The operations level responder assigned to perform evidence preservation and sampling at hazardous materials/WMD incidents shall receive the additional training necessary to meet specific needs of the jurisdiction.

***603-6.5.1.2*** ***Goal***

***603-6.5.1.2.1*** The goal of the competencies in this section shall be to provide the operations level responder assigned to evidence preservation and sampling at hazardous materials/WMD incidents with the knowledge and skills to perform the tasks in 6.5.1.2.2 safely and effectively.

***603-6.5.1.2.2*** When responding to hazardous materials/WMD incidents involving potential violations of criminal statutes or governmental regulations, the operations level responder assigned to perform evidence preservation and sampling shall be able to perform the following tasks:

1. Analyze a hazardous materials/WMD incident to determine the complexity of the problem and potential outcomes by completing the following tasks:
    a. Determine if the incident is potentially criminal in nature and identify the law enforcement agency having investigative jurisdiction.
    b. Identify unique aspects of criminal hazardous materials/WMD incidents.

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

2. Plan a response for an incident where there is potential criminal intent involving hazardous materials/WMD within the capabilities and competencies of available personnel, personal protective equipment, and control equipment by completing the following tasks:
    a. Determine the response options to conduct sampling and evidence preservation operations.
    b. Describe how the options are within the legal authorities, capabilities, and competencies of available personnel, personal protective equipment, and control equipment.

3. Implement the planned response to a hazardous materials/WMD incident involving potential violations of criminal statutes or governmental regulations by completing the following tasks under the guidance of law enforcement:
    a. Preserve forensic evidence.
    b. Take samples.
    c. Seize evidence.

### ***603-6.5.2 Competencies — Analyzing the Incident***

#### ***603-6.5.2.1 Determining If the Incident Is Potentially Criminal in Nature and Identifying the Law Enforcement Agency That Has Investigative Jurisdiction***

Given examples of hazardous materials/WMD incidents involving potential criminal intent, the operations level responder assigned to evidence preservation and sampling shall describe the potential criminal violation and identify the law enforcement agency having investigative jurisdiction by completing the following requirements:

1. Given examples of the following hazardous materials/WMD incidents, the operations level responder shall describe products that might be encountered in the incident associated with each situation:
    a. Hazardous materials/WMD suspicious letter
    b. Hazardous materials/WMD suspicious package
    c. Hazardous materials/WMD illicit laboratory
    d. Release/attack with a WMD agent
    e. Environmental crimes

2. Given examples of the following hazardous materials/WMD incidents, the operations level responder shall identify the agency(cies) with investigative authority and the incident response considerations associated with each situation:
    a. Hazardous materials/WMD suspicious letter
    b. Hazardous materials/WMD suspicious package
    c. Hazardous materials/WMD illicit laboratory
    d. Release/attack with a WMD agent
    e. Environmental crimes

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

## ***603-6.5.3 Competencies — Planning the Response***

### ***603-6.5.3.1 Identifying Unique Aspects of Criminal Hazardous Materials/WMD Incidents***

The operations level responder assigned to evidence preservation and sampling shall describe the unique aspects associated with illicit laboratories, hazardous materials/WMD incidents, and environmental crimes by completing the following requirements:

1. Given an incident involving illicit laboratories, a hazardous materials/WMD incident, or an environmental crime, the operations level responder shall perform the following tasks:
    a. Describe the procedure for securing the scene and characterizing and preserving evidence at the scene.
    b. Describe the procedure to document personnel and scene activities associated with the incident.
    c. Describe the procedure to determine whether the operations level responders are within their legal authority to perform evidence preservation and sampling tasks.
    d. Describe the procedure to notify the agency with investigative authority.
    e. Describe the procedure to notify the explosive ordnance disposal (EOD) personnel.
    f. Identify potential sample/evidence.
    g. Identify the applicable sampling equipment.
    h. Describe the procedures to protect samples and evidence from secondary contamination.
    i. Describe documentation procedures.
    j. Describe evidentiary sampling techniques.
    k. Describe field screening protocols for collected samples and evidence.
    l. Describe evidence labeling and packaging procedures.
    m. Describe evidence decontamination procedures.
    n. Describe evidence packaging procedures for evidence transportation.
    o. Describe chain-of-custody procedures.

2. Given an example of an illicit laboratory, the operations level responder assigned to evidence preservation and sampling shall be able to perform the following tasks:
    a. Describe the hazards, safety procedures, decontamination, and tactical guidelines for this type of incident.
    b. Describe the factors to be evaluated in selecting the personal protective equipment, sampling equipment, detection devices, and sample and evidence packaging and transport containers.

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

c. Describe the sampling options associated with liquid and solid sample and evidence collection.
d. Describe the field screening protocols for collected samples and evidence.

3. Given an example of an environmental crime, the operations level responder assigned to evidence preservation and sampling shall be able to perform the following tasks:
   a. Describe the hazards, safety procedures, decontamination, and tactical guidelines for this type of incident.
   b. Describe the factors to be evaluated in selecting the personal protective equipment, sampling equipment, detection devices, and sample and evidence packaging and transport containers.
   c. Describe the sampling options associated with the collection of liquid and solid samples and evidence.
   d. Describe the field screening protocols for collected samples and evidence.

4. Given an example of a hazardous materials/WMD suspicious letter, the operations level responder assigned to evidence preservation and sampling shall be able to perform the following tasks:
   a. Describe the hazards, safety procedures, decontamination, and tactical guidelines for this type of incident.
   b. Describe the factors to be evaluated in selecting the personal protective equipment, sampling equipment, detection devices, and sample and evidence packaging and transport containers.
   c. Describe the sampling options associated with the collection of liquid and solid samples and evidence.
   d. Describe the field screening protocols for collected samples and evidence.

5. Given an example of a hazardous materials/WMD suspicious package, the operations level responder assigned to evidence preservation and sampling shall be able to perform the following tasks:
   a. Describe the hazards, safety procedures, decontamination, and tactical guidelines for this type of incident.
   b. Describe the factors to be evaluated in selecting the personal protective equipment, sampling equipment, detection devices, and sample and evidence packaging and transport containers.
   c. Describe the sampling options associated with liquid and solid sample/evidence collection.
   d. Describe the field screening protocols for collected samples and evidence.

6. Given an example of a release/attack involving a hazardous material/WMD agent, the operations level responder assigned to

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

evidence preservation and sampling shall be able to perform the following tasks:

a. Describe the hazards, safety procedures, decontamination and tactical guidelines for this type of incident.
b. Describe the factors to be evaluated in selecting the personal protective equipment, sampling equipment, detection devices, and sample and evidence packaging and transport containers.
c. Describe the sampling options associated with the collection of liquid and solid samples and evidence.
d. Describe the field screening protocols for collected samples and evidence.

7. Given examples of different types of potential criminal hazardous materials/WMD incidents, the operations level responder shall identify and describe the application, use, and limitations of the various types field screening tools that can be utilized for screening the following:
   a. Corrosivity
   b. Flammability
   c. Oxidation
   d. Radioactivity
   e. Volatile organic compounds (VOC)

8. Describe the potential adverse impact of using destructive field screening techniques.

9. Describe the procedures for maintaining the evidentiary integrity of any item removed from the crime scene.

***603-6.5.3.2*** ***Selecting Personal Protective Equipment***

Given the personal protective equipment provided by the AHJ, the operations level responder assigned to evidence preservation and sampling shall select the personal protective equipment required to support evidence preservation and sampling at hazardous materials/WMD incidents based on local procedures *(see Section 603-6.2)*.

***603-6.5.4*** ***Competencies — Implementing the Planned Response***

***603-6.5.4.1*** ***Implementing the Planned Response***

Given the incident action plan for a criminal incident involving hazardous materials/WMD, the operations level responder assigned to evidence preservation and sampling shall implement selected response actions consistent with the emergency response plan or standard operating procedures by completing the following requirements:

1. Demonstrate how to secure the scene and characterize and preserve evidence at the scene.

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

2. Document personnel and scene activities associated with the incident.

3. Determine whether responders are within their legal authority to perform evidence collection and sampling tasks.

4. Describe the procedure to notify the agency with investigative authority.

5. Notify the EOD personnel.

6. Identify potential samples and evidence to be collected.

7. Demonstrate procedures to protect samples and evidence from secondary contamination.

8. Demonstrate correct techniques to collect samples utilizing the equipment provided.

9. Demonstrate documentation procedures.

10. Demonstrate sampling protocols.

11. Demonstrate field screening protocols for samples and evidence collected.

12. Demonstrate evidence/sample labeling and packaging procedures.

13. Demonstrate evidence/sample decontamination procedures.

14. Demonstrate evidence/sample packaging procedures for evidence transportation.

15. Describe chain of custody procedures for evidence/sample preservation.

***603-6.5.4.2*** The operations level responder assigned to evidence preservation and sampling shall describe local procedures for the technical decontamination process.

***603-6.5.5*** ***Competencies — Implementing the Planned Response (Reserved)***

***603-6.5.6*** ***Competencies — Terminating the Incident (Reserved)***

***603-6.6*** ***Mission-Specific Competencies: Product Control***

***603-6.6.1*** ***General***

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

***603-6.6.1.1*** ***Introduction***

***603-6.6.1.1.1*** The operations level responder assigned to perform product control shall be that person, competent at the operations level, who is assigned to implement product control measures at hazardous materials/WMD incidents.

***603-6.6.1.1.2*** The operations level responder assigned to perform product control at hazardous materials/WMD incidents shall be trained to meet all competencies at the awareness level (Section 601), all core competencies at the operations level (Section 602), all mission-specific competencies for personal protective equipment (Section 603-6.2), and all competencies in this section.

***603-6.6.1.1.3*** The operations level responder assigned to perform product control at hazardous materials/WMD incidents shall operate under the guidance of a hazardous materials technician, an allied professional, or standard operating procedures.

***603-6.6.1.1.4*** The operations level responder assigned to perform product control at hazardous materials/WMD incidents shall receive the additional training necessary to meet specific needs of the jurisdiction.

***603-6.6.1.2*** ***Goal***

***603-6.6.1.2.1*** The goal of the competencies in this section shall be to provide the operations level responder assigned to product control at hazardous materials/WMD incidents with the knowledge and skills to perform the tasks in 6.6.1.2.2 safely and effectively.

***603-6.6.1.2.2*** When responding to hazardous materials/WMD incidents, the operations level responder assigned to perform product control shall be able to perform the following tasks:

1. Plan an initial response within the capabilities and competencies of available personnel, personal protective equipment, and control equipment and in accordance with the emergency response plan or standard operating procedures by completing the following tasks:
    a. Describe the control options available to the operations level responder.
    b. Describe the control options available for flammable liquid and flammable gas incidents.

2. Implement the planned response to a hazardous materials/WMD incident.

***603-6.6.2*** ***Competencies — Analyzing the Incident (Reserved)***

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

### ***603-6.6.3 Competencies — Planning the Response***

#### ***603-6.6.3.1 Identifying Control Options***

Given examples of hazardous materials/WMD incidents, the operations level responder assigned to perform product control shall identify the options for each response objective by completing the following requirements as prescribed by the AHJ:

1. Identify the options to accomplish a given response objective.

2. Identify the purpose for and the procedures, equipment, and safety precautions associated with each of the following control techniques:
    a. Absorption
    b. Adsorption
    c. Damming
    d. Diking
    e. Dilution
    f. Diversion
    g. Remote valve shutoff
    h. Retention
    i. Vapor dispersion
    j. Vapor suppression

#### ***603-6.6.3.2 Selecting Personal Protective Equipment***

Given the personal protective equipment provided by the AHJ, the operations level responder assigned to perform product control shall select the personal protective equipment required to support product control at hazardous materials/WMD incidents based on local procedures *(see Section 603-6.2)*.

### ***603-6.6.4 Competencies — Implementing the Planned Response***

#### ***603-6.6.4.1 Performing Control Options***

Given an incident action plan for a hazardous materials/WMD incident, within the capabilities and equipment provided by the AHJ, the operations level responder assigned to perform product control shall demonstrate control functions set out in the plan by completing the following requirements as prescribed by the AHJ:

1. Using the type of special purpose or hazard suppressing foams or agents and foam equipment furnished by the AHJ, demonstrate the application of the foam(s) or agent(s) on a spill or fire involving hazardous materials/WMD.

2. Identify the characteristics and applicability of the following Class B foams if supplied by the AHJ:
    a. Aqueous film-forming foam (AFFF)
    b. Alcohol-resistant concentrates

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

c. Fluoroprotein
d. High-expansion foam

3. Given the required tools and equipment, demonstrate how to perform the following control activities:
   a. Absorption
   b. Adsorption
   c. Damming
   d. Diking
   e. Dilution
   f. Diversion
   g. Retention
   h. Remote valve shutoff
   i. Vapor dispersion
   j. Vapor suppression

4. Identify the location and describe the use of emergency remote shutoff devices on MC/DOT-306/406, MC/DOT-307/407, and MC-331 cargo tanks containing flammable liquids or gases.

5. Describe the use of emergency remote shutoff devices at fixed facilities.

**603-6.6.4.2** The operations level responder assigned to perform product control shall describe local procedures for going through the technical decontamination process.

***603-6.6.5*** ***Competencies — Evaluating Progress (Reserved)***

***603-6.6.6*** ***Competencies — Terminating the Incident.(Reserved)***

***603-6.7*** ***Mission-Specific Competencies: Air Monitoring and Sampling***

***603-6.7.1*** ***General***

***603-6.7.1.1*** ***Introduction***

***603-6.7.1.1.1*** The operations level responder assigned to perform air monitoring and sampling shall be that person, competent at the operations level, who is assigned to implement air monitoring and sampling operations at hazardous materials/WMD incidents.

**603-6.7.1.1.2** The operations level responder assigned to perform air monitoring and sampling at hazardous materials/WMD incidents shall be trained to meet all competencies at the awareness level (Section 601), all core competencies at

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

the operations level (Section 602), all mission-specific competencies for personal protective equipment (Section 603-6.2), and all competencies in this section.

**603-6.7.1.1.3** The operations level responder assigned to perform air monitoring and sampling at hazardous materials/WMD incidents shall operate under the guidance of a hazardous materials technician, an allied professional, or standard operating procedures.

1. Direct guidance: operations level responder working under the control of a hazardous material technician or allied professional who can:
    a. Continually assess and/or observe their actions
    b. Provide immediate feedback

2. Written guidance: standard operating procedures or “rules of engagement” that emphasize:
    a. Task expected operations level responders
    b. Task beyond the capability of operations level responders
    c. Required PPE and other equipment to perform the expected task
    d. Procedures for ensuring coordination within the ICS

**603-6.7.1.1.4** The operations level responder assigned to perform air monitoring and sampling at hazardous materials/WMD incidents shall receive the additional training necessary to meet specific needs of the jurisdiction.

1. Monitoring and detection equipment may include:
    a. Carbon monoxide meter
    b. Colorimetric tubes
    c. Combustible gas indicator
    d. Oxygen meter
    e. Passive dosimeters
    f. pH indicators and/or pH meters
    g. Photoionization and/or flame ionization detectors
    h. Radiation detection instruments
    i. Reagents
    j. Test strips
    k. WMD detectors (chemical and/or biological)
    l. Other equipment provided by the AHJ

2. Evidence sampling and collection equipment is addressed in Section 603-6.5

3. Sampling equipment that may be used by operations trained responders may be required by the AHJ may include but is not limited to:

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

a. Any tool designated to remove liquid or solid product from a container for the purpose of environmental sampling and testing
b. Any container suitable for the collection of a liquid or solid sample based on the type and quantity

***603-6.7.1.2*** ***Goal***

**603-6.7.1.2.1** The goal of the competencies in this section shall be to provide the operations level responder assigned to air monitoring and sampling at hazardous materials/WMD incidents with the knowledge and skills to perform the tasks in 6.7.1.2.2 safely and effectively.

**603-6.7.1.2.2** When responding to hazardous materials/WMD incidents, the operations level responder assigned to perform air monitoring and sampling shall be able to perform the following tasks:

1. Plan the air monitoring and sampling activities within the capabilities and competencies of available personnel, personal protective equipment, and control equipment and in accordance with the emergency response plan or standard operating procedures describe the air monitoring and sampling options available to the operations level responder.

2. Implement the air monitoring and sampling activities as specified in the incident action plan.

***603-6.7.2*** ***Competencies – Analyzing the Incident (Reserved)***

***603-6.7.3*** ***Competencies – Planning the Response***

**603-6.7.3.1** Given the air monitoring and sampling equipment provided by the AHJ, the operations level responder assigned to perform air monitoring and sampling shall select the detection or monitoring equipment suitable for detecting or monitoring solid, liquid, or gaseous hazardous materials/WMD.

**603-6.7.3.2** Given detection and monitoring device(s) provided by the AHJ, the operations level responder assigned to perform air monitoring and sampling shall describe the operation, capabilities and limitations, local monitoring procedures, field testing, and maintenance procedures associated with each device.

***603-6.7.3.3*** ***Selecting Personal Protective Equipment (PPE)***
Given the PPE provided by the AHJ, the operations level responder assigned to perform air monitoring and sampling shall select the personal protective equipment required to support air monitoring and sampling at hazardous materials/WMD incidents based on local procedures (*see Section 603-6.2*).

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

***603-6.7.3.4*** ***Selecting Personal Protective Equipment***

The operations level responder assigned to perform air monitoring and sampling shall select the personal protective equipment required to support air monitoring and sampling at hazardous materials/WMD incidents based on local procedures *(see Section 603-6.2).*

***603-6.7.4*** ***Competencies – Implementing the Planned Response***

**603-6.7.4.1** Given a scenario involving hazardous materials/WMD and detection and monitoring devices provided by the AHJ, the operations level responder assigned to perform air monitoring and sampling shall demonstrate the field test and operation of each device and interpret the readings based on local procedures.

1. Personnel must be able to identify:
    a. Solids
    b. Liquids
    c. Gases

2. Hazards need to be identified based on:
    a. Corrosivity
    b. Flammability
    c. Oxygen concentration
    d. Radioactivity
    e. Toxicity
    f. Pathogenicity

3. Monitoring and detection equipment may include:
    a. Carbon monoxide meter
    b. Colorimetric tubes
    c. Combustible gas indicator
    d. Oxygen meter
    e. Passive dosimeters
    f. pH indicators and/or pH meters
    g. Photoionization and/or flame ionization detectors
    h. Radiation detection instruments
    i. Reagents
    j. Test strips
    k. WMD detectors (chemical and/or biological)
    l. Other equipment provided by the AHJ

**603-6.7.4.2** The operations level responder assigned to perform air monitoring and sampling shall describe local procedures for decontamination of themselves and their detection and monitoring devices upon completion of the air monitoring mission.

