CERTIFICATION CURRICULUM MANUAL

CHAPTER SIX

HAZARDOUS MATERIALS

NFPA 472, 2008 Edition

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Texas Commission on Fire Protection
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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

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

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

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, 5th edition. International Fire Service Training Association. (2008). Stillwater, OK: Fire Protection Publications, Oklahoma State University.

Firefighter's Handbook: Essentials of Firefighting and Emergency Response, 3rd edition. Delmar Publishers. (2008). Clifton Park, NY: Delmar, Cengage Learning.

Fundamentals of Fire Fighter Skills, 2nd edition. International Association of Fire Chiefs, & National Fire Protection Association. (2008). Sudbury, MA: Jones and Bartlett.

Hazardous Materials Awareness and Operations. DeBobes, L. J. (2009). Sudbury, MA: Jones & Bartlett.

Hazardous Materials for First Responders, 3rd edition. Adams, B., & Miller, L. A. (2004). Stillwater, OK: Fire Protection Publications, Oklahoma State University.

Hazardous Materials Handbook: Awareness and Operations Levels. Hawley, C., & Walter, A. (2008). Clifton Park, NY: Delmar, Cengage Learning.

Hazardous Materials/Weapons of Mass Destruction Response Handbook, 5th edition. Trebisacci, D. G. (2008). Quincy, MA: National Fire Protection Association.

*NFPA 472: Standard for Professional Competence of Responders to Hazardous Materials Incidents. (*2008 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.

Texts

Hazardous Materials Field Guide, 2nd edition. Bevelacqua, A. S., & Stilp, R. H. (2007). Albany, NY: Delmar Publications.

Symbol Seeker: Hazard Identification Manual. Burns, P. P. (2002). Preston, England: Symbol Seeker.

Media

DOT Chart 13: 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 2008. [DVD]. United States. (2008). 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.

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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
    b. EPA
    c. DOT
    d. Other

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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 emergency response plan, the standard operating procedures, 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 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

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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, 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.

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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 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.
    i. Class 1 — Explosives

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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.

ii. 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:
   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

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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 LC50 value of not more than 5000 ppm.

iii. 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 gasoline, methyl ethyl ketone, and ethyl alcohol.

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.

iv. Class 4 — Flammable Solids

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.

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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) comprises 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.

v. Class 5 — Oxidizers and Organic Peroxides

i. Division 5.1 (oxidizers) comprises materials that can, generally by yielding oxygen, cause or enhance the combustion of other materials.

ii. Division 5.2 (organic peroxides) comprises 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.

vi. 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.

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.

vii. 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.

viii. 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

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time. A liquid that has a severe corrosion rate on steel or aluminum is also a corrosive material.

ix. 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.

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

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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
      i. Health – blue color
      ii. Flammability – red color
      iii. Reactivity – yellow color
      iv. 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) and shipping papers for hazardous materials:
    a. Identify where to find MSDS.
    b. Identify major sections of an MSDS.
       i. Basic information that indicates hazardous materials
       ii. 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.
    d. Match the name of the shipping papers found in transportation (air, highway, rail, and water) with the mode of transportation.
       i. Air – air bill
       ii. Highway – Bill of Lading or freight bill
       iii. Water – dangerous cargo manifest
       iv. 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) the sight, sound, and odor of which indicate hazardous materials/WMD.
    a. Odors
    b. Gas leak

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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 building
    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
    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

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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
    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

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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***

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 and shall meet 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. Material Safety Data Sheets (MSDS)
    f. Facility documents

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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* and shall meet 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.
    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.

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

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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
        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. Sheltering in-place

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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)
    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 emergency response plan and/or standard operating procedures.

601-4.5 Competencies — Evaluating Progress

No competencies required at this level.

601-4.6 Competencies — Terminating the Incident

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No competencies required at this level.

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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. 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, 5th edition. International Fire Service Training Association. (2008). Stillwater, OK: Fire Protection Publications, Oklahoma State University.

Firefighter's Handbook: Essentials of Firefighting and Emergency Response, 3rd edition. Delmar Publishers. (2008). Clifton Park, NY: Delmar, Cengage Learning.

Fundamentals of Fire Fighter Skills, 2nd edition. International Association of Fire Chiefs, & National Fire Protection Association. (2008). Sudbury, MA: Jones and Bartlett.

Hazardous Materials Awareness and Operations. DeBobes, L. J. (2009). Sudbury, MA: Jones & Bartlett.

Hazardous Materials for First Responders, 3rd edition. Adams, B., & Miller, L. A. (2004). Stillwater, OK: Fire Protection Publications, Oklahoma State University.

Hazardous Materials Handbook: Awareness and Operations Levels. Hawley, C., & Walter, A. (2008). Clifton Park, NY: Delmar, Cengage Learning.

Hazardous Materials/Weapons of Mass Destruction Response Handbook, 5th edition. Trebisacci, D. G. (2008). Quincy, MA: National Fire Protection Association.

NFPA 472: Standard for Professional Competence of Responders to Hazardous Materials Incidents. (2008). Quincy, MA: NFPA Publications. National Fire Protection Association

NIOSH Pocket Guide to Chemical Hazards. Cincinnati National Institute for Occupational Safety and Health. (2005 or 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

DOT Chart 13: Hazardous Materials Marking, Labeling and Placarding Guide. United States. (2007). Washington, DC: U.S. Dept. of Transportation, Pipeline and Hazardous Materials Safety Administration.

Hazardous Materials Field Guide, 2nd edition. Bevelacqua, A. S., & Stilp, R. H. (2007). Albany, NY: Delmar Publications.

Symbol Seeker: Hazard Identification Manual. Burns, P. P. (2002). Preston, England: Symbol Seeker.

Media

Emergency Response Guidebook 2008. United States. (2008). [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* 2008 ed., the *TCFP Standards Manual*, and the *TCFP Certification Curriculum Manual.*

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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 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.

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

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

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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.

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:

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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 survey the incident to identify the containers and materials involved, determine whether hazardous materials/WMD have been released, and evaluate the surrounding conditions and shall meet 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

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)

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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
    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

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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 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.

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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
    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.

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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 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)
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

602-5.2.1.3 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

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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
14. Air returns

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

1. CHEMTREC
2. MSDS
3. Emergency Response Guides
4. Shipping Papers
5. Online or computer-based data/programs

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

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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 and shall meet 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

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

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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 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
      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 predict

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the likely behavior of the material or agent and its container and shall meet the following requirements:

1. Interpret 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)
        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.

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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
    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

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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
   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 estimate the potential harm within the endangered area at each incident and shall meet 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, estimate 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, identify 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 and shall meet the following requirements:

1. Given an analysis of a hazardous materials/WMD incident and the exposures, determine 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.

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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)
    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-radiological, chemical
    h. Class 8-thermal, chemical, mechanical
    i. Class 9-thermal, radiological, asphyxiation, chemical, etiological, mechanical

4. Assess 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

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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
    b. Per Medical Protocol

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

Given examples of hazardous materials/WMD incidents, including the name of the hazardous material/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 and shall meet 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***

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Given scenarios involving hazardous materials/WMD incidents, operations level responders shall identify when emergency decontamination is needed and shall meet the following requirements:

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 factors that should be considered in emergency decontamination.

6. Identify the 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 identify how to establish and enforce scene control, including control zones and emergency decontamination, and communications between responders and to the public and shall meet 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. Sheltering-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

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iii. Description of site
iv. Task(s) to be performed
v. Length of time for task(s)
vi. Required personnel protective clothing
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 initiate the incident command system specified in the emergency response plan and/or standard operating procedures and shall meet 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:

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a) Deviations from the incident safety plan
b) Dangerous or unsafe activities

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***

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 evaluate the status of the actions taken in accomplishing the response objectives and shall meet the following requirements:

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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 communicate the status of the planned response through the normal chain of command and shall meet the following requirements:

1. Identify the methods for communicating 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)**

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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, 5th edition. International Fire Service Training Association. (2008). Stillwater, OK: Fire Protection Publications, Oklahoma State University.