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

### ***603-6.7.5 Competencies – Evaluating Progress (Reserved)***

### ***603-6.7.6 Competencies – Terminating the Incident (Reserved)***

## ***603-6.8 Mission-Specific Competencies: Victim Rescue and Recovery***

### ***603-6.8.1 General***

#### ***603-6.8.1.1 Introduction***

**603-6.8.1.1.1** The operations level responder assigned to perform victim rescue and recovery shall be that person, competent at the operations level, who is assigned to rescue and recover exposed and contaminated victims at hazardous materials/WMD incidents.

**603-6.8.1.1.2** The operations level responder assigned to perform victim rescue and recovery at hazardous materials/WMD incidents shall be trained to meet all competencies at the awareness level (Section 601), all core competencies at the operations level (Section 602), all mission-specific competencies for personal protective equipment (Section 603-6.2), and all competencies in this section.

**603-6.8.1.1.3** The operations level responder assigned to perform victim rescue and recovery at hazardous materials/WMD incidents shall operate under the guidance of a hazardous materials technician, an allied professional, or standard operating procedures.

1. Direct guidance: operations level responder working under the control of a hazardous materials technician or allied professional who can:
    a. Continually assess and/or observe their actions
    b. Provide immediate feedback

2. Written guidance: standard operating procedures or “rules of engagement” that emphasize:
    a. Task expected operations level responders
    b. Task beyond the capability of operations level responders
    c. Required PPE and other equipment to perform the expected task
    d. Procedures for ensuring coordination within the ICS

**603-6.8.1.1.4** The operations level responder assigned to perform victim rescue and recovery at hazardous materials/WMD incidents shall receive the additional training necessary to meet specific needs of the jurisdiction.

#### ***603-6.8.1.2 Goal***

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

**603-6.8.1.2.1** The goal of the competencies in this section shall be to provide the operations level responder assigned victim rescue and recovery at hazardous materials/WMD incidents with the knowledge and skills to perform the tasks in 6.8.1.2.2 safely and effectively.

**603-6.8.1.2.2** When responding to hazardous materials/WMD incidents, the operations level responder assigned to perform victim rescue and recovery shall be able to perform the following tasks:

1. Plan a response for victim rescue and recovery operations involving the release of hazardous materials/WMD agent within the capabilities of available personnel and personal protective equipment.

2. Implement the planned response to accomplish victim rescue and recovery operations within the capabilities of available personnel and personal protective equipment.

***603-6.8.2*** ***Competencies – Analyzing the Incident (Reserved)***

***603-6.8.3*** ***Competencies – Planning the Response***

**603-6.8.3.1** Given scenarios involving hazardous materials/WMD incidents, the operations level responder assigned to victim rescue and recovery shall determine the feasibility of conducting victim rescue and recovery operations at an incident involving a hazardous material/WMD and shall be able to perform the following tasks:

1. Determine the feasibility of conducting rescue and recovery operations.

2. Describe the safety procedures, tactical guidelines, and incident response considerations to effect a rescue associated with each of the following situations:
    a. Line-of-sight with ambulatory victims
    b. Line-of-sight with nonambulatory victims
    c. Non-line-of-sight with ambulatory victims
    d. Non-line-of-sight with nonambulatory victims
    e. Victim rescue operations versus victim recovery operations
        i. Additional victim rescue hazard considerations include:
            a) Hostile human threats
            b) Improvised explosive devices (IEDs)
            c) Agent type and possible harm
        ii. Operational considerations may include:
            a) The emergency responders will enter potentially contaminated areas only to perform rescue of known live victims or to perform rescue of

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

known live victims or to perform an immediate reconnaissance to determine if live victims exist

b) Emergency responders will immediately exit any area where they encounter evidence of chemical contamination and cannot identify any living victims
c) Emergency responders will avoid contact with any unidentified materials
d) Emergency responders and rescued victims will undergo an emergency decontamination immediately upon exit from the potentially hazardous area
e) Immediate medical assistance such as that provided by EMS providers is immediately available
f) Emergency responders, when finding conditions in excess of immediately dangerous to life or health (IDLH) should attempt to change the environment (ventilation, vapor dispersion/suppression, etc.) to enable others to respond to assist
g) While reducing the hazards to create a safer environment in which to operate is always a good work practice, it is essential when performing victim recovery

3. Determine if the options are within the capabilities of available personnel and personal protective equipment.

4. Describe the procedures for implementing victim rescue and recovery operations within the incident command system.

***603-6.8.3.2*** ***Selecting Personal Protective Equipment (PPE)***

Given the PPE provided by the AHJ, the operations level responder assigned to perform victim rescue and recovery shall select the personal protective equipment required to support victim rescue and recovery at hazardous materials/WMD incidents based on local procedures *(see Section 603-6.2).*

***603-6.8.4*** ***Competencies – Implementing the Planned Response***

**603-6.8.4.1** Given a scenario involving a hazardous material/WMD, the operations level responder assigned to victim rescue and recovery shall perform the following tasks:

1. Identify the different team positions and describe their main functions.

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

2. Select and use specialized rescue equipment and procedures provided by the AHJ to support victim rescue and recovery operations.

3. Demonstrate safe and effective methods for victim rescue and recovery.

4. Demonstrate the ability to triage victims.

5. Describe local procedures for performing decontamination upon completion of the victim rescue and removal mission.

***603-6.8.5*** ***Competencies – Evaluating Progress (Reserved)***

***603-6.8.6*** ***Competencies – Terminating the Incident (Reserved)***

***603-6.9*** ***Mission-Specific Competencies: Response to Illicit Laboratory Incidents***

***603-6.9.1*** ***General***

***603-6.9.1.1*** ***Introduction***

**603-6.9.1.1.1** The operations level responder assigned to respond to illicit laboratory incidents shall be that person, competent at the operations level, who, at hazardous materials/WMD incidents involving potential violations of criminal statutes specific to the illegal manufacture of methamphetamines, other drugs, or WMD, is assigned to secure the scene, identify the laboratory or process, and preserve evidence at hazardous materials/WMD incidents involving potential violations of criminal statutes specific to the illegal manufacture of methamphetamines, other drugs, or WMD.

**603-6.9.1.1.2** The operations level responder who responds to illicit laboratory incidents shall be trained to meet all competencies at the awareness level (Section 601), all core competencies at the operations level (Section 602), all mission-specific competencies for personal protective equipment (Section 603-6.2), and all competencies in this section.

**603-6.9.1.1.3** The operations level responder who responds to illicit laboratory incidents shall operate under the guidance of a hazardous materials technician, an allied professional, or standard operating procedures.

1. Direct guidance: operations level responder working under the control of a hazardous material technician or allied professional who can:
    a. Continually assess and/or observe their actions
    b. Provide immediate feedback

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

2. Written guidance: standard operating procedures or "rules of engagement" that emphasize:
    a. Task expected operations level responders
    b. Task beyond the capability of operations level responders
    c. Required PPE and other equipment to perform the expected task
    d. Procedures for ensuring coordination within the ICS

**603-6.9.1.1.4** The operations level responder who responds to illicit laboratory incidents shall receive the additional training necessary to meet specific needs of the jurisdiction.

***603-6.9.1.2*** ***Goal***

**603-6.9.1.2.1** The goal of the competencies in this section shall be to provide the operations level responder assigned to respond to illicit laboratory incidents with the knowledge and skills to perform the tasks in 6.9.1.2.2 safely and effectively.

**603-6.9.1.2.2** When responding to hazardous materials/WMD incidents, the operations level responder assigned to respond to illicit laboratory incidents shall be able to perform the following tasks:

1. Analyze a hazardous materials/WMD incident to determine the complexity of the problem and potential outcomes and whether the incident is potentially a criminal illicit laboratory operation.

2. Plan a response for a hazardous materials/WMD incident involving potential illicit laboratory operations in compliance with evidence preservation operations within the capabilities and competencies of available personnel, personal protective equipment, and control equipment after notifying the responsible law enforcement agencies of the problem.

3. Implement the planned response to a hazardous materials/WMD incident involving potential illicit laboratory operations utilizing applicable evidence preservation guidelines.

***603-6.9.2*** ***Competencies – Analyzing the Incident***

***603-6.9.2.1*** ***Determining if a Hazardous Materials/WMD Incident is an Illicit Laboratory Operation***

Given examples of hazardous materials/WMD incidents involving illicit laboratory operations, the operations level responder assigned to respond to illicit laboratory incidents shall identify the potential drugs/WMD being manufactured by completing the following related requirements:

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

1. Given examples of illicit drug manufacturing methods, describe the operational considerations, hazards, and products involved in the illicit process.
    a. Illegal drugs (e.g., methamphetamines)
    b. Chemical modification (e.g., distilled pesticides)
    c. Biological toxins or pathogens (e.g., ricin, anthrax, touleremia)
    d. Explosives (e.g., ANFO, pipe bombs)

2. Given examples of illicit chemical WMD methods, describe the operational considerations, hazards, and products involved in the illicit process.

3. Given examples of illicit WMD methods, describe the operational considerations, hazards, and products involved in the illicit process.

4. Given examples of illicit laboratory operations describe the potential booby traps that have been encountered by response personnel.

5. Given examples of illicit laboratory operations, describe the agencies that have investigative authority and operational responsibility to support the response.

***603-6.9.3*** ***Competencies – Planning the Response***

***603-6.9.3.1*** ***Determining the Response Options***

Given an analysis of hazardous materials/WMD incidents involving illicit laboratories, the operations level responder assigned to respond to illicit laboratory incidents shall identify possible response options.

***603-6.9.3.2*** ***Identifying Unique Aspects of Criminal Hazardous Materials/WMD Incidents***

**603-6.9.3.2.1** The operations level responder assigned to respond to illicit laboratory incidents shall identify the unique operational aspects associated with illicit drug manufacturing and illicit WMD manufacturing.

**603-6.9.3.2.2** Given an incident involving illicit drug manufacturing or illicit WMD manufacturing, the operations level responder assigned to illicit laboratory incidents shall describe the following tasks:

1. Law enforcement securing and preserving the scene
    a. Tasks include neutralization of tactical threat
    b. Safe rendering of explosive devices or booby traps
    c. Maintain accountability and identification of all personnel in the crime scene
    d. Crime scene documentation

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

e. Safeguarding/protecting evidence

2. Joint hazardous materials and EOD personnel site reconnaissance and hazard identification

3. Determining atmospheric hazards through air monitoring and detection
   a. At a minimum, monitoring should include:
      i. Flammability – combustible gas indicator
      ii. Oxygen level – oxygen meter
      iii. Toxicity – photoionization detector
      iv. Corrosivity – pH paper
      v. Radiological – radiological survey meter
   b. Other monitoring devices as determined by the AHJ

4. Mitigation of immediate hazards while preserving evidence

5. Coordinated crime scene operation with the law enforcement agency having investigative authority

6. Documenting personnel and scene activities associated with incident

***603-6.9.3.3*** ***Identifying the Law Enforcement Agency That Has Investigative Jurisdiction***

The operations level responder assigned to respond to illicit laboratory incidents shall identify the law enforcement agency having investigative jurisdiction by completing the following:

1. Given scenarios involving illicit drug manufacturing or illicit WMD manufacturing, identify the law enforcement agency(s) with investigative authority for the following situations:
   a. Illicit drug manufacturing
   b. Illicit WMD manufacturing
   c. Environmental crimes resulting from illicit laboratory operations

2. Identify the role of law enforcement agencies at the following levels:
   a. Federal
   b. State
   c. Local

***603-6.9.3.4*** ***Identifying Unique Tasks and Operations at Sites Involving Illicit Laboratories***

**603-6.9.3.4.1** The operations level responder assigned to respond to illicit laboratory incidents shall identify and describe the unique tasks and operations encountered at illicit laboratory scenes.

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

**603-6.9.3.4.2** Given scenarios involving illicit drug manufacturing or illicit WMD manufacturing, describe the following:

1. Hazards, safety procedures, and tactical guidelines for this type of emergency

2. Factors to be evaluated in selection of the appropriate personal protective equipment for each type of tactical operation
   a. Selection of PPE is based upon:
      i. Available intelligence
      ii. Outward warning signs
      iii. Detection clues
      iv. Activity of animals
      v. Interviews with neighbors/witnesses
   b. Explosive ordnance disposal (EOD) operations will require an appropriate level of EOD protective gear to augment chemical protective clothing based on the hazard risk assessment

3. Factors to be considered in selection of appropriate decontamination procedures

4. Factors to be evaluated in the selection of detection devices

5. Factors to be considered in the development of a remediation plan

***603-6.9.3.5*** ***Selecting Personal Protective Equipment***

The operations level responder assigned to respond to illicit laboratory incidents shall select the personal protective equipment required to respond to illicit laboratory incidents based on local procedures.

***603-6.9.4*** ***Competencies – Implementing the Planned Response***

***603-6.9.4.1*** ***Implementing the Planned Response***

Given scenarios involving an illicit drug/WMD laboratory operation involving hazardous materials/WMD, the operations level responder assigned to respond to illicit laboratory incidents shall implement or oversee the implementation of the selected response options safely and effectively.

**603-6.9.4.1.1** Given a simulated illicit drug/WMD laboratory incident, the operations level responder assigned to respond to illicit laboratory incidents shall be able to perform the following tasks:

1. Describe safe and effective methods for law enforcement to secure the scene.

2. Demonstrate decontamination procedures for tactical law enforcement personnel (SWAT or K-9) securing an illicit laboratory.

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

3. Demonstrate methods to identify and avoid potential unique safety hazards found at illicit laboratories such as booby traps and releases of hazardous materials.

4. Demonstrate methods to conduct joint hazardous materials/EOD operations to identify safety hazards and implement control procedures.
    a. At a minimum, monitoring should include:
        i. Flammability – combustible gas indicator
        ii. Oxygen level – oxygen meter
        iii. Toxicity – photoionization detector
        iv. Corrosivity – pH paper
        v. Radiological – radiological survey meter
    b. Other monitoring devices as determined by the AHJ

**603-6.9.4.1.2** Given a simulated illicit drug/WMD laboratory entry operation, the operations level responder assigned to respond to illicit laboratory incidents shall describe methods of identifying the following during reconnaissance operations:

1. Potential manufacture of illicit drugs

2. Potential manufacture of illicit WMD materials

3. Potential environmental crimes associated with the manufacture of illicit drugs/WMD materials

**603-6.9.4.1.3** Given a simulated illicit drug/WMD laboratory incident, the operations level responder assigned to respond to illicit laboratory incidents shall describe joint agency crime scene operations, including support to forensic crime scene processing teams.

**603-6.9.4.1.4** Given a simulated illicit drug/WMD laboratory incident, the operations level responder assigned to respond to illicit laboratory incidents shall describe the policy and procedures for post–crime scene processing and site remediation operations.

**603-6.9.4.1.5** The operations level responder assigned to respond to illicit laboratory incidents shall describe local procedures for performing decontamination upon completion of the illicit laboratory mission.

***603-6.9.5*** ***Competencies – Evaluating Progress (Reserved)***

***603-6.9.6*** ***Competencies – Terminating the Incident (Reserved)***

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

## ***6.3-6.10*** ***Mission-Specific Competencies: Disablement/Disruption of Improvised Explosives Devices (IEDs), Improvised WMD Dispersal Devices, and Operations at Improvised Explosives Laboratories***

### ***603-6.10.1*** ***General***

#### ***603-6.10.1.1*** ***Introduction***

**603-6.10.1.1.1** The operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories shall be that person, competent at the operations level, who is assigned to interrupt the functioning of an IED or an improvised WMD dispersal device or conduct operations at improvised explosives laboratories.

**603-6.10.1.1.2** The operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories shall possess current certification as a Hazardous Device Technician from the FBI Hazardous Devices School, Department of Defense, or equivalent certifying agency as determined by the AHJ and be functioning as a member of a bomb squad or recognized military unit.

1. Potential training/credentialing sources
    a. Department of Defense (DoD)
    b. Department of Homeland Security (DHS)
    c. Bureau of Alcohol, Tobacco and Firearms (ATF)
    d. Federal Bureau of Investigation (FBI)
    e. Texas Commission on Law Enforcement (TCOLE)
    f. Texas Engineering Extension Services (TEEX)

**603-6.10.1.1.3** The operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories shall be trained to meet all competencies at the awareness level (see Section 601), all core competencies at the operations level (see Section 602), all mission-specific competencies for personal protective equipment (see Section 603), mission-specific competencies for response to illicit laboratories (see Section 603), and all competencies in this section.

**603-6.10.1.1.4** The operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories shall operate under the guidance of an allied professional or standard operating procedures.

1. Direct guidance: operations level responder working under the control of an allied professional who can:
    a. Continually assess and/or observe their actions

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

b. Provide immediate feedback

2. Written guidance: standard operating procedures or "rules of engagement" that emphasize:
   a. Task expected operations level responders
   b. Task beyond the capability of operations level responders
   c. Required PPE and other equipment to perform the expected task
   d. Procedures for ensuring coordination within the ICS

**603-6.10.1.1.5** The operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories shall receive the additional training necessary to meet the specific needs of the jurisdiction and/or agency.

1. Operations Mission-Specific Competency: Technical Decontamination (603-6.4)

2. Operations Mission-Specific Competency: Evidence Preservation and Sampling (603-6.5)

3. Operations Mission-Specific Competency: Air Monitoring and Sampling (603-6.7)

4. Additional training per AHJ

***603-6.10.1.2*** ***Goal***

**603-6.10.1.2.1** The goal of the competencies in this section shall be to provide the operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories with the knowledge and skills to perform the tasks in 6.10.1.2.2 and 6.10.1.2.3 safely and effectively.