Fire Fighter's Handbook of Hazardous Materials, 7th edition. Baker, Charles T., (2006). Sudsbury, MA: Jones and Bartlett.

Firefighter's Handbook: Essentials of Firefighting and Emergency Response, 3rd edition. Delmar Publishers. (2008). Clifton Park, NY: Delmar, Cengage Learning.

Fundamentals of Fire Fighter Skills, 2nd edition. International Association of Fire Chiefs, & National Fire Protection Association. (2008). Sudbury, MA: Jones and Bartlett.

Hazardous Materials Awareness and Operations. DeBobes, L. J. (2009). Sudbury, MA: Jones & Bartlett.

Hazardous Materials for First Responders, 3rd edition. Adams, B., & Miller, L. A. (2004). Stillwater, OK: Fire Protection Publications, Oklahoma State University.

Hazardous Materials: Managing the Incident. Chester Noll, G. G., Hildebrand, M. S., & Yvorra, J. G. (2005). MD: Red Hat Publishing, Inc.

Hazardous Materials/Weapons of Mass Destruction Response Handbook, 5th edition. Trebisacci, D. G. (2008). Quincy, MA: National Fire Protection Association.

*NFPA 472: Standard for Professional Competence of Responders to Hazardous Materials Incidents. (*2008). 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.

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

CHRIS: Chemical Hazards Response Information System. United States. (1992). COMDTINST, M16465.11B. Washington, DC: U.S. Dept. of Transportation, U.S. Coast Guard.

Emergency Action Guides. Association of American Railroads. (2006). Pueblo, CO: Association of American Railroads.

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. (2009). Washington, DC: Association of American Railroads.

Field Guide to Tank Car Identification. Association of American Railroads. (2009). Washington, DC: Association of American Railroads.

Fire Protection Guide to Hazardous Materials. National Fire Protection Association. (2001). Quincy, MA: National Fire Protection Association.

Hawley's Condensed Chemical Dictionary. Lewis, R. J., & Hawley, G. G. (2007). West Sussex: Wiley.

Hazardous Materials Air Monitoring and Detection Devices. Hawley, C. (2002). Albany, NY: Delmar/Thomson Learning.

Hazardous Materials Field Guide, 2nd edition. Bevelacqua, A. S., & Stilp, R. H. (2007). Albany, NY: Delmar Publications.

Hazardous Materials: Managing the Incident Field Operations Guide. Chester Bevelacqua, A. S., Hildebrand, M. S., & Noll, G. G. (2005). MD: Red Hat Publishing, Inc.

How to Use the Chlorine Institute Emergency Kit "A" for 100 lb. and 150 lb. Chlorine Cylinders. Chlorine Institute. (1996). New York. NY: The Chlorine Institute.

How to Use the Chlorine Institute Emergency Kit “B” for Chlorine Ton Containers. Chlorine Institute. (1988). New York, NY: The Chlorine Institute.

How to Use the Chlorine Institute Emergency Kit "C" for Chlorine Tank Cars and Tank Trucks. Chlorine Institute. (1993). New York, NY: The Chlorine Institute.

Symbol Seeker: Hazard Identification Manual. Burns, P. P. (2002). Preston, England: Symbol Seeker.

Media

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 603
HAZARDOUS MATERIALS OPERATIONS - MISSION SPECIFIC COMPETENCIES CURRICULUM OUTLINES

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

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	
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**

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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**
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**

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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 Consensus Standards	1
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**

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

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SECTION 603

HAZARDOUS MATERIALS OPERATIONS

MISSION SPECIFIC COMPETENCIES

Hazardous Materials Operations – Mission Specific Competencies are optional job performance requirements (JPRs) which may be adopted by the authority having jurisdiction (AHJ). These JPRs may 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.

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 Ed., the *TCFP Standards Manual* and the *TCFP Curriculum Manual*.

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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

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.

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.

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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 of personal protective equipment at hazardous materials/WMD incidents.

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.

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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, 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 and shall meet the following requirements:

1. Describe the types of protective clothing and 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

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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 and shall meet the following requirements:

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

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

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shall identify and complete the reporting and documentation requirements consistent with 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.

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:

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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, 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 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.

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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 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 complete the reporting and documentation requirements consistent with the emergency response plan or standard operating procedures and shall meet the following requirements:

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***

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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.

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.

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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, 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 and shall meet the following requirements:

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.

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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 and shall meet the following requirements:

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

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Given a scenario involving a hazardous materials/WMD incident, the operations level responder assigned to technical decontamination operations shall complete the reporting and documentation requirements consistent with the emergency response plan or standard operating procedures and shall meet the following requirements:

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***

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

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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.

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 and shall meet 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:

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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(s) 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

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 be capable of identifying the unique aspects associated with illicit laboratories, hazardous materials/WMD incidents, and environmental crimes and shall meet 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 to secure, characterize, and preserve 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.

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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.
   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.

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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 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***

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

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preservation and sampling shall implement or oversee the implementation of the selected response actions safely and effectively and shall meet the following requirements:

1. Secure, characterize, and preserve the scene.
2. Document personnel and scene activities associated with the incident.
3. Describe whether the responders are within their legal authority to perform evidence preservation and sampling tasks.
4. Notify the agency with investigative authority.
5. Notify the EOD personnel.
6. Identify potential samples and evidence to be collected.
7. Demonstrate the procedures to protect samples and evidence from secondary contamination.
8. Demonstrate the correct techniques to collect samples utilizing the equipment provided.
9. Demonstrate the documentation procedures.
10. Demonstrate the sampling protocols.
11. Demonstrate field screening protocols for samples and evidence collected.
12. Demonstrate evidence labeling and packaging procedures.
13. Demonstrate evidence decontamination procedures.
14. Demonstrate evidence packaging procedures for evidence transportation.

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***

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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)***

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

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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 and shall meet 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***

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 and shall meet 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
    c. Fluoroprotein
    d. High-expansion foam

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

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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:
    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***

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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***
The operations level responder assigned to perform air monitoring and sampling shall identify the local procedures for selecting personal protective equipment to support air monitoring and sampling at hazardous materials/WMD incidents.

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***

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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.

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

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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***

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.

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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 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

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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***

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.

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***

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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

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.

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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 and shall meet the following related requirements:

1. Illicit laboratories can be designed to produce many different products including:
    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 drug manufacturing methods, describe the operational considerations, hazards, and products involved in the illicit process.

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

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

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

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6. 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
    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

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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 and shall meet the following requirements:

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.

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

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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.

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 demonstrate methods of identifying the following during reconnaissance operations:

1. The potential manufacture of illicit drugs

2. The potential manufacture of illicit WMD materials

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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 be able to 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)***

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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 Action Guides. Association of American Railroads. (2006). Pueblo, CO: Association of American Railroads.

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

Fire Fighter's Handbook of Hazardous Materials, 7th edition. Baker, Charles T., (2006). Sudsbury, MA: Jones and Bartlett.

Hazardous Materials: Managing the Incident. Chester Noll, G. G., Hildebrand, M. S., & Yvorra, J. G. (2005). MD: Red Hat Publishing, Inc.

Hazardous Materials/Weapons of Mass Destruction Response Handbook Trebisacci, D. G. (2008). 5th edition. Quincy, MA: National Fire Protection Association.

*NFPA 472: Standard for Professional Competence of Responders to Hazardous Materials Incidents. (*2008 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.

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

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. New Cheremisinoff, N. P., King, J. A., & Boyko, R. (1994). York, NY: M. Dekker.

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

Emergency Handling of Hazardous Materials in Surface Transportation. Association of American Railroads. (2009). Washington, DC: Association of American Railroads.

Field Guide to Tank Car Identification. Association of American Railroads. (2009). Washington, DC: Association of American Railroads.

Fire Protection Guide to Hazardous Materials. National Fire Protection Association. (2001). Quincy, MA: National Fire Protection Association.

Hawley's Condensed Chemical Dictionary. Lewis, R. J., & Hawley, G. G. (2007). West Sussex, England: Wiley.