**603-6.10.1.2.2** When responding to hazardous materials/WMD incidents involving a potential IED or improvised WMD dispersal device, the operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories shall be able to perform the following tasks:

1. Analyze a hazardous materials/WMD incident involving an improvised WMD dispersal device to determine the complexity of the problem and potential outcomes by completing the following tasks:
   a. Determine if an IED or WMD dispersal device is potentially present
   b. Categorize the device by its delivery method

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

2. Plan a response for a hazardous materials/WMD incident where there is a potential improvised WMD dispersal device within the capabilities and competencies of available personnel, personal protective equipment, and control equipment by completing the following tasks:
    a. Determine if response options can be effectively employed to conduct a disablement/disruption of the device
    b. Describe the actions to be taken and the resources to be requested if the incident exceeds the available capabilities

3. Implement the planned response to a hazardous materials/WMD incident involving an IED or WMD dispersal device by completing the following tasks under the guidance of the senior hazardous devices technician (HDT) present:
    a. Employ disablement/disruption techniques in accordance with the FBI Hazardous Devices School "logic tree," the current edition of the National Bomb Squad Commanders Advisory Board (NBSCAB) "A Model for Bomb Squad Standard Operating Procedures," established protocol of military units, or the AHJ

**603-6.10.1.2.3** When responding to hazardous materials/WMD incidents involving potential improvised explosives laboratories, the operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories shall be able to perform the following tasks:

1. Analyze a hazardous materials/WMD incident involving a potential improvised explosives laboratory to determine the complexity of the problem and potential outcomes and whether the incident is potentially an improvised explosives laboratory operation

2. Plan a response to a hazardous materials/WMD incident involving a potential improvised explosives laboratory in compliance with mitigation techniques and evidence recovery within the capabilities and competencies of available personnel, personal protective equipment, and control equipment, after notifying the responsible investigative agencies of the problem

3. Implement the planned response to a hazardous materials/WMD incident involving a potential improvised explosives laboratory utilizing applicable standard operating procedures and/or technical advice from qualified allied professionals

***603-6.10.2*** ***Competencies – Analyzing the Incident***

***603-6.10.2.1*** ***Determining if the incident involves the potential presence of an improvised WMD dispersal device.***

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

1. Given examples of hazardous materials/WMD incidents involving an IED or improvised WMD dispersal device, the operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories shall identify and/or categorize the hazard by completing the following:
    a. Letter/package-based improvised dispersal device
    b. Briefcase backpack-based improvised dispersal device
    c. Transportation-borne WMD dispersal device
    d. Fixed location hazards where an IED has been placed to cause the deliberate release of a material

***603-6.10.2.2*** *Determining if the hazardous materials/WMD incident involves an improvised explosives laboratory operation.*

Given examples of hazardous materials/WMD incidents involving improvised explosives laboratories, the operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories shall identify the potential explosives/WMD being manufactured by completing the following related requirements:

1. Given examples of improvised explosives manufacturing methods, describe the operational considerations, hazards, and products involved in the process

2. Given examples of improvised explosives laboratory operations, describe the potential booby traps that have been encountered by response personnel
    a. Potential secondary devices
    b. Explosives (including grenades and dynamite)
    c. Wires attached to explosives or alerting devices
    d. Weapons tied to doors
    e. Bottles that will break thereby mixing chemicals to produce toxic fumes
    f. On/off switches that have been reversed
    g. Holes in floors (trap doors to snake pits)
    h. Electrified door handles
    i. Exposed wiring
    j. Animals (such as dogs and poisonous snakes)
    k. Spikes
    l. Hooks
    m. Acid

3. Given examples of improvised explosives laboratory operations, describe the agencies that have investigative authority and operational responsibility to support the response
    a. Department of Defense (DoD)
    b. Department of Homeland Security (DHS)

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

c. Bureau of Alcohol, Tobacco and Firearms (ATF)
d. Federal Bureau of Investigation (FBI)
e. Joint Terrorism Task Force (JTTF)
f. Drug Enforcement Administration (DEA)
g. Environmental Protection Agency (EPA)
h. Postal Inspection Service
i. National Park Service (NPS)
j. Texas Department of Public Safety (DPS)
k. Local law enforcement (i.e. County Sheriff and/or local PD)
l. Public health agencies

### ***603-6.10.3 Competencies – Planning the Response***

#### ***603-6.10.3.1 Identifying unique aspects of improvised WMD dispersal device related hazardous materials/EMD incidents.***

When responding to hazardous materials/WMD incidents, the operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratory
incidents shall be capable of identifying the unique aspects associated with such incidents by completing the following requirements:

1. Given an incident involving a nonvehicle based WMD dispersal device, shall be able to perform the following tasks:
    a. Describe the hazards, safety procedures, and tactical guidelines for this type of incident
    b. Describe the factors to be evaluated in selecting the personal protective equipment
    c. Describe the procedure for identifying and obtaining the appropriate emergency response elements to support disablement/disruption activities

2. Given an incident involving a vehicle-borne WMD dispersal device, shall be able to perform the following tasks:
    a. Describe the hazards, safety procedures, and tactical guidelines for this type of incident
    b. Describe the factors to be evaluated in selecting the personal protective equipment
    c. Describe the procedure for identifying and obtaining the appropriate emergency response elements to support disablement/disruption activities

3. Given examples of different types of incidents involving an improvised WMD dispersal device, shall identify and describe the application use and limitations of various types of field screening tools that can be utilized for determining the presence of the following materials:
    a. Gamma and neutron radiation

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

b. Explosive materials (commercial and home-made explosives (HME)]

***603-6.10.3.2*** *Identifying unique aspects of improvised explosives laboratory related hazardous materials/WMD incidents.*

When responding to conduct mitigation procedures on energetic materials at an improvised explosive laboratory, the operations level responder assigned to perform disablement/ disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives shall be capable of identifying the unique aspects associated with such incidents by completing the following requirements:

1. Given a scenario involving an improvised explosive laboratory and detection devices provided by the AHJ, complete the following:
    a. Describe the hazards, safety procedures, and tactical guidelines for this type of incident
    b. Describe the factors to be evaluated in selecting the personal protective equipment
    c. Describe the application, use, and limitations of various types of field screening tools that can be utilized for determining the presence of the following materials:
        i. Radioactive materials that emit alpha, beta, gamma, or neutron radiation, including radionuclide identification of gamma emitting radioactive materials
        ii. Explosive materials (commercial and HME)
    a. Demonstrate the field test and operation of each detection device and interpret the readings based on local procedures
    b. Describe local procedures for decontamination of themselves and their detection devices upon completion of the material detection mission
    c. Describe the procedure for identifying and obtaining the appropriate emergency response elements to support disablement/disruption or mitigation activities

***603-6.10.3.3*** ***Identifying Potential Response Options***

**603-6.10.3.3.1** Given scenarios involving a potential IED or improvised WMD materials dispersal device, the operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories incident shall identify possible response options

1. Law enforcement securing and preserving the scene
    a. Tasks include neutralization of tactical threat
    b. Safe rendering of explosive devices or booby traps
    c. Maintain accountability and identification of all personnel in the crime scene
    d. Crime scene documentation

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

e. Safeguarding/protecting evidence

2. Joint hazardous materials and EOD personnel site reconnaissance and hazard identification

3. Determining atmospheric hazards through air monitoring and detection
   a. At a minimum, monitoring should include:
      i. Flammability – combustible gas indicator
      ii. Oxygen level – oxygen meter
      iii. Toxicity – photoionization detector
      iv. Corrosivity – pH paper
      v. Radiological – radiological survey meter
   b. Other monitoring devices as determined by the AHJ

4. Mitigation of immediate hazards while preserving evidence

5. Coordinated crime scene operation with the law enforcement agency having investigative authority

6. Documenting personnel and scene activities associated with incident

**603-6.10.3.3.2** Given scenarios involving a potential improvised explosives laboratories, the operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories incident shall identify possible response options

1. Offensive operations

2. Defensive operations

3. Non intervention

***603-6.10.3.4*** ***Selecting Personal Protective Equipment***

Given the personal protective equipment provided by the AHJ, the operations level responder assigned to perform disablement/ disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories incident, shall select the personal protective equipment required to support such operations at hazardous materials/WMD incidents based on the National Guidelines for Bomb Technicians adopted by the National Bomb Squad Commanders Advisory Board (NBSCAB) (see Section 6.2).

***603-6.10.4*** ***Competencies – Implementing the Planned Response***

**603-6.10.4.1** Given scenarios involving a potential IED or improvised WMD dispersal device, the operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

operations at improvised explosives laboratory incident shall be able to complete the following tasks:

1. Using detection and monitoring devices provided by the AHJ, demonstrate the field test and operation of each device and interpret the readings based on local or agency procedures

2. Perform diagnostics based on procedures instructed by a nationally accredited hazardous devices school or program

3. Perform disablement/disruption techniques in accordance with the FBI Hazardous Devices School "logic tree," the NBSCAB A Model for Bomb Squad Standard Operating Procedures, established protocol for military units, or established protocol of the AHJ

4. Assist in planning the air monitoring and sampling activities within the capabilities and competencies of available personnel, personal protective equipment, and control equipment; and in accordance with the AHJ, describe the air monitoring and sampling options available

5. Given the air monitoring and sampling equipment provided by the AHJ, shall complete the following:
    a. Select the detection or monitoring equipment suitable for detecting or monitoring of the IED or improvised WMD dispersal device
    b. Describe the operation, capabilities, limitations, local monitoring procedures, field-testing, and maintenance procedures associated with each device provided by the AHJ
    c. Describe local procedures for decontamination of the detection and monitoring devices upon completion of the mission

**603-6.10.4.2** Given a simulated improvised explosives laboratory incident, the operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratory incident shall be able to perform the following tasks:

1. Describe the safe and effective methods for law enforcement to secure the scene
    a. Situation dependent
    b. AHJ

2. Demonstrate methods to identify and avoid unique safety hazards at improvised explosives laboratories such as booby traps, releases of hazardous materials, and initiating components
    a. Anticipate the presence of hazards
    b. Visually search
    c. Limit access

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

d. Avoiding touching or moving any hazards
e. Scene control
f. Evacuate victims and non-essential personnel
g. Scene preservation

3. Using detection and monitoring devices provided by the AHJ, demonstrate the field test and operation of each device and interpret the readings based on local or agency procedures

4. Describe the methods that could be utilized to mitigate the hazards identified
   a. Per federal requirements
   b. Per state requirements
   c. Per local AHJ requirements

**603-6.10.4.3** The operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories shall demonstrate the ability to wear an appropriate combination of chemical protective clothing, respiratory protection, and ballistic protection for the hazards identified in 6.10.2.1 and 6.10.2.2.

**603-6.10.4.4** The operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories shall describe the local procedures for the technical decontamination process.

1. Per federal requirements

2. Per state requirements

3. Per local AHJ requirements

***603-6.10.5 Competencies – Evaluating Progress (Reserved)***

***603-6.10.6 Competencies – Terminating the Incident (Reserved)***

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

# HAZARDOUS MATERIALS TECHNICIAN

# REFERENCE LIST FOR THE HAZARDOUS MATERIALS TECHNICIAN CURRICULUM

This Reference List is provided as a general guide for both instructors and students to locate information pertaining to the specific objectives in the TCFP Curriculum. This list is **not** all-inclusive and does not in any way limit TCFP development and use of questions to test the objectives of the curriculum:

## Required References

Texts

*Certification Curriculum Manual.* Texas Commission on Fire Protection. (Most current edition). Austin, TX: Texas Commission on Fire Protection.

*Code of Federal Regulations, Title 29 Part 1910.120, Appendix A*. United States. U.S. Department of Labor, Occupational Safety & Health Administration. http://edocket.access.gpo.gov/cfr_2007/julqtr/pdf/29cfr1910.120.pdf

*Emergency Response Guidebook.* United States. (Most current edition). Washington, DC: U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration.

*Hazardous Materials: Managing the Incident*, 4th edition. Noll, G. G., Hildebrand, M. S., Schnepp, R. & Rudner, G.D. (2014). Burlington, MA: Jones and Bartlett.

*Hazardous Materials Technician*, 1st edition. (2013) Stillwater, OK: International Fire Service Training Association.

*Hazardous Materials/Weapons of Mass Destruction Response Handbook*, 6th/2013 edition. McGowan, T. (2012). Quincy, MA: National Fire Protection Association.

*NFPA 472: Standard for Professional Competence of Responders to Hazardous Materials Incidents.* (2013 ed.). Quincy, MA: NFPA Publications. National Fire Protection Association

*NIOSH Pocket Guide to Chemical Hazards.* National Institute for Occupational Safety and Health. (Most current edition). Cincinnati, OH: US Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health.

*Standards Manual for Fire Protection Personnel.* Texas Commission on Fire Protection. (Most current edition). Austin, TX: Texas Commission on Fire Protection.

## Recommended References

The most current edition of the following publications and media are recommended (not required) supplemental material for program use.

Texts

*Bretherick's Handbook of Reactive Chemical Hazards*. Urben, P. G., Pitt, M. J., & Bretherick, L. (2007). Amsterdam: Elsevier.

*Field Guide to Tank Cars*. Bureau of Explosives. (2010). Pueblo, Colorado: Association of American Railroads.

*Fire Fighter's Handbook of Hazardous Materials*, 7th edition. Baker, Charles T., (2006). Sudsbury, MA: Jones and Bartlett.

*Fire Protection Guide to Hazardous Materials*. National Fire Protection Association. (2010 edition). Quincy, MA: National Fire Protection Association.

*Hawley's Condensed Chemical Dictionary*. Lewis, R. J., & Hawley, G. G. (2007). West Sussex, England: Wiley.

*Hazardous Materials: Managing the Incident: Field Operations Guide*. Bevelacqua, A. 2nd Edition (2013). MD: Jones and Bartlett Publishing

*Hazardous Materials Technician*. Weber, Chris (2013). Upper Saddle River, NJ: Pearson Education, Inc.

Media

*Chlorine Emergencies: An Overview for First Responders*. Chlorine Institute. (2007). Arlington, VA: The Chlorine Institute.

*Hazardous Materials Containment Series*. Action Training Systems. [4 Disc DVD Set] Hazardous materials containment - series of 4 titles. Seattle, WA: Action Training Systems.

*Hazardous Materials: Managing the Incident DVD Series.* Massingham, G., Noll, G. G., Hildebrand, M. S., & Noll, G. G. (2005). [8 Disc DVD Set] Edgartown, MA: Emergency Film Group.

*How to Use the Chlorine Institute Emergency Kit "A" for 100 lb. and 150 lb. Chlorine Cylinders*. Chlorine Institute. (Sept. 2013). New York. NY: The Chlorine Institute. [DVD + pamphlet]

*How to Use the Chlorine Institute Emergency Kit "B" for Chlorine Ton Containers*. New Chlorine Institute. (Dec. 2013). York, NY: The Chlorine Institute. [DVD + pamphlet]

*How to Use the Chlorine Institute Emergency Kit "C" for Chlorine Tank Cars and Tank Trucks*. Chlorine Institute. (Feb. 2014). New York, NY: The Chlorine Institute. [DVD + pamphlet]

*Intermodal Containers*. Noll, G. G., Hildebrand, M. S., & Donahue, M. L. (2002). [DVD] Edgartown, MA: Emergency Film Group.

*Petroleum Storage Tanks*. Hildebrand, M. S., & Noll, G. G. (2003). [DVD] Edgartown, MA: Emergency Film Group.

# CHAPTER 6
# SECTION 604
# HAZARDOUS MATERIALS TECHNICIAN
# CURRICULUM OUTLINE

| SECTION | SUBJECT | RECOMMENDED HOURS |
|---|---|---|
| 604-7.1 | General - Introduction - Laws, Regulations, and National Consensus Standards | 4 |
| 604-7.2 | Analyzing the Incident | 24 |
| 604-7.3 | Planning the Response | 24 |
| 604-7.4 | Implementing the Planned Response | 16 |
| 604-7.5 | Evaluating Progress | 6 |
| 604-7.6 | Terminating the Incident | 6 |
| | **TOTAL RECOMMENDED HOURS** | **80** |

The recommended hours include time for skills evaluation and are based on 12 students. Hours needed depend on the actual number of students.

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

# *SECTION 604*
# *HAZARDOUS MATERIAL TECHNICIAN*

Hazardous Materials Technician Level Personnel are those who respond to hazardous materials/weapons of mass destruction (WMD) incidents and

- Use a risked based response process to analyze a problem involving hazardous materials/weapons of mass destruction (WMD),
- Select and implement applicable decontamination procedures,
- Control a release,
- Use specialized protective clothing, and
- Use specialized control equipment.

The Hazardous Materials Technician must first master all the job performance requirements and knowledge, skills and abilities pertaining to:

- Awareness Level Personnel,
- Operations Level Responders, and
- The competencies of this chapter

Response options for technician level responders may include offensive actions.