Hazardous Materials Air Monitoring and Detection Devices. Hawley, C. (2002). Albany, NY: Delmar/Thomson Learning.

Hazardous Materials Field Guide, 2nd edition. Bevelacqua, A. S., & Stilp, R. H. (2007). Albany, NY: Delmar Publications.

Hazardous Materials: Managing the Incident Field Operations Guide. Chester Bevelacqua, A. S., Hildebrand, M. S., & Noll, G. G. (2005). MD: Red Hat Publishing, Inc.

How to Use the Chlorine Institute Emergency Kit "A" for 100 lb. and 150 lb. Chlorine Cylinders. Chlorine Institute. (1996). New York. NY: The Chlorine Institute.

How to Use the Chlorine Institute Emergency Kit “B” for Chlorine Ton Containers. New Chlorine Institute. (1988). York, NY: The Chlorine Institute.

How to Use the Chlorine Institute Emergency Kit "C" for Chlorine Tank Cars and Tank Trucks. Chlorine Institute. (1993). New York, NY: The Chlorine Institute.

Symbol Seeker: Hazard Identification Manual. Burns, P. P. (2002). Preston, England: Symbol Seeker.

Media

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.

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	2
604-7.2	Analyzing the Incident	28
604-7.3	Planning the Response	24
604-7.4	Implementing the Planned Response	56
604-7.5	Evaluating Progress	4
604-7.6	Terminating the Incident	6
	TOTAL RECOMMENDED HOURS	**120**

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

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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

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

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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 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

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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, determine the concentration of hazardous materials, and shall meet 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

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

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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 (DOT Specification 51; 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

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:

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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

604-7.2.1.2 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

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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
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

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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

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

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8. Gas chromatograph/mass spectrometer (GC/MS)

9. Infrared spectroscopy

10. Ion mobility spectroscopy

11. Mass channel analyzer

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 the following monitoring equipment, test strips, and reagents, 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 pH meters

7. Photoionization and flame ionization detectors

8. Radiation detection instruments

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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

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)

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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. ARR General Handling of Hazardous Materials in Surface Transportation
   d. Field Guide to Tank Guide Identification
   e. Bretherick's Handbook of Reactive Substances
   f. Emergency Care for Hazardous Materials Exposure
   g. Hawley's Condensed Chemical Dictionary
   h. NIOSH Pocket Guide
   i. CHRIS Chemical Hazards Response Information System (USCG)
   j. Dangerous Properties of Industrial Chemicals
   k. 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

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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. Acid, caustic
2. Air reactivity
3. Autorefrigeration
4. Biological agents and biological toxins
5. Blood agents
6. Boiling point
7. Catalyst
8. Chemical change
9. Chemical interactions
10. Compound, mixture
11. Concentration
12. Critical temperature and pressure
13. Dissociation and corrosivity
14. Dose
15. Dose response
16. Expansion ratio
17. Fire point

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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
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

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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

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

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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.***

Given examples of container damage, the hazardous materials technician shall describe the damage and shall meet 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

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

f. Low pressure chemical 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
      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

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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 (DOT Specification 51; 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
    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

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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
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

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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

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. Material Safety Data Sheets

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

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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:

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 and shall meet 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:

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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)
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

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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

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

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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 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

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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

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

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response options specified in the incident action plan in each situation and shall meet the requirements of 7.3.3.1 through 7.3.3.4.7

604-7.3.3.1 The hazardous materials technician shall identify and describe the four levels of personal protective equipment as specified by the Environmental Protection Agency (EPA) and the National Institute for Occupational Safety and Health (NIOSH)

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

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

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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

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

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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
    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

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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
    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

604-7.3.4 ***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

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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. 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 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, and shall meet 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

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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

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

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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

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

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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
    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

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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***

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

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:

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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

604-7.4.2 ***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 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

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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 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

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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*.**
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*

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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 and shall meet 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
    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

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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
   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

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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 requirements consistent with the emergency response plan or standard operating procedures and shall meet the following requirements:

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

2. Demonstrate completion of the reports required by the emergency response plan or standard operating procedures
   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)

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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
        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

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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 Action Guides. Association of American Railroads. (2006). Pueblo, CO: Association of American Railroads.

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

Fire Fighter's Handbook of Hazardous Materials, Baker, Charles T., 7th edition. (2006). Sudsbury, MA: Jones and Bartlett.

Hazardous Materials: Managing the Incident. Chester Noll, G. G., Hildebrand, M. S., & Yvorra, J. G. (2005). MD: Red Hat Publishing Company, Inc.

Hazardous Materials/Weapons of Mass Destruction Response Handbook, 5th edition. Trebisacci, D. G. (2008). Quincy, MA: National Fire Protection Association.

*NFPA 472: Standard for Professional Competence of Responders to Hazardous Materials Incidents. (*2008 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.

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

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. (2009). Washington, DC: Association of American Railroads.

Fire Protection Guide to Hazardous Materials. National Fire Protection Association. (2001). Quincy, MA: National Fire Protection Association.

Hazardous Materials: Managing the Incident: Field Operations Guide. Chester Bevelacqua, A. S., Hildebrand, M. S., & Noll, G. G. (2007). MD: Red Hat Publishing, Inc.

Hawley's Condensed Chemical Dictionary. Lewis, R. J., & Hawley, G. G. (2007). West Sussex, England: Wiley.

Symbol Seeker: Hazard Identification Manual. Burns, P. P. (2002). Preston, England: Symbol Seeker.

Media

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.

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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.

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.

605-8.1.1.3 The incident commander shall receive any additional training necessary to meet applicable governmental occupational health and safety regulations.

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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 at this level 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 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/unified command, 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
    c. Provide a focal point for information transfer to media and local elected officials through the incident command system structure

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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 collect and interpret hazard and response information not available from the current edition of the DOT *Emergency Response Guidebook* or an MSDS.

605-8.2.1.2 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
    h. Chemical test strips

3. Reference manuals
    a. DOT Emergency Response Handbook
    b. ARR Hazardous Materials Emergency Action Guides

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c. ARR General Handling of Hazardous Materials in Surface Transportation
d. Field Guide to Tank Guide Identification
e. Bretherick's Handbook of Reactive Substances
f. Emergency Care for Hazardous Materials Exposure
g. Hawley's Condensed Chemical Dictionary
h. NIOSH Pocket Guide
i. CHRIS Chemical Hazards Response Information System (USCG)
j. Dangerous Properties of Industrial Chemicals
k. 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 specialist

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
   c. Infectious dose
   d. Lethal concentrations (LC_{50})
   e. Lethal dose (LD_{50})

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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)

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
   d. Routes of exposure
      i. Inhalation
      ii. Ingestion
      iii. Absorption
      iv. Injection
   e. Synergistic effects

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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
    b. Adsorption
    c. Blanketing
    d. Covering
    e. Damming
    f. Diking
    g. Dilution
    h. Dispersion
    i. Diversion

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j. Fire suppression
k. 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
l. Overpacking
m. Patching
n. Plugging
o. Pressure isolation and reduction (flaring; venting; vent and burn; isolation of valves, pumps, or energy sources)
p. Retention
q. Solidification
r. Transfer
s. 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
      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:

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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
      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

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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
            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

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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 agency 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)
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)

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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

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

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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

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

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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

2. Adsorption

3. Chemical degradation

4. Dilution

5. Disinfection

6. Evaporation

7. Isolation and disposal

8. Neutralization

9. Solidification

10. Sterilization

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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***

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), and shall meet 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.

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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

6. Identify the elements of the incident management system 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
         a) Hazardous Materials Branch or Group
            1) 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)

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(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

2) 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
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

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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
      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

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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 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:
        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

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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
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.

605-8.6 Competencies — Terminating the Incident

605-8.6.1 Transferring Command and Control

Given a scenario involving a hazardous materials/WMD incident, the emergency response plan, and standard operating procedures, the incident commander shall

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be able to identify the steps to be taken to transfer command and control of the incident and shall be able to demonstrate the transfer of command and control.

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 Debriefing (CISD)

2. Describe the key topics in 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

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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
   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:

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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
        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.

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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.

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