## ***604-7.1*** ***General***

### ***604-7.1.1*** ***Introduction***

**604-7.1.1.1** The hazardous materials technician shall be that person who responds to hazardous materials/WMD incidents using a risk-based response process by which he or she analyzes a problem involving hazardous materials/WMD, selects applicable decontamination procedures, and controls a release using specialized protective clothing and control equipment *[see 7.1.2.2(1)]*

**604-7.1.1.2** The hazardous materials technician shall be trained to meet all competencies at the awareness level (Section 601), all core competencies at the operations level (Section 602), and all competencies of this chapter

**604-7.1.1.3** The hazardous materials technician shall receive additional training to meet applicable governmental occupational health and safety regulations

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

**604-7.1.1.4** The hazardous materials technician shall be permitted to have additional competencies that are specific to the response mission, expected tasks, and equipment and training as determined by the AHJ

***604-7.1.2*** ***Goal***

**604-7.1.2.1** The goal of the competencies at this level shall be to provide the hazardous materials technician with the knowledge and skills to perform the tasks in 7.1.2.2 safely

**604-7.1.2.2** In addition to being competent at both the awareness and the operations levels, the hazardous materials technician shall be able to perform the following tasks:

1. Analyze a hazardous materials/WMD incident to determine the complexity of the problem and potential outcomes by completing the following tasks:
    a. Survey the hazardous materials/WMD incident to identify special containers involved, to identify or classify unknown materials, and to verify the presence and concentrations of hazardous materials through the use of monitoring equipment
    b. Collect and interpret hazard and response information from printed and technical resources, computer databases, and monitoring equipment
    c. Describe the type and extent of damage to containers
    d. Predict the likely behavior of released materials and their containers when multiple materials are involved
    e. Estimate the size of an endangered area using computer modeling, monitoring equipment, or specialists in this field

2. Plan a response within the capabilities of available personnel, personal protective equipment, and control equipment by completing the following tasks:
    a. Describe the response objectives for hazardous materials/WMD incidents
    b. Describe the potential response options available by response objective
    c. Select the personal protective equipment required for a given action option
    d. Select a technical decontamination process to minimize the hazard
    e. Develop an incident action plan for a hazardous materials/WMD incident, including a site safety and control

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

plan, consistent with the emergency response plan or standard operating procedures and within the capability of the available personnel, personal protective equipment, and control equipment

3. Implement the planned response to favorably change the outcomes consistent with the standard operating procedures and site safety and control plan by completing the following tasks:
    a. Perform the duties of an assigned hazardous materials branch or group position within the local Incident Command System (ICS)
    b. Don, work in, and doff personal protective clothing, including, but not limited to, both liquid splash– and vapor–protective clothing with correct respiratory protection
    c. Perform the control functions identified in the incident action plan
    d. Perform the decontamination functions identified in the incident action plan

4. Evaluate the progress of the planned response by completing the following tasks:
    a. Evaluate the effectiveness of the control functions
    b. Evaluate the effectiveness of the decontamination process

5. Terminate the incident by completing the following tasks:
    a. Assist in the incident debriefing
    b. Assist in the incident critique
    c. Provide reports and documentation of the incident

***604-7.2*** ***Competencies — Analyzing the Incident***

***604-7.2.1*** ***Surveying Hazardous Materials/WMD Incidents***

Given examples of hazardous materials/WMD incidents, the hazardous materials technician shall identify containers involved and, given the necessary equipment, identify or classify unknown materials involved, verify the identity of the hazardous materials/WMD involved, and determine the concentration of hazardous materials, by completing the requirements of 7.2.1.1 through 7.2.1.5

**604-7.2.1.1** Given examples of various containers for hazardous materials/WMD, the hazardous materials technician shall identify each container by name and specification and identify the typical contents by name and hazard class

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

**604-7.2.1.1.1** Given examples of the following railroad cars, the hazardous materials technician shall identify the container by name and specification and identify the typical contents by name and hazard class:

1. Cryogenic liquid tank cars
2. Nonpressure tank cars
3. Pneumatically unloaded hopper cars
4. Pressure tank cars

**604-7.2.1.1.2** Given examples of the following intermodal tanks, the hazardous materials technician shall identify the container by name and specification and identify the typical contents by name and hazard class:

1. Nonpressure intermodal tanks
    a. IM-101 portable tanks (IMO Type 1 internationally)
    b. IM-102 portable tanks (IMO Type 2 internationally)
2. Pressure intermodal tank (DOT Specification 51; IMO Type 5 internationally)
3. Specialized intermodal tanks
    a. Cryogenic intermodal tanks (IMO Type 7 internationally)
    b. Tube modules

**604-7.2.1.1.3** Given examples of the following cargo tanks, the hazardous materials technician shall identify the container by name and specification and identify the typical contents by name and hazard class:

1. Compressed gas tube trailers
2. Corrosive liquid tanks
3. Cryogenic liquid tanks
4. Dry bulk cargo tanks
5. High-pressure tanks
6. Low-pressure chemical tanks

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

7. Nonpressure liquid tanks

**604-7.2.1.1.4** Given examples of the following facility storage tanks, the hazardous materials technician shall identify the container by name and identify the typical contents by name and hazard class:

1. Cryogenic liquid tank
2. Nonpressure tank
3. Pressure tank

**604-7.2.1.1.5** Given examples of the following nonbulk packaging, the hazardous materials technician shall identify the package by name and identify the typical contents by name and hazard class:

1. Bags
2. Carboys
3. Cylinders
4. Drums

**604-7.2.1.1.6** Given examples of the following radioactive materials packages, the hazardous materials technician shall identify the container/package by name and identify the typical contents by name:

1. Excepted
2. Industrial
3. Type A
4. Type B
5. Type C

**604-7.2.1.1.7** Given examples of the following packaging, the hazardous materials technician shall identify the package by name and identify the typical contents by name and hazard class:

1. Intermediate bulk container (IBC)
    a. Rigid intermediate bulk containers (RIBCs)

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

b. Flexible intermediate bulk containers (FIBCs)

2. Ton container
   a. Convex
   b. Concave

**604-7.2.1.2** Given examples of three facility and three transportation containers, the hazardous materials technician shall identify the approximate capacity of each container

**604-7.2.1.2.1** Using the markings on the container, the hazardous materials technician shall identify the capacity (by weight or volume) of the following examples of transportation vehicles:

1. Cargo tanks
2. Tank cars
3. Tank containers

**604-7.2.1.2.2** Using the markings on the container and other available resources, the hazardous materials technician shall identify the capacity (by weight or volume) of each of the following facility containers:

1. Cryogenic liquid tank
2. Nonpressure tank (general service or low-pressure tank)
3. Pressure tank

**604-7.2.1.3** Given at least three unknown hazardous materials/WMD, one of which is a solid, one a liquid, and one a gas, the hazardous materials technician shall identify or classify by hazard each unknown material

**604-7.2.1.3.1** The hazardous materials technician shall identify the steps in an analysis process for identifying unknown solid and liquid materials

1. Approach from up wind
2. Wear appropriate level of Chemical Protective Clothing (CPC)
3. Work in pairs
4. Have backup team

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

5. Monitor in the following order:
    a. Radioactivity
    b. Oxygen availability
    c. pH (if a liquid or soluble solid)

**604-7.2.1.3.2** The hazardous materials technician shall identify the steps in an analysis process for identifying an unknown atmosphere

1. Approach from up wind

2. Wear appropriate level of CPC

3. Work in pairs

4. Have backup team

5. Monitor in the following order:
    a. Radioactivity
    b. Combustibility
    c. Oxygen
        i. Deficiency
        ii. Enriched
    d. pH (if possible corrosive)
    e. Hydrogen sulfide
    f. Carbon monoxide
    g. Organic vapor

**604-7.2.1.3.3** The hazardous materials technician shall identify the type(s) of monitoring technology used to determine the following hazards:

1. Corrosivity

2. Flammability

3. Oxidation potential

4. Oxygen deficiency

5. Pathogenicity

6. Radioactivity

7. Toxicity

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

**604-7.2.1.3.4** The hazardous materials technician shall identify the capabilities and limiting factors associated with the selection and use of the following monitoring equipment, test strips, and reagents:

1. Biological immunoassay indicators
2. Chemical agent monitors (CAMs)
3. Colorimetric indicators [colorimetric detector tubes, indicating papers (pH paper and meters), reagents, test strips]
4. Combustible gas indicator
5. DNA fluoroscopy
6. Electrochemical cells (carbon monoxide meter, oxygen meter)
7. Flame ionization detector
8. Gas chromatograph/mass spectrometer (GC/MS)
9. Infrared spectroscopy
10. Ion mobility spectroscopy
11. Gamma spectrometer [radioisotope identification device (RIID)]
12. Metal oxide sensor
13. Photoionization detectors
14. Polymerase chain reaction (PCR)
15. Radiation detection and measurement instruments
16. Raman spectroscopy
17. Surface acoustical wave (SAW)
18. Wet chemistry

**604-7.2.1.3.5** Given three hazardous materials/WMD, one of which is a solid, one a liquid, and one a gas, and using equipment, test strips, and reagents,

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

provided by the AHJ as applicable, the hazardous materials technician shall select from the following equipment and demonstrate the correct techniques to identify the hazards (corrosivity, flammability, oxidation potential, oxygen deficiency, radioactivity, toxicity, and pathogenicity):

1. Carbon monoxide meter
2. Colorimetric tubes
3. Combustible gas indicator
4. Oxygen meter
5. Passive dosimeters
6. pH indicators and/or pH meters
7. Photoionization and flame ionization detectors
8. Radiation detection instruments
9. Reagents
10. Test strips
11. WMD detectors (chemical and biological)
12. Other equipment provided by the AHJ

**604-7.2.1.3.6** Given monitoring equipment, test strips, and reagents provided by the AHJ, the hazardous materials technician shall demonstrate the field maintenance and testing procedures for those items

**604-7.2.1.4** Given a label for a radioactive material, the hazardous materials technician shall identify the type or category of label, contents, activity, transport index, and criticality safety index as applicable, then describe the radiation dose rates associated with each label

**604-7.2.1.5** The hazardous materials technician shall demonstrate methods for collecting samples of the following:

1. Gas
2. Liquid

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

3. Solid

***604-7.2.2*** ***Collecting and Interpreting Hazard and Response Information***

Given access to printed and technical resources, computer databases, and monitoring equipment, the hazardous materials technician shall collect and interpret hazard and response information not available from the current edition of the DOT *Emergency Response Guidebook* or an MSDS and shall meet the requirements of 7.2.2.1 through 7.2.2.6

**604-7.2.2.1** The hazardous materials technician shall identify and interpret the types of hazard and response information available from each of the following resources and explain the advantages and disadvantages of each resource:

1. Hazardous materials databases – examples include:
    a. CAMEO (Computer Assisted Management of Emergency Operations)
    b. MARPLOT (Mapping Applications for Response, Planning and Local Operational Tasks)
    c. ALOHA (Aerial Locations Of Hazardous Atmospheres)
    d. WISER (Wireless Informational Systems for Emergency Responders)
    e. OREIS (Operational Response Emergency Informational System)

2. Monitoring equipment – examples include:
    a. Combustible gas indicators
    b. Colorimetric tubes
    c. Photoionization detectors/flame ionization detectors
    d. Radiological survey equipment
    e. Oxygen meters
    f. Toxic Gas Sensors
    g. pH paper
    h. Chemical test strips

3. Reference manuals
    a. DOT Emergency Response Handbook
    b. ARR Hazardous Materials Emergency Action Guides
    c. Field Guide to Tank Guide Identification
    d. Bretherick's Handbook of Reactive Substances
    e. Emergency Care for Hazardous Materials Exposure
    f. Hawley's Condensed Chemical Dictionary
    g. NIOSH Pocket Guide

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

h. CHRIS Chemical Hazards Response Information System (USCG)
i. Dangerous Properties of Industrial Chemicals
j. NFPA Fire Protection Guide of Hazardous Materials

4. Technical information centers (i.e., CHEMTREC/CANUTEC/ SETIQ and local, state, and federal authorities) – examples include:
   a. CHEMTREC
   b. Chlorine Institute
   c. US Coast Guard and DOT National Response Center
   d. The Agency for Toxic Substance and Disease Registry (ATSDR)
   e. National Animal Poison Control Center (NAPCC)
   f. National Pesticide Informational Center (NPIC)
   g. National Poison Control Center (Mr. Yuck)
   h. US Army Operational Center
   i. Defense Logistics Agency

5. Technical information specialists

6. Hazard Communication and Right To Know Reporting Requirements
   a. OSHA Hazardous Communication Standard 29 CFR 1910.1200
   b. Material Safety Data Sheets
   c. Tier II Reports
   d. EPA EPlan Database
   e. Other federal, state and local reporting requirements

**604-7.2.2.2** The hazardous materials technician shall describe the following terms and explain their significance in the analysis process:

1. Corrosive (acids and bases/alkaline)

2. Air reactivity

3. Autorefrigeration

4. Biological agents and biological toxins

5. Blood agents

6. Boiling point

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

7. Catalyst
8. Chemical change
9. Chemical interactions
10. Compound, mixture
11. Concentration
12. Critical temperature and pressure
13. Dissociation (acid/base)
14. Dose
15. Dose response
16. Expansion ratio
17. Fire point
18. Flammable (explosive) range (LEL and UEL)
19. Flash point
20. Half-life
21. Halogenated hydrocarbon
22. Ignition (autoignition) temperature
23. Inhibitor
24. Instability
25. Ionic and covalent compounds
26. Irritants (riot control agents)
27. Maximum safe storage temperature (MSST)
28. Melting point and freezing point

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

29. Miscibility
30. Nerve agents
31. Organic and inorganic
32. Oxidation potential
33. Persistence
34. pH
35. Physical change
36. Physical state (solid, liquid, gas)
37. Polymerization
38. Radioactivity
39. Reactivity
40. Riot control agents
41. Saturated, unsaturated (straight and branched), and aromatic hydrocarbons
42. Self-accelerating decomposition temperature (SADT)
43. Solubility
44. Solution and slurry
45. Specific gravity
46. Strength
47. Sublimation
48. Temperature of product
49. Toxic products of combustion
50. Vapor density

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

51. Vapor pressure

52. Vesicants (blister agents)

53. Viscosity

54. Volatility

**604-7.2.2.3** The hazardous materials technician shall describe the heat transfer processes that occur as a result of a cryogenic liquid spill

**604-7.2.2.4** Given five hazardous materials/WMD scenarios and the associated reference materials, the hazardous materials technician shall identify the signs and symptoms of exposure to each material and the target organ effects of exposure to that material

**604-7.2.2.5** The hazardous materials technician shall identify two methods for determining the pressure in bulk packaging or facility containers

1. Fixed pressure gauge
2. Attach a pressure gauge
3. Determine temperature of the product and use a vapor pressure/temperature conversion chart

**604-7.2.2.6** The hazardous materials technician shall identify one method for determining the amount of lading remaining in damaged bulk packaging or facility containers

1. Shipping papers and related documents
2. Fixed gauging devices
3. Weigh small nonbulk cylinders
4. Infrared cameras
5. Visible frost line on liquefied gas containers

***604-7.2.3*** ***Describing the Condition of the Container Involved in the Incident.***

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

Given examples of container damage, the hazardous materials technician shall describe the damage by completing the related requirements of 7.2.3.1 through 7.2.3.5

**604-7.2.3.1** Given examples of containers, including the DOT specification markings for nonbulk and bulk packaging, and associated reference guides, the hazardous materials technician shall identify the basic design and construction features of each container

**604-7.2.3.1.1** The hazardous materials technician shall identify the basic design and construction features, including closures, of the following bulk containers: NOTE: CGA=Compressed Gas Association, MC= Motor Carrier, TC=Transport Canada, DOT=Dept. of Transportation, SCT=Secretariat of Communications and Transportation [Mexico])

1. Cargo tanks
    a. Compressed gas tube trailers

    b. Corrosive liquid tanks
        - DOT 412, TC 412, SCT 312, MC 312, TC 312

    c. Cryogenic liquid tanks
        - MC 338, TC 338, SCT 338, TC 341, CGA 341

    d. Dry bulk cargo tanks

    e. High pressure tanks
        - MC 331, TC 331, SCT 331

    f. Low pressure liquid tanks
        - DOT 407, TC 407, SCT 307, MC 307, TC 307

    g. Non-pressure liquid tanks
        - DOT 406, TC 406, SCT 306, MC 306, TC 306

2. Fixed facility tanks
    a. Cryogenic liquid tank
        i. Refrigerated storage tanks=less than 15 psi
        ii. High pressure cryogenic tanks=greater than 15psi

    b. Non-pressure tank (Atmospheric pressure=0-0.5 psi)
        i. Horizontal tank
        ii. Cone roof tank
        iii. Floating roof tank

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

iv. Covered floating roof tank
v. Floating roof with geodesic dome
vi. Lifter roof tank
vii. Vapor dome roof tank
viii. Underground storage tanks

c. Pressure tank
    i. Low Pressure (0.5-15 psi)
        a) Vertical dome roof tanks
    ii. High pressure (greater than 15 psi)
        a) Horizontal pressure vessel
        b) Spherical pressure vessel
        c) Noded spheroid
        d) Underground high pressure

3. Intermediate bulk containers (also known as tote tanks)

4. Intermodal tanks
    a. Nonpressure intermodal tanks
        i. IM-101 portable tank (IMO Type 1 internationally)
            a) 25.4 – 100 psig
            b) 5,000 – 6,340 gallon normal capacity
        ii. IM-102 portable tank (IMO Type 2 internationally)
            a) 14.5 – 24.4 psig
            b) 5,000 – 6,340 gallon normal capacity
    b. Pressure intermodal tanks (DOT Specification 51; IMO Type 5 internationally)
        i. 100 – 500 psi
        ii. 4,500 – 5,500 gallon normal capacity
    c. Specialized intermodal tanks
        i. Cryogenic intermodal tanks (IMO Type 7 internationally)
            a) Insulated space is normally maintained under vacuum
            b) 4,500 – 5,500 gallons normal capacity
        ii. Tube modules
            a) 2,400 – 5,000 psi
            b) Cylinders range from 9 – 48 inches in diameter

5. One-ton containers (pressure drums)

6. Pipelines

7. Railroad cars

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

a. Cryogenic liquid tank cars
b. Nonpressure tank cars (general service or low pressure cars)
c. Pneumatically unloaded hopper cars
d. Pressure tank cars
e. Other specialized cars

**604-7.2.3.1.2** The hazardous materials technician shall identify the basic design and construction features, including closures of the following nonbulk containers:

1. Bags

2. Carboys and Jerricans

3. Cylinders

4. Drums
   a. Types
      i. Open head
      ii. Closed head
   b. Construction Materials
      i. Metal
      ii. Plastic
      iii. Fiberboard
      iv. Other suitable materials
   c. Fittings
      i. Bungs
      ii. Chime ring

5. Dewar flask (cryogenic liquids)

**604-7.2.3.1.3** The hazardous materials technician shall identify the basic design features and testing requirements on the following radioactive materials packages:

1. Excepted

2. Industrial

3. Type A

4. Type B

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

5. Type C – used in air shipments

**604-7.2.3.2** The hazardous materials technician shall describe how a liquid petroleum product pipeline can carry different products

1. Co-mingling of products
2. Batching
3. Separation with a pig

**604-7.2.3.3** Given an example of a pipeline, the hazardous materials technician shall identify the following:

1. Ownership of the line
2. Procedures for checking for gas migration
3. Procedure for shutting down the line or controlling the leak
4. Type of product in the line

**604-7.2.3.4** Given examples of container stress or damage, the hazardous materials technician shall identify the type of damage in each example and assess the level of risk associated with the damage

1. Cracks
2. Scores
3. Gouges
4. Dents
5. Wheel burn
6. Rail burn
7. Street burn

**604-7.2.3.5** Given a scenario involving radioactive materials, the hazardous materials technician, using available survey and monitoring equipment, shall determine if the integrity of any container has been breached

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

***604-7.2.4*** ***Predicting Likely Behavior of Materials and Their Containers Where Multiple Materials Are Involved***

Given examples of hazardous materials/WMD incidents involving multiple hazardous materials or WMD, the hazardous materials technician shall predict the likely behavior of the material in each case and meet the requirements of 7.2.4.1 through 7.2.4.3

**604-7.2.4.1** The hazardous materials technician shall identify at least three resources available that indicate the effects of mixing various hazardous materials

1. Richard J. Lewis, Jr., *Hazardous Chemicals Desk Reference*
2. NOAA (National Oceanic Atmospheric Administration) Chemical Reactivity Worksheet
3. Bretherick's *Handbook of Reactive Chemical Hazards*
4. NFPA *Fire Protection Guide on Hazardous Materials*
5. SDS/MSDS

**604-7.2.4.2** The hazardous materials technician shall identify the impact of the following fire and safety features on the behavior of the products during an incident at a bulk liquid facility and explain their significance in the analysis process:

1. Fire protection systems
2. Monitoring and detection systems
3. Pressure relief and vacuum relief protection
4. Product spillage and control (impoundment and diking)
5. Tank spacing
6. Transfer operations

**604-7.2.4.3** The hazardous materials technician shall identify the impact of the following fire and safety features on the behavior of the products during an incident at a bulk gas facility and explain their significance in the analysis process:

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

1. Fire protection systems

2. Monitoring and detection systems

3. Pressure relief protection

4. Transfer operations

***604-7.2.5*** ***Estimating the Likely Size of an Endangered Area***

Given examples of hazardous materials/WMD incidents, the hazardous materials technician shall estimate the likely size, shape, and concentrations associated with the release of materials involved in an incident by using computer modeling, monitoring equipment, or specialists in this field by completing the requirements of 7.2.5.1 through 7.2.5.4

**604-7.2.5.1** Given the emergency response plan, the hazardous materials technician shall identify resources for dispersion pattern prediction and modeling, including computers, monitoring equipment, or specialists in the field

**604-7.2.5.2** Given the quantity, concentration, and release rate of a material, the hazardous materials technician shall identify the steps for determining the likely extent of the physical, safety, and health hazards within the endangered area of a hazardous materials/WMD incident

**604-7.2.5.2.1** The hazardous materials technician shall describe the following terms and exposure values and explain their significance in the analysis process:

1. Counts per minute (cpm) and kilocounts per minute (kcpm)

2. Immediately dangerous to life and health (IDLH) value

3. Incubation period

4. Infectious dose

5. Lethal concentrations ($LC_{50}$)

6. Lethal dose ($LD_{50}$)

7. Parts per billion (ppb)

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

8. Parts per million (ppm)

9. Permissible exposure limit (PEL)

10. Radiation absorbed dose (rad)

11. Roentgen equivalent man (rem), millirem (mrem), microrem (μrem)

12. Threshold limit value ceiling (TLV-C)

13. Threshold limit value short-term exposure limit (TLV-STEL)

14. Threshold limit value time-weighted average (TLV-TWA)

15. Health Hazard = Exposure + Toxicity

16. Dose = Concentration x Time

17. ALARA = As Low As Reasonably Achievable

**604-7.2.5.2.2** The hazardous materials technician shall identify two methods for predicting the areas of potential harm within the endangered area of a hazardous materials/WMD incident

1. Determine the level of toxicity of the hazardous material that has been released in the endangered area

2. Determine the length of time that persons in the endangered area would be exposed to the hazard

3. Determine areas of potential harm using reference sources or direct monitoring instruments
    a. *Emergency Response Guidebook*
    b. Computer dispersion models
        i. CAMEO (Computer Assisted Management of Emergency Operations)
        ii. MARPLOT (Mapping Applications for Response, Planning and Local Operational Tasks)
        iii. ALOHA (Aerial Locations Of Hazardous Atmospheres)
        iv. WISER (Wireless Informational Systems for Emergency Responders)
    c. Portable and fixed air-monitoring systems

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

**604-7.2.5.3** The hazardous materials technician shall identify the steps for estimating the outcomes within an endangered area of a hazardous materials/WMD incident

1. Determining the dimensions of the endangered area
2. Estimating the number of exposures within the endangered area
3. Measuring or predicting the concentrations of materials in the endangered area
4. Estimating the physical, health, and safety hazards within the endangered area
5. Identifying the area of potential harm within the endangered area
6. Estimating the potential outcomes within the endangered area

**604-7.2.5.4** Given three examples involving a hazardous materials/WMD release and the corresponding instrument monitoring readings, the hazardous materials technician shall determine the applicable public protective response options and the areas to be protected

## ***604-7.3*** ***Competencies — Planning the Response***

### ***604-7.3.1*** ***Identifying Response Objectives***

**604-7.3.1.1** Given scenarios involving hazardous materials/WMD incidents, the hazardous materials technician shall describe the response objectives for each problem

**604-7.3.1.2** Given an analysis of a hazardous materials/WMD incident, the hazardous materials technician shall be able to describe the steps for determining response objectives (defensive, offensive, and nonintervention)

1. Estimate exposures that could be saved
2. Determine the response objectives

### ***604-7.3.2*** ***Identifying the Potential Response Options***

**604-7.3.2.1** Given scenarios involving hazardous materials/WMD incidents, the hazardous materials technician shall identify the possible response

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

options (defensive, offensive, and nonintervention) by response objective for each problem

1. Offensive
    a. Rescue
    b. Public Protective Actions
    c. Spill Control
    d. Leak Control
    e. Fire Control
    f. Clean up and recovery

2. Defensive
    a. Public Protective Actions
    b. Spill Control
    c. Fire Control
    d. Clean up and recovery

3. Non intervention - Public Protective Actions

**604-7.3.2.2** The hazardous materials technician shall be able to identify the possible response options to accomplish a given response objective.

The hazardous materials technician shall be able to identify concerns associated with the following event stages of the General Hazardous Materials Behavior Model:

1. Stress event
    a. Thermal stress
    b. Mechanical stress
    c. Chemical stress

2. Breach event
    a. Disintegration
    b. Runaway Cracking
    c. Failure of Container Attachments
    d. Container Punctures
    e. Container Splits or Tears

3. Release event
    a. Detonation
    b. Violent Rupture
    c. Rapid Relief
    d. Spills or Leaks

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

4. Engulfing event
    a. Identify the hazardous material or the energy likely to engulf the area
    b. What form is the energy or matter in?
    c. What is making it move?
    d. What path will it follow?
    e. What type of dispersion pattern will it create?
        i. Cloud
        ii. Cone
        iii. Plume
        iv. Stream
        v. Irregular

5. Impingement event (typically categorized based on duration)
    a. Harmful characteristics of material
    b. Concentration of the hazardous material
    c. Duration of the impingement
    d. Characteristics of the exposure

6. Harm event
    a. Thermal
    b. Toxicity/poison
    c. Radiation
    d. Asphyxiation
    e. Corrosivity
    f. Etiological
    g. Mechanical

***604-7.3.3*** ***Selecting Personal Protective Equipment***

Given scenarios of hazardous materials/WMD incidents with known and unknown hazardous materials/WMD, the hazardous materials technician shall determine the personal protective equipment for the response options specified in the incident action plan in each situation by completing the requirements of 7.3.3.1 through 7.3.3.4.8

**604-7.3.3.1** The hazardous materials technician shall describe types of personal protective equipment that are available for response based on NFPA standards and how these items relate to EPA levels of protection

1. Level A – Vapor Protective Chemical Protective Clothing (CPC)
    a. Encapsulated garment
    b. Requires SCBA (positive pressure self contained breathing apparatus) or SAR (supplied air respirator) use

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

2. Level B – Splash Protective CPC
    a. Encapsulated garment
    b. Non-encapsulated garment
    c. Requires SCBA or SAR use

3. Level C – Splash Protective CPC
    a. Non-encapsulated garment
    b. Utilizes APR (air purifying respirator) or PAPR (powered air purifying respirator)

4. Level D – Non-emergency/hazardous materials response work clothing

5. Chemical protective clothing for Level A, Level B or Level C ensembles should be selected based on one of the following applicable criteria:
    a. NFPA 1991 *Standard on Vapor Protective Ensembles for Hazardous Materials Emergencies*
    b. NFPA 1992 *Standard on Liquid Splash Protective Ensembles and Clothing for Hazardous Materials Emergencies*
    c. NFPA 1994 *Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents*

**604-7.3.3.2** The hazardous materials technician shall identify and describe personal protective equipment options available for the following hazards:

1. Thermal

2. Radiological

3. Asphyxiating

4. Chemical (liquids and vapors)

5. Etiological (biological)

6. Mechanical (explosives)

**604-7.3.3.3** The hazardous materials technician shall identify the process to be considered in selecting respiratory protection for a specified action option

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

1. IDLH environments
    a. Toxic environments
    b. Flammable/explosive environments
    c. Hazardous oxygen levels
    d. Radiation exposure

2. Non-IDLH Atmospheres
    a. Toxic environments
    b. Flammable/explosive environments
    c. Hazardous oxygen levels
    d. Radiation exposure

**604-7.3.3.4** The hazardous materials technician shall identify the factors to be considered in selecting chemical-protective clothing for a specified action option

**604-7.3.3.4.1** The hazardous materials technician shall describe the following terms and explain their impact and significance on the selection of chemical-protective clothing:

1. Degradation

2. Penetration

3. Permeation

**604-7.3.3.4.2** The hazardous materials technician shall identify at least three indications of material degradation of chemical-protective clothing

1. Stiffness or excessive pliability

2. Tears, cuts or abrasions

3. Damage to zippers or other closures

**604-7.3.3.4.3** The hazardous materials technician shall identify the different designs of vapor-protective and splash-protective clothing and describe the advantages and disadvantages of each type

1. Type I
    a. Fully encapsulating air tight vapor protective suit
    b. With SCBA

2. Type II

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

a. Non-encapsulating suit
b. With SCBA worn on outside

3. Type III
   a. Fully encapsulating suit
   b. With SAR

**604-7.3.3.4.4** The hazardous materials technician shall identify the relative advantages and disadvantages of the following heat exchange units used for the cooling of personnel in personal protective equipment:

1. Air cooled
2. Ice cooled
3. Water cooled
4. Phase change cooling technology

**604-7.3.3.4.5** The hazardous materials technician shall identify the process for selecting protective clothing at hazardous materials/WMD incidents

1. Perform site management control functions
2. Identify the problem
3. Perform hazard and risk analysis
4. Consult PPE compatibility charts and respiratory protection guidelines
5. Select appropriate PPE based on the above

**604-7.3.3.4.6** Given three examples of various hazardous materials, the hazardous materials technician shall determine the protective clothing construction materials for a given action option using chemical compatibility charts

**604-7.3.3.4.7** The hazardous materials technician shall identify the physiological and psychological stresses that can affect users of personal protective equipment

1. Physiological
   a. Extreme heat or cold operating conditions

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

b. Noise
c. Reduced vision from fogging of CPC or SCBA face pieces
d. Operations in low-light or low-visibility environments
e. Reduced handling and dexterity due to the need to wear several layers of gloves
f. Adverse weather conditions
g. Physical hazards and the physical operating environment

2. Psychological
   a. Lack of physical fitness and the physical ability to perform the required tasks
   b. Response operations involving injuries, fatalities or high-risk operations
   c. Operations within enclosed or confined space environments
   d. Background and experience levels in both wearing CPC and operating in hostile environments
   e. Fear of either suit or respiratory protection failure

**604-7.3.3.4.8** Given the personal protective equipment provided by the AHJ, the hazardous materials technician shall identify the process for inspecting, testing, and maintenance of personal protective equipment.

1. Inspection – in accordance with manufacturers' recommendations and AHJ policies
   a. Acceptance
   b. Inspect before use
   c. After each use
   d. Periodic (i.e. monthly, quarterly or annually)
   e. As needed
2. Testing– in accordance with manufacturers' recommendations and AHJ policies
   a. Visual
   b. Tactile
   c. Pressure test - ASTM1052 Standard test method for pressure testing vapor ensembles
   d. Soap bubble test
   e. Light bar test
3. Maintenance and storage– in accordance with manufacturers' recommendations and AHJ policies
   a. Protect from
      i. Dust
      ii. Moisture
      iii. Sunlight
      iv. Chemical exposures

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

v. Temperature extremes
vi. Impact

b. Documentation
i. Inspection
ii. Testing
iii. Maintenance

***604-7.3.4*** ***Selecting Decontamination Procedures***

Given a scenario involving a hazardous materials/WMD incident, the hazardous materials technician shall select a decontamination procedure that will minimize the hazard, shall determine the equipment required to implement that procedure, and shall complete the following tasks:

1. Describe the advantages and limitations of each of the following decontamination methods:
   a. Absorption
   b. Adsorption
   c. Chemical degradation
   d. Dilution
   e. Disinfecting
   f. Evaporation
   g. Isolation and disposal
   h. Neutralization
   i. Solidification
   j. Sterilization
   k. Vacuuming
   l. Washing

2. Identify three sources of information for determining the applicable decontamination procedure and identify how to access those resources in a hazardous materials/WMD incident
   a. CHEMTREC
   b. CHEM-TEL
   c. Manufacturer
   d. SDS/MSDS
   e. National Response Center (NRC)
   f. CANUTEC
   g. SETIQ
   h. Local or regional poison control centers

***604-7.3.5*** ***Developing a Plan of Action***

Given scenarios involving hazardous materials/WMD incidents, the hazardous materials technician shall develop a plan of action, including

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

site safety and a control plan, that is consistent with the emergency response plan and standard operating procedures and within the capability of available personnel, personal protective equipment, and control equipment for that incident, by completing the requirements of 7.3.5.1 through 7.3.5.5

A typical plan of action for a hazardous materials response would contain the following components:

1. Site description
2. Entry objective
3. On scene organization and coordination
4. On scene control
5. Hazard evaluation
6. Personal protective equipment
7. On scene work assignments
8. Communications procedures
9. Decontamination procedures
10. On scene safety and health considerations including designation of the safety officer, emergency medical care procedures, environmental monitoring, emergency procedures, and personnel monitoring

**604-7.3.5.1** The hazardous materials technician shall describe the purpose of, procedures for, equipment required for, and safety precautions used with the following techniques for hazardous materials/WMD control:

1. Absorption
2. Adsorption
3. Blanketing
4. Covering

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

5. Damming

6. Diking

7. Dilution

8. Dispersion

9. Diversion

10. Fire suppression

11. Neutralization
    a. For corrosive releases
        i. Not for use on living tissue – use primarily on decon equipment or neutralize spills
        ii. Process generates heat
        iii. Final solution should be as close to pH 7 as possible
        iv. pH disposal guidelines dependent on AHJ
    b. For other chemical releases
        i. Consult technical reference
        ii. Process typically generates heat
        iii. pH disposal guidelines dependent on AHJ

12. Overpacking

13. Patching

14. Plugging

15. Pressure isolation and reduction (flaring; venting; vent and burn; isolation of valves, pumps, or energy sources)

16. Retention

17. Solidification

18. Transfer

19. Vapor control (dispersion, suppression)

**604-7.3.5.2** Given a scenario involving a hazardous materials/WMD incident, the hazardous materials technician shall develop the site safety and control plan that must be included as part of the incident action plan

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

In accordance with 29 CFR 1910.120 site safety and control plans should address the following:

1. Analysis of hazards on the site and a risk analysis of those hazards
2. Site map or sketch
3. Site work (control) zones
4. Use of buddy system
5. Site communications
6. Command post
7. Standard operating procedures and safe work practices
8. Medical Assistance and triage area
9. Other relevant topics

**604-7.3.5.2.1** The hazardous materials technician shall list and describe the safety considerations to be included

**604-7.3.5.2.2** The hazardous materials technician shall identify the points that should be made in a safety briefing prior to working at the scene

**604-7.3.5.3** The hazardous materials technician shall identify the atmospheric and physical safety hazards associated with hazardous materials/WMD incidents involving confined spaces

Hazards associated with confined spaces that should continually be monitored include but are not limited to:

1. Atmospheric hazards
    a. Oxygen deficient
    b. Oxygen enriched
    c. Flammable/explosive
    d. Toxic
2. Physical hazards
    a. Engulfment
    b. Slips/falls

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

c. Electrical
d. Structural
e. Mechanical

**604-7.3.5.4** The hazardous materials technician shall identify the pre-entry activities to be performed.

1. Initial activities would include:
   a. Establish command
   b. Appoint a Safety Officer
   c. Establish hazard control zones
   d. Identify escape routes
   e. Designate a withdrawal signal
   f. Identify safe locations (uphill, upwind, up stream)

2. Develop Incident Action Plan

3. Identify hazards

4. Prior to entry into a hazard area the following tasks should be complete:
   a. Establish entry team(s) and back up team(s)
   b. Conduct site safety briefing
   c. Designate primary and emergency modes of communication
   d. Establish decon corridor
   e. Identification of task(s) to be performed
   f. Identification of personal protective equipment/respiratory protection
   g. Monitoring requirements

**604-7.3.5.5** The hazardous materials technician shall identify the procedures, equipment, and safety precautions for preserving and collecting legal evidence at hazardous materials /WMD incidents

1. Evidence should be collected in accordance with AHJ.

2. All evidence collected must be appropriately documented and chain of custody maintained in accordance with AHJ.

3. Proper PPE must be utilized during collection process.

## ***604-7.4 Competencies — Implementing the Planned Response***

### ***604-7.4.1 Performing Incident Command Duties***

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

Given the emergency response plan or standard operating procedures and a scenario involving a hazardous materials/WMD incident, the hazardous materials technician shall demonstrate the duties of an assigned function in the hazardous materials branch or group within the incident command system and shall identify the role of the hazardous materials technician during hazardous materials/WMD incidents

**604-7.4.1.1** Describe the duties of an assigned function in the hazardous materials branch or group within the incident command system

1. Primary hazardous materials group or branch functions include:
    a. Hazardous materials branch/group supervision (Hazardous Materials Branch Director/Group Supervisor)
    b. Safety (Assistant Safety Officer – Hazardous Materials)
    c. Site Access Control (Site Access Control Unit Leader)
        i. Establishes Hazard Control Zones
        ii. Manages Safe Refuge Area
    d. Entry Team Operations (Entry Team Leader)
        i. Recon team
        ii. Entry team(s)
        iii. Back-up team
    e. Decontamination (Decon Team Leader)
    f. Information/research coordination (Information/Research Team Leader)
        i. Technical/Product Specialist
        ii. Environmental/Remediation Contractors
        iii. Governmental or External Agency Liaisons

2. Secondary hazardous materials group or branch functions include:
    a. Resources/Logistics
    b. Medical (Medical Unit Leader)
    c. Incident rehabilitation (Rehabilitation Unit Leader)
    d. The above secondary functions are performed by the Hazardous Materials Branch/Group only if they are not being performed by the Logistics section, i.e., Logistics section has not been activated

**604-7.4.1.2** Identify the role of the hazardous materials technician during hazardous materials/WMD incidents

1. Implement the employer's emergency response plan

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

2. Use field survey instruments to verify and/or determine the nature of the release

3. Function within the ICS

4. Select and use PPE

5. Understand hazard and risk assessment techniques

6. Perform advanced product control, containment, and/or confinement techniques

7. Understand and implement decontamination procedures

8. Understand termination procedures

9. Understand basic chemical and toxicological terminology and behavior

***604-7.4.2*** ***Using Protective Clothing and Respiratory Protection***

The hazardous materials technician shall demonstrate the ability to don, work in, and doff liquid splash–protective, vapor-protective, and chemical-protective clothing and any other specialized personal protective equipment provided by the AHJ, including respiratory protection, and shall complete the following tasks:

1. Describe three safety procedures for personnel working in chemical-protective clothing

2. Describe three emergency procedures for personnel working in chemical-protective clothing
    a. Loss of air supply
    b. Loss of suit integrity
    c. Loss of verbal communications
    d. Victim/responder down in hazard area

3. Demonstrate the ability to don, work in, and doff self-contained breathing apparatus in addition to any other respiratory protection provided by the AHJ

4. Demonstrate the ability to don, work in, and doff liquid splash–protective, vapor-protective, and chemical-protective clothing in

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

addition to any other specialized protective equipment provided by the AHJ

***604-7.4.3*** ***Performing Control Functions Identified in Incident Action Plan.***
Given scenarios involving hazardous materials/WMD incidents, the hazardous materials technician shall select the tools, equipment, and materials for the control of hazardous materials/WMD incidents and identify the precautions for controlling releases from the packaging/containers and shall complete the following tasks:

1. Given a pressure vessel, select the material or equipment and demonstrate a method(s) to contain leaks from the following locations:
    a. Fusible plug
    b. Fusible plug threads
    c. Side wall of cylinder
    d. Valve blowout
    e. Valve gland
    f. Valve inlet threads
    g. Valve seat
    h. Valve stem assembly blowout

2. Given the fittings on a pressure container, demonstrate the ability to perform the following:
    a. Close valves that are open
    b. Replace missing plugs
    c. Tighten loose plugs

3. Given a 55 gal (208 L) drum and applicable tools and materials, demonstrate the ability to contain the following types of leaks:
    a. Bung leak
    b. Chime leak
    c. Forklift puncture
    d. Nail puncture

4. Given a 55 gal (208 L) drum and an overpack drum, demonstrate the ability to place the 55 gal (208 L) drum into the overpack drum using the following methods:
    a. Rolling slide-in
    b. Slide-in
    c. Slip-over

5. Identify the maintenance and inspection procedures for the tools and equipment provided for the control of hazardous materials

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

releases according to the manufacturer's specifications and recommendations

6. Identify three considerations for assessing a leak or spill inside a confined space without entering the area.

   Use remote monitoring to evaluate for:
   a. Oxygen levels
   b. Flammable atmospheres
   c. Toxic atmospheres

7. Identify three safety considerations for product transfer operations
   a. Grounding
   b. Bonding
   c. Elimination of ignition sources and shock hazards

8. Given an MC-306/DOT-406 cargo tank and a dome cover clamp, demonstrate the ability to install the clamp on the dome

9. Identify the methods and precautions used to control a fire involving an MC-306/DOT-406 aluminum shell cargo tank

10. Describe at least one method for containing each of the following types of leaks in MC-306/DOT-406, MC-307/DOT-407, and MC-312/DOT-412 cargo tanks:
    a. Dome cover leak
    b. Irregular-shaped hole
    c. Puncture
    d. Split or tear

11. Describe three product removal and transfer considerations for overturned MC-306/DOT-406, MC-307/DOT-407, MC-312/DOT-412, MC-331, and MC-338 cargo tanks
    a. Inherent risks associated with such operations
    b. Procedures and safety precautions
    c. Equipment required

**604-7.4.4** Given MC-306/DOT-406, MC-307/DOT-407, MC-312/DOT-412, MC-331, and MC-338 cargo tanks, the hazardous materials technician shall identify the common methods for product transfer from each type of cargo tank.

***604-7.4.5*** ***Performing Decontamination Operations Identified in the Incident Action Plan*.**

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

The hazardous materials technician shall demonstrate the ability to set up and implement the following types of decontamination operations:

1. Technical decontamination operations in support of entry operations

2. Technical decontamination operations involving ambulatory and non-ambulatory victims

3. Mass decontamination operations involving ambulatory and non-ambulatory victims

## ***604-7.5*** ***Competencies — Evaluating Progress***

### ***604-7.5.1*** ***Evaluating the Effectiveness of the Control Functions***

Given scenarios involving hazardous materials/WMD incidents and the incident action plan, the hazardous materials technician shall evaluate the effectiveness of any control functions identified in the incident action plan.

### ***604-7.5.2*** ***Evaluating the Effectiveness of the Decontamination Process***

Given an incident action plan for a scenario involving a hazardous materials/WMD incident, the hazardous materials technician shall evaluate the effectiveness of any decontamination procedures identified in the incident action plan.

## ***604-7.6*** ***Competencies — Terminating the Incident***

### ***604-7.6.1*** ***Assisting in the Debriefing***

Given a scenario involving a hazardous materials/WMD incident, the hazardous materials technician shall participate in the debriefing of the incident by completing the following requirements:

An effective debriefing should address the following informational issues regarding response activities:

- Positive aspects – Identify strengths or things that went well that need to be maintained or continued
- Negative aspects – Identify weaknesses that went poorly and need to be corrected
- Unique aspects – Unusual or unsuspected conditions that may need to be addressed or planned for

1. Describe (at least) three components of an effective debriefing

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

a. Inform responders of the potential signs and symptoms of any possible hazardous materials exposures
b. Identify:
    i. Damaged equipment
    ii. Expended supplies
    iii. Items that need to be disposed
    iv. Unsafe site conditions
c. Assign:
    i. information gathering responsibilities for a post-incident analysis and critique
    ii. Point of contact for any follow up on incident related issues
d. Assess the need for Critical Incident Stress Debriefing (CISD)

2. Describe the key topics of an effective debriefing
    a. Health information
    b. Equipment and apparatus exposure review
    c. A follow-up contact person
    d. Problems requiring immediate action
    e. Thank you!

3. Describe when a debriefing should take place
    a. As soon as the “emergency phase” of the incident is over
    b. Should be before any responders leave the scene

4. Describe who should be involved in a debriefing.
    a. Hazardous Materials Response Team
    b. Incident Commander
    c. Section Chiefs/Branch Directors/Division and Group Supervisors, etc.
    d. Information Officer
    e. Agency representatives or key players as determined by the Incident Commander (i.e. Safety Officer and Agency Liaisons)

***604-7.6.2*** ***Assisting in the Incident Critique***

Given a scenario involving a hazardous materials/WMD incident, the hazardous materials technician shall provide operational observations of the activities that were performed in the hot and warm zones during the incident and shall complete the following tasks:

1. Describe three components of an effective critique
    a. Direction

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

b. Participation
c. Solutions

2. Describe who should be involved in a critique
   a. Hazardous Materials Response Team
   b. Incident Commander
   c. Section Chiefs/Branch Directors/Division and Group Supervisors, etc.
   d. Information Officer
   e. Agency representatives or key players as determined by the Incident Commander (i.e. Safety Officer and Agency Liaisons)

3. Describe why an effective critique is necessary after a hazardous materials/WMD incident
   a. Develop recommendations for improving the emergency response team
   b. Promotes systems-dependent operations rather than people-dependent organizations
   c. Promotes a willingness to cooperate through teamwork
   d. Promotes improvement of safe operating procedures
   e. Promotes sharing of information among emergency response organizations

4. Describe which written documents should be prepared as a result of the critique
   a. Post-Critique Report
   b. Formal-Critique Report

5. Describe recommended methods for critiquing large-scale emergency responses
   a. Participant-level critique
   b. Operations-level critique
   c. Group-level critique

***604-7.6.3*** ***Reporting and Documenting the Incident***

Given a scenario involving a hazardous materials/WMD incident, the hazardous materials technician shall complete the reporting and documentation as required by the AHJ by completing the following requirements:

1. Identify the reports and supporting documentation required by the emergency response plan or standard operating procedures

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

2. Demonstrate completion of the reports and supporting documentation
    a. Incident action plan and all components
    b. Site safety plan and all components
    c. Other documentation required by AHJ

3. Describe the importance of personnel exposure records

4. Describe the importance of debriefing records

5. Describe the importance of critique records

6. Identify the steps in keeping an activity log and exposure records
    a. Activity log
        i. Record major event(s)
        ii. Record time major event(s) occurred
        iii. Briefly describe major event(s)
        iv. Additional information to include
            a) Information that may assist in the investigation or cost recovery process
            b) Task assignments
            c) Task completion
            d) Injuries and exposures
    b. Exposure records
        i. General information
            a) Name of exposed worker
            b) Personal ID number
            c) Assignment/station
            d) Incident date
            e) Incident number
            f) Incident location
        ii. Nature of incident
        iii. Level of personal protection
        iv. Emergency response activity
        v. Exposure data
            a) Method of exposure
            b) Duration of exposure
        vi. Medical treatment provided
            a) Signs and symptoms
            b) On-scene medical treatment
            c) Medical facility treatment
            d) Follow-up action required
        vii. Medical treatment provided
            a) Comment section

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

b) Individual's signature and date
c) Officer's signature and date

7. Identify the steps to be taken in compiling incident reports that meet federal, state, local, and organizational requirements – AHJ

8. Identify the requirements for compiling hot zone entry and exit logs – AHJ

9. Identify the requirements for compiling personal protective equipment logs

   The compilation of personal protective equipment logs should follow the PPE manufacturer's recommended procedures and any additional guidance from the AHJ (Regulations, SOPs, SOGs, etc.).

10. Identify the requirements for filing documents and maintaining records – AHJ

Reprinted with permission from NFPA 472 *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* 2013 Edition Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

# HAZARDOUS MATERIALS INCIDENT COMMANDER

# REFERENCE LIST FOR THE HAZARDOUS MATERIALS INCIDENT COMMANDER CURRICULUM

This Reference List is provided as a general guide for both instructors and students to locate information pertaining to the specific objectives in the TCFP Curriculum. This list is **not** all-inclusive and does not in any way limit TCFP development and use of questions to test the objectives of the curriculum:

## Required References

Texts

*Certification Curriculum Manual.* Texas Commission on Fire Protection. (Most current edition). Austin, TX: Texas Commission on Fire Protection.

*Code of Federal Regulations, Title 29 Part 1910.120, Appendix A*. United States. U.S. Department of Labor, Occupational Safety & Health Administration. http://edocket.access.gpo.gov/cfr_2007/julqtr/pdf/29cfr1910.120.pdf

*Emergency Response Guidebook.* United States. (Most current edition). Washington, DC: U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration.

*Hazardous Materials: Managing the Incident*, 4th edition. Noll, G. G., Hildebrand, M. S., Schnepp, R. & Rudner, G.D. (2014). Burlington, MA: Jones and Bartlett.

*Hazardous Materials/Weapons of Mass Destruction Response Handbook*, 6th/2013 edition. McGowan, T. (2012). Quincy, MA: National Fire Protection Association.

*NFPA 472: Standard for Professional Competence of Responders to Hazardous Materials Incidents.* (2013 ed.). Quincy, MA: NFPA Publications. National Fire Protection Association

*NIOSH Pocket Guide to Chemical Hazards.* Cincinnati National Institute for Occupational Safety and Health. (Most current edition). OH: US Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health. http://www.cdc.gov/niosh/npg/

*Standards Manual for Fire Protection Personnel.* Texas Commission on Fire Protection. (Most current edition). Austin, TX: Texas Commission on Fire Protection.

## Recommended References

The most current edition of the following publications and media are recommended (not required) supplemental material for program use.

Texts

*Bretherick's Handbook of Reactive Chemical Hazards*. Urben, P. G., Pitt, M. J., & Bretherick, L. (2007). Amsterdam: Elsevier.

*CHRIS: Chemical Hazards Response Information System*. United States. (1992). COMDTINST, M16465.11B. Washington, DC: U.S. Dept. of Transportation, U.S. Coast Guard.

*Dangerous Properties of Industrial and Consumer Chemicals*. Cheremisinoff, N. P., King, J. A., & Boyko, R. (1994). New York, NY: M. Dekker.

*Emergency Care for Hazardous Materials Exposure*. Currance, P., Bronstein, A. C., & Clements, B. (2005). St. Louis, MO: Mosby.

*Emergency Handling of Hazardous Materials in Surface Transportation.* Association of American Railroads. (2011). Washington, DC: Association of American Railroads.

*Fire Fighter's Handbook of Hazardous Materials*, Baker, Charles T., 7th edition. (2006). Sudsbury, MA: Jones and Bartlett.

*Fire Protection Guide to Hazardous Materials*. National Fire Protection Association. (2010 edition). Quincy, MA: National Fire Protection Association.

*Hawley's Condensed Chemical Dictionary*. Lewis, R. J., & Hawley, G. G. (2007). West Sussex, England: Wiley.

*Hazardous Materials: Managing the Incident: Field Operations Guide*. Bevelacqua, A. 2nd Edition (2013). MD: Jones and Bartlett Publishing

*Symbol Seeker: Hazard Identification Manual*. Burns, P. P. (2002). Preston, England: Symbol Seeker.

Media

*Chlorine Emergencies: An Overview for First Responders*. Chlorine Institute. (2007). Arlington, VA: The Chlorine Institute.

*Hazardous Materials Containment Series*. Action Training Systems. [4 Disc DVD Set]. Hazardous materials containment - series of 4 titles. Seattle, WA: Action Training Systems.

*Hazardous Materials: Managing the Incident DVD Series.* Massingham, G., Noll, G. G., Hildebrand, M. S., & Noll, G. G. (2005). [8 Disc DVD Set]. Edgartown, MA: Emergency Film Group.

# CHAPTER 6
# SECTION 605
# HAZARDOUS MATERIALS INCIDENT COMMANDER
# CURRICULUM OUTLINE

| SECTION | SUBJECT | RECOMMENDED HOURS |
|---|---|---|
| 605-8.1 | General - Introduction - Laws, Regulations, and National Consensus Standards | 1 |
| 605-8.2 | Analyzing the Incident | 4 |
| 605-8.3 | Planning the Response | 9 |
| 605-8.4 | Implementing the Planned Response | 4 |
| 605-8.5 | Evaluating Progress | 2 |
| 605-8.6 | Terminating the Incident | 4 |
| | **TOTAL RECOMMENDED HOURS** | **24** |

The recommended hours include time for skills evaluation and are based on 12 students. Hours needed depend on the actual number of students.

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

# *SECTION 605*
# *HAZARDOUS MATERIALS INCIDENT COMMANDER*

The Hazardous Materials Incident Commander is the person responsible for all hazardous materials/weapons of mass destruction (WMD) incident activities, including the development of strategies and tactics and the ordering and release of resources. The Hazardous Materials Incident Commander has overall authority and responsibility for conducting incident operations and is responsible for the management of all incident operations at the hazardous materials/weapons of mass destruction (WMD) incident site.

The Hazardous Materials Incident Commander must first master all the job performance requirements and knowledge, skills and abilities pertaining to:

- Awareness Level Personnel,
- Operations Level Responders and,
- The competencies of this chapter

The Hazardous Materials Incident Commander performs the following functions and is primarily responsible for:

- Having clear authority and knowledge of agency policy,
- Ensuring incident safety,
- Establishing the incident command post (ICP),
- Setting priorities, determining incident objectives and strategies to be followed,
- Establishing the incident command system (ICS) needed to manage the incident,
- Approving the incident action plan (IAP),
- Coordinating command and general staff functions,
- Approving resource order requests and the use of volunteers and auxiliary personnel,
- Ordering demobilization as needed,
- Ensuring after-action reports are completed.

## ***605-8.1*** ***General***

### ***605-8.1.1*** ***Introduction***

**605-8.1.1.1** The incident commander (IC) shall be that person responsible for all incident activities, including the development of strategies and tactics and the ordering and release of resources as designated by the authority having jurisdiction (AHJ).

**605-8.1.1.2** The incident commander shall be trained to meet all competencies at the awareness level (Section 601), all core competencies at the operations level (Section 602), and all competencies in this chapter.

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents.* Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

**605-8.1.1.3** The incident commander shall receive any additional training necessary to meet applicable governmental response and occupational health and safety regulations.

**605-8.1.1.4** The incident commander shall receive any additional training necessary to meet specific needs of the jurisdiction.

***605-8.1.2*** ***Goal***

**605-8.1.2.1** The goal of the competencies in this chapter shall be to provide the incident commander with the knowledge and skills to perform the tasks in 8.1.2.2 safely.

**605-8.1.2.2** In addition to being competent at the awareness and all core competencies at the operations levels, the incident commander shall be able to perform the following tasks:

1. Analyze a hazardous materials/WMD incident to determine the complexity of the problem and potential outcomes by completing the following tasks:
    a. Collect and interpret hazard and response information from printed and technical resources, computer databases, and monitoring equipment
    b. Estimate the potential outcomes within the endangered area at a hazardous materials/WMD incident

2. Plan response operations within the capabilities and competencies of available personnel, personal protective equipment, and control equipment by completing the following tasks:
    a. Identify the response objectives for hazardous materials/WMD incidents
    b. Identify the potential response options (defensive, offensive, and nonintervention) available by response objective
    c. Approve the level of personal protective equipment required for a given action option
    d. Develop an incident action plan, including site safety and control plan, consistent with the emergency response plan or standard operating procedures and within the capability of available personnel, personal protective equipment, and control equipment

3. Implement a response to favorably change the outcome consistent with the emergency response plan or standard operating procedures by completing the following tasks:
    a. Implement an incident command system, including the specified procedures for notification and utilization of nonlocal resources (e.g., private, state, and federal government personnel)
    b. Direct resources (private, governmental, and others) with task assignments and on-scene activities and provide management overview, technical review, and logistical support to those resources

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents.* Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

c. Provide a focal point for information transfer to media and local elected officials through the incident command system structure

4. Evaluate the progress of the planned response to ensure the response objectives are being met safely, effectively, and efficiently and adjust the incident action plan accordingly.

5. Terminate the emergency phase of the incident by completing the following tasks:
   a. Transfer command (control) when appropriate
   b. Conduct an incident debriefing
   c. Conduct a multiagency critique
   d. Report and document the hazardous materials/WMD incident and submit the report to the designated entity

## ***605-8.2 Competencies — Analyzing the Incident***

### ***605-8.2.1 Collecting and Interpreting Hazard and Response Information***

**605-8.2.1.1** Given access to printed and technical resources, computer databases, and monitoring equipment, the incident commander shall ensure the collection and interpretation of hazard and response information not available from the current edition of the DOT *Emergency Response Guidebook* or an MSDS.

**605-8.2.1.2** Given access to printed and technical resources, computer databases, and monitoring equipment, the incident commander shall be able to identify and interpret the types of hazard and response information available from each of the following resources and explain the advantages and disadvantages of each resource:

1. Hazardous materials databases – examples include:
   a. CAMEO (Computer Assisted Management of Emergency Operations)
   b. MARPLOT (Mapping Applications for Response, Planning and Local Operational Tasks)
   c. ALOHA (Aerial Locations Of Hazardous Atmospheres)
   d. WISER (Wireless Informational Systems for Emergency Responders)
   e. OREIS (Operational Response Emergency Informational System)

2. Monitoring equipment – examples include:
   a. Combustible gas indicators
   b. Colorimetric tubes
   c. Photoionization detectors/flame ionization detectors
   d. Radiological survey equipment
   e. Oxygen meters
   f. Toxic Gas Sensors
   g. pH paper

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents.* Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

h. Chemical test strips

3. Reference materials
   a. DOT Emergency Response Handbook
   b. Field Guide to Tank Guide Identification
   c. Bretherick's Handbook of Reactive Substances
   d. Emergency Care for Hazardous Materials Exposure
   e. Hawley's Condensed Chemical Dictionary
   f. NIOSH Pocket Guide
   g. CHRIS Chemical Hazards Response Information System (USCG)
   h. Dangerous Properties of Industrial Chemicals
   i. NFPA Fire Protection Guide of Hazardous Materials

4. Technical information centers (i.e., CHEMTREC/CANUTEC/ SETIQ and local, state, and federal authorities) – examples include:
   a. CHEMTREC
   b. Chlorine Institute
   c. US Coast Guard and DOT National Response Center
   d. The Agency for Toxic Substance and Disease Registry (ATSDR)
   e. National Animal Poison Control Center (NAPCC)
   f. National Pesticide Informational Center (NPIC)
   g. National Poison Control Center (Mr. Yuck)
   h. US Army Operational Center
   i. Defense Logistics Agency

5. Technical information specialists

***605-8.2.2*** ***Estimating Potential Outcomes***

Given scenarios involving hazardous materials/WMD incidents, the surrounding conditions, and the predicted behavior of the container and its contents, the incident commander shall estimate the potential outcomes within the endangered area and shall complete the following tasks:

1. Identify the steps for estimating the outcomes within an endangered area of a hazardous materials/WMD incident.
   a. Determining the dimensions of the endangered area
   b. Estimating the number of exposures within the endangered area
   c. Measuring or predicting the concentrations of materials in the endangered area
   d. Estimating the physical, health, and safety hazards within the endangered area
   e. Identifying the area of potential harm within the endangered area
   f. Estimating the potential outcomes within the endangered area

2. Describe the following toxicological terms and exposure values and explain their significance in the analysis process:
   a. Counts per minute (cpm) and kilocounts per minute (kcpm)
   b. Immediately dangerous to life and health (IDLH) value

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents.* Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

c. Infectious dose
d. Lethal concentrations ($LC_{50}$)
e. Lethal dose ($LD_{50}$)
f. Parts per billion (ppb)
g. Parts per million (ppm)
h. Permissible exposure limit (PEL)
i. Radiation absorbed dose (rad)
j. Roentgen equivalent man (rem); millirem (mrem); microrem (μrem)
k. Threshold limit value ceiling (TLV-C)
l. Threshold limit value short-term exposure limit (TLV-STEL)
m. Threshold limit value time-weighted average (TLV-TWA)
n. Other toxicological terms or exposure values as determined by the AHJ

3. Identify two methods for predicting the areas of potential harm within the endangered area of a hazardous materials/WMD incident.
   a. Determine the level of toxicity of the hazardous material that has been released in the endangered area
   b. Determine the length of time that persons in the endangered area would be exposed to the hazard
   c. Determine areas of potential harm using reference sources or direct monitoring instruments
      i. *Emergency Response Guidebook*
      ii. Computer dispersion models
         a) CAMEO (Computer Assisted Management of Emergency Operations)
         b) MARPLOT (Mapping Applications for Response, Planning and Local Operational Tasks)
         c) ALOHA (Aerial Locations Of Hazardous Atmospheres)
         d) WISER (Wireless Informational Systems for Emergency Responders)
      iii. Portable and fixed air-monitoring systems

4. Identify the methods available to the organization for obtaining local weather conditions and predictions for short-term future weather changes.
   a. National Weather Service
   b. Local weather service
   c. Internet weather resources, i.e. Weather Bug station locations
   d. On-scene direct monitoring instrumentation, i.e. WeatherPak

5. Explain the basic toxicological principles relative to assessment and treatment of personnel exposed to hazardous materials, including the following:
   a. Acute and delayed toxicity (chronic)
   b. Dose response
   c. Local and systemic effects

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents.* Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

d. Routes of exposure
    i. Inhalation
    ii. Ingestion
    iii. Absorption
    iv. Injection
e. Synergistic effects

6. Describe the health risks associated with the following:
    a. Biological agents and biological toxins
    b. Blood agents
    c. Choking agents
    d. Irritants (riot control agents)
    e. Nerve agents
    f. Radiological materials
    g. Vesicants (blister agents)

## ***605-8.3 Competencies — Planning the Response***

### ***605-8.3.1 Identifying Response Objectives***

Given an analysis of a hazardous materials/WMD incident, the incident commander shall be able to describe the steps for determining response objectives (defensive, offensive, and nonintervention).

### ***605-8.3.2 Identifying the Potential Response Options***

Given scenarios involving hazardous materials/WMD, the incident commander shall identify the possible response options (defensive, offensive, and nonintervention) by response objective for each problem and shall complete the following tasks:

1. Identify the possible response options to accomplish a given response objective.
    a. Offensive
        i. Rescue
        ii. Public Protective Actions
        iii. Spill Control
        iv. Leak Control
        v. Fire Control
        vi. Clean up and recovery
    b. Defensive
        i. Public Protective Actions
        ii. Spill Control
        iii. Fire Control
        iv. Clean up and recovery
    c. Non intervention - Public Protective Actions

2. Identify the purpose of each of the following techniques for hazardous materials control:
    a. Absorption

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents.* Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

b. Adsorption
c. Blanketing
d. Covering
e. Contamination isolation
f. Damming
g. Diking
h. Dilution
i. Dispersion
j. Diversion
k. Fire suppression
l. Neutralization
    i. For corrosive releases
        a) Not for use on living tissue – use primarily on decon equipment or neutralize spills
        b) Process generates heat
        c) Final solution should be as close to pH 7 as possible
        d) pH disposal guidelines dependent on AHJ
    ii. For other chemical releases
        a) Consult technical reference
        b) Process typically generates heat
        c) pH disposal guidelines dependent on AHJ
m. Overpacking
n. Patching
o. Plugging
p. Pressure isolation and reduction (flaring; venting; vent and burn; isolation of valves, pumps, or energy sources)
q. Retention
r. Solidification
s. Transfer
t. Vapor control (dispersion, suppression)

***605-8.3.3*** ***Approving the Level of Personal Protective Equipment***

Given scenarios involving hazardous materials/WMD with known and unknown hazardous materials/WMD, the incident commander shall approve the personal protective equipment for the response options specified in the incident action plan in each situation and shall complete the following tasks:

1. Identify the four levels of chemical protection (EPA/OSHA) and describe the equipment required for each level and the conditions under which each level is used.
    a. Level A – Vapor Protective Chemical Protective Clothing (CPC)
        i. Encapsulated garment
        ii. Requires SCBA (positive pressure self contained breathing apparatus) or SAR (supplied air respirator) use
    b. Level B – Splash Protective CPC
        i. Encapsulated garment
        ii. Non-encapsulated garment

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents.* Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

iii. Requires SCBA or SAR use

c. Level C – Splash Protective CPC
   i. Non-encapsulated garment
   ii. Utilizes APR (air purifying respirator) or PAPR (powered air purifying respirator)

d. Level D – Non-emergency/hazardous materials response work clothing

e. Chemical protective clothing for Level A, Level B or Level C ensembles should be selected based on one of the following applicable criteria:
   i. NFPA 1991 *Standard on Vapor Protective Ensembles for Hazardous Materials Emergencies*
   ii. NFPA 1992 *Standard on Liquid Splash Protective Ensembles and Clothing for Hazardous Materials Emergencies*
   iii. NFPA 1994 *Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents*

2. Describe the following terms and explain their impact and significance on the selection of chemical-protective clothing:
   a. Degradation
   b. Penetration
   c. Permeation

3. Describe three safety considerations for personnel working in vapor-protective, liquid splash–protective and high temperature–protective clothing.
   a. Loss of dexterity
   b. Limited vision
   c. Reduced communications capability
   d. Heat and/or cold stress
   e. Need for rehabilitation

4. Identify the physiological and psychological stresses that can affect users of personal protective equipment.
   a. Physiological
      i. Extreme heat or cold operating conditions
      ii. Noise
      iii. Reduced vision from fogging of CPC or SCBA face pieces
      iv. Operations in low-light or low-visibility environments
      v. Reduced handling and dexterity due to the need to wear several layers of gloves
      vi. Adverse weather conditions
      vii. Physical hazards and the physical operating environment
   b. Psychological
      i. Lack of physical fitness and the physical ability to perform the required tasks

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents.* Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

ii. Response operations involving injuries, fatalities or high-risk operations
iii. Operations within enclosed or confined space environments
iv. Background and experience levels in both wearing CPC and operating in hostile environments
v. Fear of either suit or respiratory protection failure

***605-8.3.4*** ***Developing an Incident Action Plan***

Given scenarios involving hazardous materials/WMD incidents, the incident commander shall develop an incident action plan, including site safety and control plan, consistent with the emergency response plan or standard operating procedures and within the capability of the available personnel, personal protective equipment, and control equipment, and shall complete the tasks in 8.3.4.1 through 8.3.4.5.5.

**605-8.3.4.1** The incident commander shall identify the steps for developing an incident action plan.

1. Analyze - Analyze the incident

2. Plan - Develop the Incident Action Plan including the following:
   a. Site restrictions
   b. Entry objectives
   c. On-scene organization and control
   d. Selection of personal protective equipment
   e. Site safety plan (ICS 208HM)
   f. Communications procedures
   g. Emergency procedures and personnel accountability
   h. Emergency medical care arrangements
   i. Rehabilitation plan
   j. Decontamination procedures
   k. On-scene work assignments (branches)
   l. Ensure debriefing and critiquing of the incident is conducted once the incident is terminated
   m. Document the plan using:
      i. Appropriate regulatory agency methods as necessary
      ii. Department of Homeland Security – National Incident Management System/Incident Command System standardized forms
         a) ICS 201 Incident Briefing Form
         b) ICS 202 Incident Objectives Worksheet
         c) ICS 203 Organization Assignment List
         d) ICS 204 Division Assignment List
         e) ICS 205 Communications Plan
         f) ICS 206 Medical Plan
         g) ICS 208HM Site Safety and Control Plan
         h) ICS 211 Incident Check-in List

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents.* Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

i) ICS 213 General Message
j) ICS 214 Unit Log
k) ICS 215 Incident Planning Worksheet
l) ICS 215A Incident Action Plan Safety Analysis

3. Implement - Implement the plan

4. Evaluate - Evaluate the plan's effectiveness and revise as necessary

**605-8.3.4.2** The Incident Commander shall identify the factors to be evaluated in selecting public protective actions, including evacuation and sheltering-in-place.

1. The Hazardous Material Involved
   a. Degree of health hazard
   b. Chemical and physical properties
   c. Amount involved
   d. Containment/control of release
   e. Rate of vapor movement

2. The Population Threatened
   a. Location
   b. Number of people
   c. Time available to evacuate or shelter in-place
   d. Ability to control evacuation or shelter-in-place
   e. Building types and availability
   f. Special institutions or populations, e.g., nursing homes, hospitals, prisons

3. Weather Conditions
   a. Effect on vapor and cloud movement
   b. Potential for change
   c. Effect on evacuation or protection in-place

**605-8.3.4.3** Given the emergency response plan or standard operating procedures, the incident commander shall identify which entity will perform 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)

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents.* Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

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

**605-8.3.4.4** The incident commander shall identify the process for determining the effectiveness of a response option based on the potential outcomes.

1. Evaluate the effectiveness of the response based on:
    a. Are the IAP objectives being met?
    b. What problems have arisen?

2. Revise or modify the incident action plan based on identified needs

3. Reevaluate the effectiveness of the revised IAP

4. Continually monitor the effectiveness of the IAP

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents.* Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

**605-8.3.4.5** The incident commander shall identify the safe operating practices and procedures that are required to be followed at a hazardous materials/WMD incident.

1. Approach cautiously from upwind, uphill and up stream

2. Secure the scene
    a. Establish command
    b. Implement ICS
    c. Implement isolation zones

3. Identify the hazards

4. Assess the situation - perform hazard and risk analysis

5. Obtain help as needed
    a. Ensure that all responders are only assigned to duties commensurate with their level of training
    b. Awareness level personnel cannot intervene directly with the material
    c. Operations level personnel can only perform defensive response tasks
    d. Operations personnel trained to a mission specific competency may perform that task under the direct supervision of Technician level personnel
    e. Technician level personnel may perform offensive response activities
    f. Specialist personnel may provide technical assistance, advice or response support depending on their degree of training
    g. Skilled support personnel may operate special equipment needed to support the response. They may not have any hazardous materials training and must be adequately briefed prior to being utilized.

6. Decide on site entry – if applicable

7. Respond
    a. Develop IAP
    b. Develop site safety plan
    c. Implement IAP

8. Above all, do not come into contact with the material
    a. Do not smell the material
    b. Do not touch the material
    c. Do not taste the material

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents.* Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

**605-8.3.4.5.1** The incident commander shall identify the importance of pre-incident planning relating to safety during responses to specific sites.

**605-8.3.4.5.2** The incident commander shall identify the procedures for presenting a safety briefing prior to allowing personnel to work on a hazardous materials/WMD incident.

1. Orient personnel to the scene
2. Identify objectives
3. Identify scene safety and health considerations
4. Designate a safety officer
5. Identify emergency medical care procedures – ICS 206 Medical Plan
6. Establish environmental monitoring
7. Identify emergency procedures
    a. Communications plan
    b. Safe havens
    c. Back-up team
    d. Buddy system
    e. Establish decon plan – have technical decon and emergency decon procedures in place
    f. Identify SOPs and other safe work practices that apply
8. Conduct personnel monitoring
    a. Pre and post entry medical screening
    b. Personnel accountability

**605-8.3.4.5.3** The incident commander shall identify at least three safety precautions associated with search and rescue missions at hazardous materials/WMD incidents.

1. Buddy system
2. Back up team
3. PPE requirements - based on scene size up and the hazard and risk analysis

**605-8.3.4.5.4** The incident commander shall identify the advantages and limitations of the following and describe an example where each decontamination method would be used:

1. Absorption

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents.* Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

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

**605-8.3.4.5.5** The incident commander shall identify the atmospheric and physical safety hazards associated with hazardous materials/WMD incidents involving confined spaces.

1. Atmospheric hazards
    a. Oxygen-deficient atmosphere
    b. Oxygen-enriched atmosphere
    c. Flammable and explosive atmospheres
    d. Toxic atmosphere

2. Physical hazards
    a. Engulfment hazards
    b. Falls and slips
    c. Electrical hazards
    d. Structural hazards
        i. Limited egress
        ii. Extended travel distances
        iii. Darkness
    e. Mechanical hazards
    f. Poor communications

## ***605-8.4 Competencies — Implementing the Planned Response***

### ***605-8.4.1 Implementing an Incident Command System***

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents.* Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

Given a copy of the emergency response plan and annexes related to hazardous materials/WMD, the incident commander shall identify the requirements of the plan, including the procedures for notification and utilization of nonlocal resources (private, state, and federal government personnel), by completing the following requirements:

1. Identify the role of the incident commander during a hazardous materials/WMD incident.
    a. The incident commander (IC) shall be that person responsible for all incident activities, including the development of strategies and tactics and the ordering and release of resources.
    b. The incident commander is the responder in charge of a single command ICS structure.

2. Describe the concept of unified command and its application and use at a hazardous materials/WMD incident.
    a. Unified command involves establishing a unified command team of command-level representatives from each of the primary responding agencies that develop strategies and tactics and authorize the ordering and release of resources.
    b. Unified command team shares command responsibilities but the responsible party plays the lead role.

3. Identify the duties and responsibilities of the following hazardous materials branch/group functions within the incident command system:
    a. Decontamination
    b. Entry (backup)
    c. Hazardous materials branch director or group supervisor
    d. Hazardous materials safety
    e. Information and research

4. Identify the steps for implementing the emergency response plans required under Title III Emergency Planning and Community Right-to-Know Act (EPCRA) of the Superfund Amendments and Reauthorization Act (SARA) Section 303, or other state and emergency response planning legislation.
    a. An event occurs
    b. The emergency management/response system is activated
    c. Responders respond to the scene
    d. The local, state, federal, or facility response plan is implemented per AHJ

5. Given the emergency response planning documents, identify the elements of each of the documents.
    a. Facility emergency response plans
    b. Pre-incident tactical plans
    c. Published emergency response references
    d. Shipping documents

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents.* Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

6. Identify the elements of the incident management system/incident command system (IMS/ICS) necessary to coordinate response activities at hazardous materials/WMD incidents.
    a. Command staff
        i. Incident commander
        ii. Incident Safety Officer
        iii. Public Information Officer
        iv. Liaison Officer
    b. General Staff
        i. Operations Section Chief – Hazardous Materials Branch or Group
            a) Primary hazardous materials group or branch functions include:
                i) Hazardous materials branch/group supervision (Hazardous Materials Branch Director/Group Supervisor)
                ii) Safety (Assistant Safety Officer – Hazardous Materials)
                iii) Site Access Control (Site Access Control Unit Leader)
                (a) Establishes Hazard Control Zones
                (b) Manages Safe Refuge Area
                iv) Entry Team Operations (Entry Team Leader)
                (a) Recon team
                (b) Entry team(s)
                (c) Back-up team
                v) Decontamination (Decon Team Leader)
                vi) Information/research coordination (Information/Research Team Leader)
                (a) Technical/Product Specialist
                (b) Environmental/Remediation Contractors
                (c) Governmental or External Agency Liaisons
            b) Secondary hazardous materials group or branch functions include:
                i) Resources/logistics
                ii) Medical (Medical Unit Leader)
                iii) Incident rehabilitation (Rehabilitation Unit Leader)
                iv) The above secondary functions are performed by the Hazardous Materials Branch/Group only if they are not being performed by the logistics section, i.e., logistics section has not been activated.
        ii. Planning Section Chief – as applicable

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents.* Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

iii. Logistics Section Chief – as applicable
iv. Finance/Admin. Section Chief – as applicable

7. Identify the primary government agencies and identify the scope of their regulatory authority (including the regulations) pertaining to the production, transportation, storage, and use of hazardous materials and the disposal of hazardous wastes.
   a. Federal
      i. DHS – Department of Homeland Security
      ii. DOT – Department of Transportation
      iii. EPA – Environmental Protection Agency
      iv. FAA – Federal Aviation Administration
      v. NRC – Nuclear Regulatory Commission
      vi. OSHA – Occupational Safety and Health Administration
      vii. USCG – United States Coast Guard
   b. State
      i. DPS – Department of Public Safety
      ii. Railroad Commission
      iii. TCEQ – Texas Commission on Environmental Quality
      iv. TDSHS – Texas Department of State Health Services
      v. TGLO – Texas General Land Office
      vi. TXDOT – Texas Department of Transportation
   c. Local
      i. Local emergency management
      ii. Local county/municipal agencies

8. Identify the governmental agencies and resources that can offer assistance during a hazardous materials/WMD incident and identify their role and the type of assistance or resources that might be available.
   a. Federal
      i. DHS - Homeland Security Issues
      ii. FBI - Crisis Management
      iii. FEMA - Consequence Management
      iv. EPA - Environmental Management
      v. US Coast Guard - Navigable Waterway Management & Port Security
      vi. DOD - Explosives, Munitions, Military Shipments Technical Assistance/Response
      vii. ATF - Explosives Technical Assistance
   b. State
      i. DPS - District Disaster Chair (DDC)
      ii. TDEM - Emergency Management
      iii. TCEQ - Environmental Management
      iv. TGLO - Water Quality
      v. TRRC - Pipelines and Propane Storage
   c. Local
      i. Local emergency management
      ii. Local fire department

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents.* Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

iii. Local police department
iv. EMS providers

***605-8.4.2*** ***Directing Resources (Private and Governmental)***

Given a scenario involving a hazardous materials/WMD incident and the necessary resources to implement the planned response, the incident commander shall demonstrate the ability to direct the resources in a safe and efficient manner consistent with the capabilities of those resources.

Criteria and factors should include the following:

1. Task assignment (based on strategic and tactical options)
2. Operational safety
3. Operational effectiveness
4. Planning support
5. Logistics support
6. Administrative support

***605-8.4.3*** ***Providing a Focal Point for Information Transfer to the Media and Elected Officials***

Given a scenario involving a hazardous materials/WMD incident, the incident commander shall identify information to be provided to the media and local, state, and federal officials and shall complete the following tasks:

1. Identify the local policy for providing information to the media. (AHJ)
2. Identify the responsibilities of the public information officer and the liaison officer at a hazardous materials/WMD incident.
3. Describe the concept of a joint information center (JIC) and its application and use at a hazardous materials/WMD incident.

***605-8.5*** ***Competencies — Evaluating Progress***

***605-8.5.1*** ***Evaluating Progress of the Incident Action Plan***

Given scenarios involving hazardous materials/WMD incidents, the incident commander shall evaluate the progress of the incident action plan to determine whether the efforts are accomplishing the response objectives and shall complete the following tasks:

1. Identify the procedures for evaluating whether the response options are effective in accomplishing the objectives.
    a. Evaluate the effectiveness of the response based on:

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents.* Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

i. Are the IAP objectives being met?
ii. What problems have arisen?

b. Revise or modify the incident action plan based on identified needs
c. Reevaluate the effectiveness of the revised IAP
d. Continually monitor the effectiveness of the IAP

2. Identify the steps for comparing actual behavior of the material and the container to that predicted in the analysis process.

   Identifying and predicting material and container behavior can be done utilizing the General Hazardous Materials Behavior Model which includes identifying the following:

   a. Stress event
      i. Thermal stress
      ii. Mechanical stress
      iii. Chemical stress
   b. Breach event
      i. Disintegration
      ii. Runaway Cracking
      iii. Failure of Container Attachments
      iv. Container Punctures
      v. Container Splits or Tears
   c. Release event
      i. Detonation
      ii. Violent Rupture
      iii. Rapid Relief
      iv. Spills or Leaks
   d. Engulfing event
      i. Identify the hazardous material or the energy likely to engulf the area
      ii. What form is the energy or matter in?
      iii. What is making it move?
      iv. What path will it follow?
      v. What type of dispersion pattern will it create?
         a) Cloud
         b) Cone
         c) Plume
         d) Stream
         e) Irregular
   e. Impingement event (typically categorized based on duration)
      i. Harmful characteristics of material
      ii. Concentration of the hazardous material
      iii. Duration of the impingement
      iv. Characteristics of the exposure
   f. Harm event
      i. Thermal
      ii. Toxicity/poison

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents.* Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

iii. Radiation
iv. Asphyxiation
v. Corrosivity
vi. Etiological
vii. Mechanical

3. Determine the effectiveness of the following:
    a. Control, containment, or confinement operations
    b. Decontamination process
    c. Established control zones
    d. Personnel being used
    e. Personal protective equipment

4. Make modifications to the incident action plan as necessary.

### 605-8.5.2 *Transferring Command and Control Both During the Response Phase and the Post-Response Phase*

Given a scenario involving a hazardous materials/WMD incident, the emergency response plan, and standard operating procedures, the incident commander shall be able to identify the steps to be taken to transfer command and control of the incident

1. Transfer of Command briefings should include the following information
    a. Nature of the emergency
    b. Actions taken to stabilize and resolve the emergency
    c. Resource(s) status
    d. Name and amount of hazardous material(s) involved
    e. Hazards and risks that were mitigated and those that still exist
    f. Safety procedures
    g. Relevant documentation and points of contact
    h. Parties responsible for the spill
    i. Law enforcement agencies responsible for traffic control
    j. State, municipal, or other regulatory authority having jurisdiction

## *605-8.6 Competencies — Terminating the Incident*

### *605-8.6.1 Terminating Response Operations*

Given a scenario involving a hazardous materials/WMD incident in which the incident action plan objectives have been achieved, the hazardous materials incident commander shall describe the steps taken to terminate the incident consistent with the emergency response plan and/or standard operating procedures and shall complete the following tasks:

1. Identify the steps required for terminating the hazardous materials/WMD incident
    a. Conduct debriefings
    b. After action review or critique
    c. Post incident analysis

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents.* Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

d. Incident reporting/documentation

2. Identify the procedures for conducting incident debriefings at a hazardous materials/WMD incident
    a. Select a facilitator
    b. Inform responders of potential exposures
    c. Signs and symptoms of potential exposures
    d. Identify damaged equipment
    e. Identify expended supplies
    f. Identify equipment decontamination or disposal needs
    g. Identify unsafe site conditions
    h. Assign information gathering responsibilities
    i. Assess need for critical incident stress management (formerly CISD)
    j. Assign a point of contact

***605-8.6.2*** ***Conducting a Debriefing***

Given scenarios involving a hazardous materials/WMD incident, the incident commander shall conduct a debriefing of the incident and shall complete the following tasks:

An effective debriefing should address the following informational issues regarding response activities:

- Positive aspects – Identify strengths or things that went well that need to be maintained or continued
- Negative aspects – Identify weaknesses that went poorly and need to be corrected
- Unique aspects – Unusual or unsuspected conditions that may need to be addressed or planned for

1. Describe three components of an effective debriefing.
    a. Inform responders of the potential signs and symptoms of any possible hazardous materials exposures
    b. Identify:
        i. Damaged equipment
        ii. Expended supplies
        iii. Items that need to be disposed
        iv. Unsafe site conditions
    c. Assign:
        i. information gathering responsibilities for a post-incident analysis and critique
        ii. Point of contact for any follow up on incident related issues
    d. Assess the need for Critical Incident Stress Management (formerly CISD)

2. Describe the key topics in an effective debriefing.
    a. Health information
    b. Equipment and apparatus exposure review

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents.* Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

c. A follow-up contact person
d. Problems requiring immediate action
e. Thank you!

3. Describe when a debriefing should take place.
   a. As soon as the "emergency phase" of the incident is over
   b. Should be before any responders leave the scene

4. Describe who should be involved in a debriefing.
   a. Hazardous Materials Response Team
   b. Incident Commander
   c. Section Chiefs/Branch Directors/Division and Group Supervisors, etc.
   d. Information Officer
   e. Agency representatives or key players as determined by the Incident Commander (i.e. Safety Officer and Agency Liaisons)

5. Identify the procedures for conducting incident debriefings at a hazardous materials/WMD incident.

***605-8.6.3*** ***Conducting a Critique***

Given details of a scenario involving a multiagency hazardous materials/WMD incident, the incident commander shall conduct a critique of the incident and shall complete the following tasks:

1. Describe three components of an effective critique.
   a. Direction
   b. Participation
   c. Solutions

2. Describe who should be involved in a critique.
   a. Hazardous Materials Response Team
   b. Incident Commander
   c. Section Chiefs/Branch Directors/Division and Group Supervisors, etc.
   d. Information Officer
   e. Agency representatives or key players as determined by the Incident Commander (i.e. Safety Officer and Agency Liaisons)

3. Describe why an effective critique is necessary after a hazardous materials/WMD incident.
   a. Develop recommendations for improving the emergency response team
   b. Promotes systems-dependent operations rather than people-dependent organizations
   c. Promotes a willingness to cooperate through teamwork
   d. Promotes improvement of safe operating procedures

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents.* Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

e. Promotes sharing of information among emergency response organizations

4. Describe what written documents should be prepared as a result of the critique.
   a. Post-Critique Report
   b. Formal-Critique Report

5. Implement the procedure for conducting a critique of the incident.

***605-8.6.4*** ***Reporting and Documenting the Hazardous Materials/WMD Incident***

Given a scenario involving a hazardous materials/WMD incident, the incident commander shall demonstrate the ability to report and document the incident consistent with local, state, and federal requirements and shall complete the following tasks:

1. Identify the reporting requirements of the federal, state, and local agencies.
   a. Incident action plan and all components
   b. Site safety plan and all components
   c. Other documentation required by AHJ

2. Identify the importance of the documentation for a hazardous materials/WMD incident, including training records, exposure records, incident reports, and critique reports.

3. Identify the steps in keeping an activity log and exposure records for hazardous materials/WMD incidents.
   a. Activity log
      i. Record major event(s)
      ii. Record time major event(s) occurred
      iii. Briefly describe major event(s)
      iv. Additional information to include
         a) Information that may assist in the investigation or cost recovery process
         b) Task assignments
         c) Task completion
         d) Injuries and exposures
   b. Exposure records
      i. General information
         a) Name of exposed worker
         b) Personal ID number
         c) Assignment/station
         d) Incident date
         e) Incident number
         f) Incident location
      ii. Nature of incident
      iii. Level of personal protection

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents.* Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

iv. Emergency response activity
v. Exposure data
    a) Method of exposure
    b) Duration of exposure
vi. Medical treatment provided
    a) Signs and symptoms
    b) On-scene medical treatment
    c) Medical facility treatment
    d) Follow-up action required
vii. Medical treatment provided
    a) Comment section
    b) Individual's signature and date
    c) Officer's signature and date

4. Identify the requirements for compiling hazardous materials/WMD incident reports found in the emergency response plan or standard operating procedures.

5. Identify the requirements for filing documents and maintaining records found in the emergency response plan or standard operating procedures.

6. Identify the procedures required for legal documentation and chain of custody and continuity described in the standard operating procedures or the emergency response plan.

Reprinted with permission from NFPA 472-2013, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents.* Copyright © 2012, National Fire Protection Association, Quincy, MA 02169. This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented only by the standard in its entirety.

**Hazardous Materials Training**
**Equipment & Prop List**

The following are minimal recommended supplies necessary for hazardous materials training at the below listed levels of certification. Variations may exist based on the needs of each AHJ and any mission-specific job tasks as assigned by an AHJ.

## Hazardous Materials Awareness

Department of Transportation's *Emergency Response Guidebook* (ERG) (current ed.)
Material Safety Data Sheet (MSDS) or Safety Data Sheets (SDS) – Samples
Placards & Labels
Transportation/Shipping document – Sample
NFPA 704 sample
Safety Vests
Binoculars

## Hazardous Materials Operations

***All awareness equipment*** *plus…*
Structural Firefighter Protective Ensemble (bunker gear)

Reference Material:

- NIOSH *Pocket Guide to Chemical Hazards*
- NFPA *Hazardous Materials / Weapons of Mass Destruction Response Handbook* (current edition)
- Pesticide label example

Respiratory Protection to include:

- Air Purifying Respirator (APR-half mask)
- Air Purifying Respirator (APR-full face)
- SCBA

Chemical Protective Clothing to include:

- Vapor Protective CPC (Level A)
- Splash Protective Encapsulated CPC (Level B)
- Splash Protective Non-Encapsulated CPC (Level B, Level C)
- Chemical Boots (Rubber Boots for training only)
- Inner/Outer gloves - assorted types
- Chem Tape (duct tape for training only)

Fire Hose, Foam Nozzles and Eductors, Foam
Pictures/slides of various railcar, intermodal, and highway cargo trailers
Pictures/slides of bulk and non-bulk containers, and fixed facility containment systems

Defensive Spill Equipment:

- Absorbent/Adsorbent
- Broom/Shovel
- 5-gallon buckets
- Assortment of boom and pads

Decontamination Equipment:

- Poly sheeting or tarp
- Duct tape
- Traffic cone(s)
- Decon Pools
- Sprayer(s)
- Garden hose(s) and sprayer/nozzles
- 5-gallon bucket(s)
- Various Decon solution(s)
- Folding chairs
- Overpack drum

Various monitoring detection equipment as may be required. Examples *may* include:

- Combustible Gas Indicator
- Oxygen Meter
- Radiation Detector

**Hazardous Materials Operations – Mission Specific Competencies**

Equipment needed for training to Hazardous Materials Operations – Mission Specific Competencies will be based the competencies themselves and the authority having jurisdiction (AHJ). Equipment, at a minimum, will include that which is required to train to the Hazardous Materials Operations Level. Additional equipment or props may include part or all of the equipment listed below for Hazardous Materials Technician.

For example, if training to the Mission Specific Competencies: Air Monitoring and Sampling is to be performed, additional monitoring detection and sampling equipment will be required.

**Hazardous Materials Technician**

***Awareness and Operations equipment*** *plus…*

Reference Material:

- CPC Permeation Guides/Tables
- BOE/AAR *Field Guide to Railcar Identification*
- NFPA *Fire Protection Guide to Hazardous Materials Detection*
- Other printed or electronic publications/databases as may be required by the AHJ

Various monitoring detection equipment and corresponding samples to include:

- Combustible Gas Indicator
- Oxygen Meter
- Carbon monoxide meter
- Gas specific meter
- Photoionization detector
- Radiation Detectors (alpha, beta, gamma)
- Colorimetric tubes, pump
- Classifier/detection strips and reagents
- pH paper or pH meter
- additional monitoring and detection equipment as may be required by AHJ
- Calibration kit(s) as required for above

Leak & Spill Equipment:

- Plugging/patching supplies
- Leaking drum(s): metal & poly
- Overpack drum(s)
- Leak pipe simulator
- 150 lbs. Chlorine cylinder leak prop
    - Chlorine emergency kit type “A”
- Chlorine 1-Ton cylinder leak prop
    - Chlorine emergency kit type “B”
- Pressure Railcar dome leak prop
    - Chlorine emergency kit type “C” or Midland kit
- Cargo Tank Leak Simulator (MC-306/DOT-406 Dome)
- Dome Cover Clamp
- Grounding & Bonding Kit
- Product Transfer Equipment
- Misc. Hand Tools (e.g., hand wrenches, bung wrench, spanner wrench, mallet, screwdrivers, etc.)

Command and Control Equipment/Forms (e.g., Incident Action Plan, Site Safety Plan, Medical Plan, Communication Plan - all NIMS/ICS compliant)

**<u>Hazardous Materials Incident Commander</u>**

Reference Material

- Department of Transportation’s *Emergency Response Guidebook* (ERG) (current ed.)
- Material Safety Data Sheet (MSDS) or Safety Data Sheet (SDS) - Samples
- Transportation/Shipping document – Sample
- NIOSH *Pocket Guide to Chemical Hazards*

- NFPA *Hazardous Materials / Weapons of Mass Destruction Response Handbook* (current edition)
- CPC Permeation Guides/Tables
- BOE/AAR *Field Guide to Railcar Identification*
- NFPA *Fire Protection Guide to Hazardous Materials Detection*
- Other printed or electronic publications/databases as may be required by the AHJ

Command and Control Equipment/Forms

- Department of Homeland Security – National Incident Management System/Incident Command System standardized forms
    - ICS 201 Incident Briefing Form
    - ICS 202 Incident Objectives Worksheet
    - ICS 203 Organization Assignment List
    - ICS 204 Division Assignment List
    - ICS 205 Communications Plan
    - ICS 206 Medical Plan
    - ICS 208HM Site Safety and Control Plan
    - ICS 211 Incident Check-in List
    - ICS 213 General Message
    - ICS 214 Unit Log
    - ICS 215 Incident Planning Worksheet
    - ICS 215A Incident Action Plan Safety Analysis